

Current Titles in Soil Science

- Abd El-Hady, A. M.; Rognon, P.; Escadafal, R.; et al.** Contribution of Landsat data (MSS) to soil survey; application to the soil of southwestern Sinai, (Egypt): International Journal of Remote Sensing, 12(5), p. 1053-1061, illus. (incl. sketch maps), 1991.
- Abrahams, Athol D.; and Parsons, Anthony J.** Relation between infiltration and stone cover on a semiarid hillslope, southern Arizona: Journal of Hydrology, 122(1-4), p. 49-59, illus. (incl. 1 table), 1991.
- Addiscott, T. M.; and Whitmore, A. P.** Simulation of solute leaching in soils of differing permeabilities: Soil Use and Management, 7(2), p. 94-102, illus. (incl. 2 tables), 1991.
- Adrian, B. M.; Arbogast, Belinda F.; Detra, D. E.; et al.** Direct-current arc emission spectrographic method for the semiquantitative analysis of rock, stream-sediment, soil, and heavy-mineral-concentrate samples: *in* Quality assurance manual for the Branch of Geochemistry, U.S. Geological Survey (Arbogast, Belinda F., editor), Open-File Report - U. S. Geological Survey, p. 100-106, 4 tables, 1990. (Rep. No. OF 90-0668) available from: U. S. Geol. Surv., Denver, CO, United States.
- Agassi, M.; and Levy, G. J.** Stone-cover and rain intensity; effects on infiltration, erosion and water splash: Australian Journal of Soil Research, 29(4), p. 565-575, illus. (incl. 3 tables), 1991.
- Agbu, Patrick A.; and Olson, Kenneth R.** Spatial variability of soil properties in selected Illinois Mollisols: Soil Science, 150(5), p. 777-786, 5 tables, sketch map, 1990.
- Ahmad, A. R.; and Nye, P. H.** Coupled diffusion and oxidation of ferrous iron in soils; I, Kinetics of oxygenation of ferrous iron in soil suspension: Journal of Soil Science, 41(3), p. 395-409, illus. (incl. 1 table), 1990.
- Ahmad, Nisar; Qaiser, M. A.; and Amin, M.** Comparative evaluation of laterite deposits of Pakistan: Pakistan Journal of Scientific and Industrial Research, 33(7), p. 265-267, illus. (incl. 3 tables), 1990.
- Ahmed, Hassan; and Maswood, M.** Void ratio and porosity of the bank soil around Maijan and Mathola, Dibrugarh District, Assam: Journal of the Geological Society of India, 35(4), p. 404-407, 1 table, sketch maps, 1990.
- Akhtar, K.; and Ahmad, A. H. M.** Single-cycle cratonic quartzarenites produced by tropical weathering; the Nimar Sandstone (Lower Cretaceous), Narmada Basin, India: Sedimentary Geology, 71(1-2), p. 23-32, illus. (incl. 4 tables, strat. col., geol. sketch map), 1991.
- Al-Kanani, T.; Barthakur, N. N.; and Hussien, A. J.** Evaluation of potassium quantity-intensity relationships in Calcareous soils: *in* Neutron probe standards; transport shields or a large drum of water? (Hodnett, M. G.; et al.), Soil Science, 151(2), p. 167-173, illus. (incl. 2 tables), 1991.
- Aldridge, L. P.; and Churchman, G. J.** The role of iron in the weathering of a climosequence of soils derived from schist: Australian Journal of Soil Research, 29(3), p. 387-398, illus. (incl. 5 tables), 1991.
- Alegre, Julio C.; Felipe-Morales, Carmen; and La Torre, Braulio.** Soil erosion studies in Peru: Journal of Soil and Water Conservation, 45(3), p. 417-420, illus. (incl. 9 tables), 1990.
- Aleksandrovskiy, A. L.; Targul'yan, V. O.; Cherkinskii, A. Ye.; et al.** New data on the age and evolution of Sod-Podzolic soils of the central Russian Plain: Soviet Soil Science, 23(3), p. 1-5, illus. (incl. 1 table), 1991.
- Allen, B. L.** Mineralogy of Aridisols: *in* Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers (Kimble, J. M., editor; et al.), Proceedings - International Soil Correlation Meeting (ISCOM), 4, p. 191-196, 1 table, 1990.

- Allen, William Jeffrey.** Soil survey of Wakulla County, Florida: 163 p., illus. (incl. 19 tables; colored soils map 1:190,080; soils maps 1:24,000), 1991. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Univ. Fla., Inst. Food and Agric. Sci., Agric. Exp. Stn., and Soil Sci. Dep.; Fla. Dep. Agric. and Consum. Serv.; and U. S. Dep. Agric., For. Serv.).
- Alloway, B. J.** Soil processes and the behaviour of metals: *in* Heavy metals in soils (Alloway, B. J., editor), p. 7-28, illus. (incl. 7 tables), Blackie and Son, Glasgow, United Kingdom, John Wiley & Sons, Somerset, NJ, United States, 1990.
- Alonso Zarza, A. M.; Calvo, J. P.; Wright, V. P.; et al.** Paleosuelos y sedimentacion continental; aplicacion al analisis de cuencas [Paleosols and continental sedimentation; application to basin analysis]: *in* I congreso del Grupo Espanol del Terciario (Colombo, F., editor; *et al.*), Congreso del Grupo Espanol del Terciario, p. 11-14, 1991.
- Altunin, V. S.; Zubkova, N. G.; and Yankovskaya, L. B.** Hydraulic resistances of river and canal channels in noncohesive soils: Water Resources, 17(1), p. 48-52, illus. (incl. 1 table), 1990.
- Alva, A. K.; and Sumner, M. E.** Effects of concentration of supporting solution on soil solution aluminum in variable charge soils: Soil Science, 150(3), p. 622-629, illus. (incl. 3 tables), 1990.
- Ambles, A.; Jacquesy, J. C.; Jambu, P.; et al.** Polar lipid fraction in soil; a kerogen-like matter: Organic Geochemistry, 17(3), p. 341-349, illus. (incl. 4 tables), 1991.
- Ambrose, Stanley H.; and Sikes, Nancy E.** Soil carbon isotope evidence for Holocene habitat change in the Kenya Rift valley: Science, 253(5026), p. 1402-1405, illus. (incl. sketch map), 1991.
- Amer, F.; Saleh, M. E.; and Mostafa, H. E.** Phosphate behavior in submerged Calcareous soils: Soil Science, 151(4), p. 306-311, illus. (incl. 3 tables), 1991.
- Amirebrahimi, Amir Mohammad.** An equivalent homogeneous model for discretely drained soil stratum: 146 p., Doctoral, 1991, University of California, Davis, Davis, CA. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Amouric, M.; Parc, S.; and Nahon, D.** High-resolution transmission electron microscopy study of Mn-oxyhydroxide transformations and accompanying phases in a lateritic profile of Moanda, Gabon: Clays and Clay Minerals, 39(3), p. 254-263, 1 table, charts, 1991.
- Amrhein, C.; and Suarez, D. L.** Sodium-calcium exchange with anion exclusion and weathering corrections: Soil Science Society of America Journal, 55(3), p. 698-706, illus. (incl. 2 tables), 1991.
- Anderson, M. A.; Zelazny, L. W.; and Bertsch, P. M.** Fluoro-aluminum complexes on model and soil exchangers: Soil Science Society of America Journal, 55(1), p. 71-75, illus. (incl. 6 tables), 1991.
- Ando, Y.** Regionalization of parameters using basin geology, land use, and soil type for use in a storm rainfall-runoff relationship: *in* Regionalization in hydrology (Beran, M. A., editor; *et al.*), IAHS-AISH Publication, 191, p. 211-218 (incl. French sum.), illus. (incl. 3 tables, sketch maps), 1990. *An international symposium.*
- Andraski, B. J.** Rubber-balloon and drive-core sampling for determining bulk density of an alluvial Desert soil [abstr.]: *in* American Society of Agronomy, Crop Science Society of America, Soil Science Society of America; proceedings of the 1990 annual meetings, Agronomy Abstracts, 1990, p. 208, 1990.
- Andraski, B. J.** Balloon and core sampling for determining bulk density of alluvial desert soil: Soil Science Society of America Journal, 55(4), p. 1188-1190, illus. (incl. 2 tables), 1991.
- Andronikov, V. L.** Pervaya pochvennaya karta RSFSR [First soil map of the Russian Republic]: Priroda, 1990(7), p. 89, 1990.
- Angino, E. E.; Zeller, E. J.; Dreschhoff, G. A. M.; et al.** Spatial distribution of hydrogen in soil gas in central Kansas, U.S.A.: *in* Geochemistry of gaseous elements and compounds (Durrance, E. M.; *et al.*), p. 485-493, illus. (incl. 1 table, geol. sketch map), Theophrastus Publ., Athens, Greece, 1990.
- Anonymous.** Transport processes in the soil: Sept. 1989, United Kingdom. Journal of Soil Science, 41(4), p. 613-675, 1990.
- Aragonese, Francisco Jose; and Garcia-Gonzalez, Maria Teresa.** High-charge smectite in Spanish "Rana" soils: Clays and Clay Minerals, 39(2), p. 211-218, 3 tables, charts, 1991.
- Archer, Warren M.** Soil survey of Storey County area, Nevada: 291 p., illus. (incl. 73 tables, sketch map; soils maps 1:24,000; colored soils map 1:190,080; index map 1:190,080), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States.

- Aredes, Sonia; and Nicholson, Keith.** Ammonia in soil; a new technique in geothermal exploration: *in* Transactions, 1990 International symposium on geothermal energy (Combs, Jim, chairperson), Transactions - Geothermal Resources Council, 14(1-2), p. 1371-1375, illus. (incl. 1 table, geol. sketch maps), 1990. *Geothermal Resources Council 1990 annual meeting*.
- Arnalds, Olafur.** Characterization and erosion of Andisols in Iceland: 192 p., Doctoral, 1990, Texas A&M University, College Station, TX. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Arnold, J. G.; Williams, J. R.; Nicks, A. D.; et al.** SWRRB; a basin scale simulation model for soil and water resources management: 142 p., illus. (incl. 25 tables), Tex. A&M Univ. Press, College Station, TX, United States, 1990.
- Arnold, Richard W.** Processes that affect soil morphology: *in* Soils on a warmer Earth; effects of expected climate change on soil processes, with emphasis on the tropics and sub-tropics (Scharpenseel, H. W., editor; *et al.*), Developments in Soil Science, 20, p. 31-38, illus., 1990. *International workshop*.
- Arshad, Muhammad; and Frankenberger, W. T., Jr.** Effects of soil properties and trace elements on ethylene production in soils: Soil Science, 151(5), p. 377-386, illus. (incl. 3 tables), 1991.
- Arustamyants, Ye. I.; and Kryuchkova, A. V.** Determining the maximum dispersal of soil aggregates: Soviet Soil Science, 22(6), p. 115-118, illus. (incl. 2 tables), 1990.
- Asadu, C. L. A.** A comparative characterization of two foot-slope soils in the Nsukka area of eastern Nigeria: Soil Science, 150(2), p. 527-534, illus. (incl. 5 tables), 1990.
- Asolekar, S. R.; Valentine, R. L.; and Schnoor, J. L.** Kinetics of chemical weathering in B horizon Spodosol fraction: Water Resources Research, 27(4), p. 527-532, illus. (incl. 1 table), 1991.
- Atputhanathan, C. S.; Gunawardena, E. R. N.; and Rushton, K. R.** Soilwater dynamics related to waterlogging in a sloping catchment: Journal of Hydrology, 123(3-4), p. 279-295, illus. (incl. 1 table, sketch maps), 1991.
- Autry, Andrew Randolph.** Sulfur accumulation by forest soils in response to increasing sulfate input: 237 p., Doctoral, 1990, University of Georgia, Athens, GA. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Avery, B. W.** Soils of the British Isles: 463 p., illus. (incl. 187 tables, 4 plates, sects.), CAB Int., Wallingford, Oxon, United Kingdom, 1990.
- Babajimopoulos, C.** A Douglas-Jones predictor-corrector program for simulating one-dimensional unsaturated flow in soil: Ground Water, 29(2), p. 267-270, illus., 1991.
- Bache, Bryon W.** Solute transport in soils: *in* Process studies in hillslope hydrology (Anderson, M. G., editor; *et al.*), p. 437-462, illus. (incl. 3 tables), John Wiley and Sons, Chichester, United Kingdom, 1990.
- Bagina, O. L.; Karpachevskiy, L. O.; Kashinskaya, I. V.; et al.** Magnetoviscous properties of ash soils of Kamchatka and their use for dating: Soviet Soil Science, 22(5), p. 109-118, illus. (incl. 3 tables), 1990.
- Bahadur, Rakesh.** Multicomponent solute transport and nitrogen transformation model for soil-aquifer system: 197 p., Doctoral, 1990, Colorado State University, Fort Collins, CO. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Bai Jingling; Zhang Yiping; Zhao Gaoxia; et al.** Research on energetic and pyrolytic characteristics of humic acid from several principal soils in Shensi: Acta Pedologica Sinica = T'u Jang Hsueh Pao, 27(2), p. 151-158 (Chinese, incl. English sum.), 4 tables, charts, 1990.
- Bailey, Nathaniel Oliver.** Solute flux into porous cup samplers near the water table: 259 p., Doctoral, 1990, Cornell Univ., Ithaca, NY. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Bain, D. C.; Mellor, A.; and Wilson, M. J.** Nature and origin of an aluminous vermiculitic weathering product in acid soils from upland catchments in Scotland: Clay Minerals, 25(4), p. 467-475, illus. (incl. 1 table, sketch map), 1990.
- Baker, D. E.** Areas of acidic, neutral and alkaline soil groups in humid Queensland: Proceedings of the Royal Society of Queensland, 101, p. 101-108, illus. (incl. 4 tables), 1991.
- Baker, John M.** Measurement of soil water content: *in* Instrumentation for studying vegetation canopies for remote sensing in optical and thermal infrared regions (Goel, Narendra S., editor; *et al.*), Remote Sensing Reviews, 5(1), p. 263-279, illus. (incl. 2 tables), 1990.
- Ballantyne, Colin K.** Late Holocene erosion in upland Britain; climate deterioration or human influence?: The Holocene, 1(1), p. 81-85, illus. (incl. sect.), 1991.

- Banerji, P. K.** REE dispersion in some laterites as a framework of Quaternary tectonic and climatic records: *Indian Minerals*, 44(4), p. 243-286, illus. (incl. 13 tables, 1 plate, strat. cols., sketch map), 1990.
- Banfield, Jillian F.; Jones, Blair F.; and Veblen, David R.** An AEM-TEM study of weathering and diagenesis, Abert Lake, Oregon; I, Weathering reactions in the volcanics: *Geochimica et Cosmochimica Acta*, 55(10), p. 2781-2793, illus. (incl. 2 tables, geol. sketch map), 1991.
- Banfield, Jillian F.; Jones, Blair F.; and Veblen, David R.** An AEM-TEM study of weathering and diagenesis, Abert Lake, Oregon; II, Diagenetic modification of the sedimentary assemblage: *Geochimica et Cosmochimica Acta*, 55(10), p. 2795-2810, illus. (incl. geol. sketch map), 1991.
- Bansal, O. P.** Potassium-calcium exchange in an illitic Entisol and some thermodynamic studies: *Journal of the Indian Society of Soil Science*, 38(2), p. 196-200, illus. (incl. 1 table), 1990.
- Banton, O.; Cote, D.; and Trudelle, M.** Determination au champ de la conductivite hydraulique saturée a l'aide de l'infiltrometre a charge constante de Cote; theorie et approximations mathematiques [Determination in the field of saturated hydraulic conductivity using the Cote constant head infiltrometer; theory and mathematical approximations]: *Canadian Journal of Soil Science*, 71(1), p. 119-126 (incl. English sum.), illus. (incl. 1 table), 1991.
- Bar-Tal, Asher; Sparks, Donald L.; Pesek, John D.; et al.** Analyses of adsorption kinetics using a stirred-flow chamber; I, Theory and critical tests: *Soil Science Society of America Journal*, 54(5), p. 1273-1278, illus., 1990.
- Bardossy, G.; and Aleva, G. J. J.** Lateritic bauxites: Developments in Economic Geology, 27, 264 p., 1990.
- Barnes, James R.** Soil survey of Warren County, Indiana: 323 p., illus. (incl. 19 tables; colored soils map 1:190,080; soils maps 1:15,840), 1990. available from: U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Purdue Univ., Agric. Exp. Stn.; and Indiana Dep. Nat. Resour., State Soil Conserv. Board and Div. Soil Conserv.).
- Barnhardt, Michael L.; and Kunken, Darrell J.** Identifying buried soils and geomorphic surfaces on floodplains: *Journal of the Tennessee Academy of Science*, 66(3), p. 89-93, illus. (incl. sketch map), 1991.
- Barnhill, William L.** Soil survey of Pender County, North Carolina: 150 p., illus. (incl. 18 tables, sketch map; soils maps 1:24,000; colored soils map 1:253,440; index map 1:253,440), 1990. available from: U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with N.C. Dep. Nat. Resour. and Commun. Dev., N.C. Agric. Res. Serv., N.C. Agric. Ext. Serv. and Pender Cty. Board Comm.).
- Barry, P. V.; Stott, D. E.; Turco, R. F.; et al.** Organic polymers' effect on soil shear strength and detachments by single raindrops: *Soil Science Society of America Journal*, 55(3), p. 799-804, illus. (incl. 2 tables), 1991.
- Bartenfelder, D. C.; and Karathanasis, A. D.** Quartz thermal activation energy as a tool in locating lithological discontinuities in Kentucky soils (U.S.A.): *Geoderma*, 48(1-2), p. 17-30, illus. (incl. 2 tables, sketch map), 1991.
- Bartoli, F.; Burtin, G.; and Herbillon, A. J.** Disaggregation and clay dispersion of Oxisols; Na resin, a recommended methodology: *Geoderma*, 49(3-4), p. 301-317, 1991.
- Bartoli, F.; Philippy, R.; Doirisse, M.; et al.** Structure and self-similarity in silty and sand soils; the fractal approach: *Journal of Soil Science*, 42(2), p. 167-185, illus. (incl. 3 tables), 1991.
- Bartoli, Francois; and Philippy, Renee.** Al-organic matter associations as cementing substances of ochreous brown soil aggregates; preliminary examination: *Soil Science*, 150(4), p. 745-751, illus. (incl. 3 tables), 1990.
- Basta, N. T.; and Tabatabai, M. A.** Ion chromatographic determination of total metals in soils: *Soil Science Society of America Journal*, 54(5), p. 1289-1297, illus. (incl. 5 tables), 1990.
- Bathke, G. R.; Amoozegar, A.; and Cassel, D. K.** Description of soil pore size distribution with mean weighted pore diameter and coefficient of uniformity: *Soil Science*, 152(2), p. 82-86, illus., 1991.
- Bathke, G. R.; and Cassel, D. K.** Anisotropic variation of profile characteristics and saturated hydraulic conductivity in an Ultisol landscape: *Soil Science Society of America Journal*, 55(2), p. 333-339, illus. (incl. 6 tables), 1991.

- Baumgardner, M. F.** A global soils and terrain database; a tool to quantify global changes: *in* Proceedings of the International conference, Soils and the greenhouse effect (Bouwman, A. F., editor), p. 519-527, illus. (incl. 1 table, sketch map), John Wiley & Sons, Chichester, United Kingdom, 1990.
- Baumhardt, R. L.; Romkens, M. J. M.; Parlange, J. Y.; et al.** Predicting soil-surface seal conductance from incipient ponding and infiltration data: *Journal of Hydrology*, 128(1-4), p. 277-291, illus. (incl. 2 tables), 1991.
- Baumhardt, R. L.; Romkens, M. J. M.; Whisler, F. D.; et al.** Modeling infiltration into a sealing soil: *Water Resources Research*, 26(10), p. 2497-2505, illus. (incl. 4 tables), 1990.
- Baumler, Rupert; Zech, Wolfgang; Heuberger, Helmut; et al.** Investigations on the intensity of weathering of soils developed from glacial and fluvioglacial deposits and their relationship with the history of the landscape in the Mt. Everest region: *Geoderma*, 48(3-4), p. 223-243, illus. (incl. 3 tables, sketch map), 1991.
- Beke, G. J.** Soil development in a 100-year-old dike near Grand Pre, Nova Scotia: *Canadian Journal of Soil Science*, 70(4), p. 683-692 (incl. French sum.), illus. (incl. 4 tables), 1990.
- Bell, James C.** A GIS-based soil-landscape modeling approach to predict soil drainage class: 216 p., Doctoral, 1990, Pennsylvania State University, University Park, PA. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Belohlavy, Francis; and Lewis, David T.** Changes in depth of lime zones of Haplustolls in northeastern Nebraska [abstr.]: *in* Proceedings of the 101st annual meeting of the Nebraska Academy of Sciences; 91 including the NATS & TER-QUA Divisions and affiliated societies, *Proceedings of the Nebraska Academy of Sciences and Affiliated Societies*, 101, p. 55, 1991.
- Belz, David J.; Carter, Lewis J.; Dearstyne, David A.; et al.** Soil survey of Hendry County, Florida: 174 p., illus. (incl. 21 tables; colored soils map 1:253,440; soils maps 1:24,000), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Univ. Fla., Inst. Food and Agric. Sci., Agric. Exp. Stn., and Soil Sci. Dep.; and Fla. Dep. Agric. and Consum. Serv.).
- Benham, Ken E.** Soil survey of Linn County, Missouri: p. 132, illus. (incl. block diag., sketch map; soils maps 1:24,000; colored soils map 1:190,080; index map 1:190,080), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Mo. Agric. Exp. Stn.).
- Bennett, Philip C.; Siegel, Donald I.; Hill, Barbara M.; et al.** Fate of silicate minerals in a peat bog: *Geology* (Boulder), 19(4), p. 328-331, illus. (incl. 1 table, block diag., sketch map), 1991.
- Berdanier, C. R.; Ross, S. J.; and Grossman, R. B.** Soil water capacity prediction: *Geoderma*, 49(1-2), p. 77-81, illus., 1991.
- Berezin, P. N.** Evaluation of the potential and actual compaction of soils from physical criteria: *Soviet Soil Science*, 22(7), p. 104-114, illus. (incl. 3 tables), 1991.
- Berman, D. I.; Alfimov, A. V.; and Poploukhin, A. A.** Method and equipment for measuring lateral flow in frozen soils: *Soviet Soil Science*, 23(3), p. 77-80, illus., 1991.
- Berry, Margaret E.** Soil catena development on fault scarps of different ages, eastern escarpment of the Sierra Nevada, California: *in* Soils and landscape evolution; proceedings of the 21st annual Binghamton symposium in geomorphology (Kneupfer, Peter L. K., editor; et al.), *Geomorphology*, 3(3-4), p. 333-350, illus. (incl. 4 tables, sketch map), 1990.
- Berry, Margaret Elaine.** Soil-geomorphic analysis of late Quaternary glaciation and faulting, eastern escarpment of the central Sierra Nevada, California: 376 p., Doctoral, 1990, University of Colorado, Boulder, CO. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Berube, Marc-Andre; Choquette, Marc; and Locat, Jacques.** Effects of lime on common soil and rock forming minerals: *Applied Clay Science*, 5(2), p. 145-163, 5 tables, charts, 1990.
- Bestland, Erick Anthony.** Miocene volcanioclastic deposits and Paleosols of Rusinga Island, Kenya: 130 p., Doctoral, 1990, Univ. of Oregon, Eugene, OR. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Betelev, N. P.; and Kulachkin, B. I.** Methods of determining content of organic matter in soils: *Soviet Engineering Geology*, 1990(4), p. 77-85, illus. (incl. 4 tables), 1990.
- Beyer, L.; Blume, H. P.; and Peters, M.** Biological activity and organic matter transformations in typical soils of Schleswig-Holstein: *Geoderma*, 49(3-4), p. 273-284, 1991.

- Bhattacharyya, T.; and Ghosh, Sudhansu K.** Genesis and transformation of minerals in an Alfisol derived from granite gneiss: *Journal of the Indian Society of Soil Science*, 38(2), p. 279-285, illus. (incl. 7 tables), 1990.
- Bigelow, N. H.; and Beget, J. E.** Holocene loess and Paleosols in central Alaska; correlations with secular changes in solar intensity? [abstr.]: *in Abstracts; International conference on the role of the Polar regions in global change* (University of Alaska at Fairbanks, Geophysical Institute), p. 192, Univ. Alaska at Fairbanks, Fairbanks, AK, United States, 1990.
- Biot, Yvan.** The use of tree mounds as benchmarks of previous land surfaces in a semi-arid tree savanna, Botswana: *in Vegetation and erosion; processes and environments* (Thornes, John Barrie, editor), p. 437-450, illus. (incl. 2 tables, sketch map), John Wiley and Sons, Chichester, United Kingdom, 1990.
- Bird, Michael I.; Chivas, Allan R.; and Fyfe, William S.** Carbon ratios in the Amazon: *Nature* (London), 354(6351), p. 271-272, sketch map, 1991.
- Bird, Michael I.; Fyfe, B.; Chivas, Allan R.; et al.** Deep weathering at extra-tropical latitudes; a response to increased atmospheric CO₂: *in Proceedings of the International conference, Soils and the greenhouse effect* (Bouwman, A. F., editor), p. 383-389, illus. (incl. 1 table), John Wiley & Sons, Chichester, United Kingdom, 1990.
- Birina, A. G.; Vitt, V. S.; and Rubilina, N. Ye.** Mineralogy of clay and micromorphology of Gley-podzolic and Bog-podzolic soils of the northern taiga: *Soviet Soil Science*, 22(5), p. 77-86, 3 tables, 1990.
- Birkeland, Peter W.** Soil-geomorphic research; a selective overview: *in Soils and landscape evolution; proceedings of the 21st annual Binghamton symposium in geomorphology* (Kneupper, Peter L. K., editor; et al.), *Geomorphology*, 3(3-4), p. 207-224, illus., 1990.
- Birkeland, Peter W.; Berry, Margaret E.; and Swanson, David K.** Use of soil catena field data for estimating relative ages of moraines: *Geology* (Boulder), 19(3), p. 281-283, illus. (incl. 1 table), 1991.
- Birnie, A. C.; and Paterson, E.** The mineralogy and morphology of iron and manganese oxides in an imperfectly-drained Scottish soil: *Geoderma*, 50(3), p. 219-238, 1991.
- Blank, R. R.; and Fosberg, M. A.** Duripans of Idaho, U.S.A.; in situ alteration of eolian dust (loess) to an opal-A/X-ray amorphous phase: *Geoderma*, 48(1-2), p. 131-149, illus. (incl. 5 tables, sketch map), 1991.
- Blank, R. R.; and Fosberg, M. A.** Duripans of the Owyhee Plateau region of Idaho; genesis of opal and sepiolite: *Soil Science*, 152(2), p. 116-133, illus. (incl. 3 tables, sketch map), 1991.
- Bleeker, P.; and Sagedam, R.** Surface charge characteristics and clay mineralogy of some variable charge soils in Papua New Guinea: *Australian Journal of Soil Research*, 28(6), p. 901-917, illus. (incl. 5 tables, sketch map), 1990.
- Bliss, N. B.** A hierarchy of soil databases for calibrating models of global climate change: *in Proceedings of the International conference, Soils and the greenhouse effect* (Bouwman, A. F., editor), p. 529-533, sketch map, John Wiley & Sons, Chichester, United Kingdom, 1990.
- Blodgett, Robert Hugh.** Nonmarine depositional environments and Paleosol development, Upper Triassic Dolores Formation, southwestern Colorado: 672 p., Doctoral, 1990, University of Texas, Austin, TX. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Blume, L. J.; Schumacher, B. A.; Schaffer, P. W.; et al.** Handbook of methods for acid deposition studies; laboratory analyses for soil chemistry: 161 p., illus. (incl. 11 tables), 1990. (Rep. No. EPA/600/4-90/023) *available from:* U. S. Environ. Prot. Agency, United States.
- Bockheim, J. G.** Soil development rates in the Transantarctic Mountains: *Geoderma*, 47(1-2), p. 59-77, illus. (incl. 5 tables, sketch map), 1990.
- Bockheim, James G.; and Burns, Scott F.** Pergelic soils of the western contiguous United States; distribution and taxonomy: *Arctic and Alpine Research*, 23(2), p. 206-212, 3 tables, sketch map, 1991.
- Boekhold, Alexandra E.; and van der Zee, Sjoerd E. A. T. M.** Long-term effects of soil heterogeneity on cadmium behaviour in soil: *Journal of Contaminant Hydrology*, 7(4), p. 371-390, illus. (incl. 5 tables), 1991.
- Boekhold, Alexandra E.; van der Zee, Sjoerd E. A. T. M.; and de Haan, F. A. M.** Prediction of cadmium accumulation in a heterogeneous soil using a scaled sorption model: *in ModelCARE 1990; calibration and reliability in groundwater modelling* (Kovar, Karel, editor), IAHS-AISH Publication, 195, p. 211-220, illus. (incl. 2 tables), 1990.

- Boettinger, J. L.; and Southard, R. J.** Silica and carbonate sources for Aridisols on a granitic pediment, western Mojave Desert: *Soil Science Society of America Journal*, 55(4), p. 1057-1067, 3 tables, geol. sketch map, 1991.
- Bolikhovskaya, N. S.** Paleogeography, stratigraphy and genesis of the loess-Paleosol formation of northern Eurasia (palyнологical data): *in Proceedings, 13th Congress of the International Union for Quaternary Research; Distribution and chronological problems of loess* (Pecsi, Marton, editor), *GeoJournal*, 24(2), p. 181-184, illus., 1991.
- Bonnell, Stephen M.** Soil survey of Rockland County, New York: 179 p., illus. (incl. 21 tables, block diag., sketch map; soils maps 1:24,000; colored soils map 1:126,720; index map 1:126,720), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Cornell Univ. Agric. Exp. Stn.).
- Bono, R.; and Schaub, D.** Bodenerosion; ein Umweltproblem in den lossbedeckten Randland-Schaften am Oberrhein [Soil erosion; a problem in the loess areas of the Haut-Rhin]: *in Premier colloque scientifique des Universites du Rhin superieur; Recherches sur l'environnement dans la region* (Rentz, O., editor; *et al.*), p. 631-643 (incl. French sum.), illus. (incl. 2 tables, geol. sketch map), Univ. Rhin Super., France, 1987.
- Booltink, H. W. G.; Bouma, J.; and Gimenez, D.** Suction crust infiltrometer for measuring hydraulic conductivity of unsaturated soil near saturation: *Soil Science Society of America Journal*, 55(2), p. 566-568, illus., 1991.
- Borah, Deva K.; Banerjee, N. K.; and Rattan, R. K.** Studies on adsorption of zinc by soils: *Journal of the Indian Society of Soil Science*, 38(1), p. 27-33, illus. (incl. 7 tables), 1990.
- Borchardt, Glenn (editor).** Soil development and displacement along the Hayward Fault; Volume II, Point Pinole, California: *Open File Report - California Division of Mines and Geology*, 233 p., illus., 1990. (Rep. No. 88-13).
- Borchardt, Glenn.** Soil development and displacement along the Hayward Fault, Point Pinole regional shoreline, Richmond, California: *in Soil development and displacement along the Hayward Fault; Volume II, Point Pinole, California* (Borchardt, Glenn, editor), *Open File Report - California Division of Mines and Geology*, p. 95-161, illus. (incl. 10 tables, sects., sketch maps), 1990. (Rep. No. 88-13).
- Borchardt, Glenn; Seelig, Kimberley A.; and Wagner, David L.** Geology, Paleosols, and crustal stability at Point Pinole regional shoreline, Contra Costa County, California: *in Soil development and displacement along the Hayward Fault; Volume II, Point Pinole, California* (Borchardt, Glenn, editor), *Open File Report - California Division of Mines and Geology*, p. 3-94, illus. (incl. 4 tables, sketch maps), 1990. (Rep. No. 88-13).
- Borggard, O. K.; Jorgensen, S. S.; Moberg, J. P.; et al.** Influence of organic matter on phosphate adsorption by aluminium and iron oxides in sandy soils: *Journal of Soil Science*, 41(3), p. 443-449, illus. (incl. 3 tables), 1990.
- Borisova, O. K.** Klimat pozdnego driasa vnetropicheskoy oblasti Severnogo polushariya [Younger Dryas climate of the nontropical Northern Hemisphere]: *Izvestiya Akademii Nauk SSSR. Seriya Geograficheskaya*, 1990(3), p. 66-74, illus. (incl. 1 table, sketch maps), 1990.
- Bosch, David Dean.** Derivation and application of effective parameters for modeling moisture flow in heterogeneous unsaturated porous media: 318 p., Doctoral, 1990, University of Arizona, Tucson, AZ. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Botha, G. A.; de Villiers, J. M.; and Vogel, J. C.** Cyclicity of erosion, colluvial sedimentation and Palaeosol formation in Quaternary hillslope deposits from northern Natal, South Africa: *in Palaeoecology of Africa and the surrounding islands* (Maud, Rodney R., editor), *Palaeoecology of Africa and of the Surrounding Islands*, 21, p. 195-210, illus. (incl. 1 table, 1 plate), 1990. *IXth biennial conference of the Southern African Society for Quaternary Research*.
- Botha, G. A.; de Villiers, J. M.; and von Brunn, V.** Pedostratigraphy; an analysis of different systems of nomenclature and their application to subdivision of the Masotcheni Formation, South Africa: *in Palaeoecology of Africa and the surrounding islands* (Maud, Rodney R., editor), *Palaeoecology of Africa and of the Surrounding Islands*, 21, p. 211-224, 1 plate, 1990. *IXth biennial conference of the Southern African Society for Quaternary Research*.

- Boucher, Kim; and Weaver, Alex van Breda.** Sediment yield in South Africa; a preliminary geophysical analysis: *in* Soil erosion and host materials in Africa (Dardis, George, editor), GeoJournal, 23(1), p. 7-17, illus. (incl. 4 tables, sketch maps), 1991.
- Boyd, Stephen A.; Jaynes, William F.; and Ross, Brenda S.** Immobilization of organic contaminants by organo-clays; application to soil restoration and hazardous waste containment: *in* Organic substances and sediments in water; Volume 1, Humics and soils (Baker, Robert Andrew, editor), p. 181-300, illus. (incl. 7 tables), Lewis Publ., Chelsea, MI, United States, 1991. *American Chemical Society meeting*.
- Boyd, William H.** Soil survey of Caldwell Parish, Louisiana: 175 p., illus. (incl. 23 tables, sketch map; soils maps 1:20,000; colored soils map 1:190,080; index map 1:190,080), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with La. Agric. Exp. Stn. and La. Soil and Water Conserv. Comm.).
- Brady, Patrick V.** The effect of silicate weathering on global temperature and atmospheric CO₂: Journal of Geophysical Research, B, Solid Earth and Planets, 96(11), p. 18,101-18,106, illus. (incl. 1 table), 1991.
- Brandt, C. Jane.** Simulation of the size distribution and erosivity of raindrops and throughfall drops: Earth Surface Processes and Landforms, 15(8), p. 687-698, illus. (incl. 3 tables), 1990.
- Branney, M. J.; and Sparks, R. S. J.** Fiamme formed by diagenesis and burial-compaction in soils and subaqueous sediments [abstr.]: Journal of the Geological Society of London, 147(6), p. 919-922, illus. (incl. sketch maps), 1990.
- Brause, Catherine Jeanne Chisholm.** Spectroscopic and equilibrium study of cobalt(II) sorption complexes at oxide/water interfaces: 128 p., Doctoral, 1991, Stanford University, Stanford, CA. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Bravard, Sylvie; and Righi, Dominique.** Characterization of fulvic and humic acids from an Oxisol-Spodosol toposequence of Amazonia, Brazil: Geoderma, 48(1-2), p. 151-162, illus. (incl. 3 tables), 1991.
- Bregt, A. K.; McBratney, A. B.; and Wopereis, M. C. S.** Construction of isolinear maps of soil attributes with empirical confidence limits: Soil Science Society of America Journal, 55(1), p. 14-19, illus. (incl. 2 tables), 1991.
- Bremner, J. M.; and Genrich, D. A.** Characterisation of the sand, silt, and clay fractions of some Mollisols: *in* Soil colloids and their associations in aggregates (De Boodt, Marcel F., editor; *et al.*), NATO ASI Series, Series B: Physics, 215, p. 423-438, illus. (incl. 17 tables), 1990. *NATO Advanced Research Workshop*.
- Bresson, L. M.; and Boiffin, J.** Morphological characterization of soil crust development stages on an experimental field: Geoderma, 47(3-4), p. 301-325, illus. (incl. 6 tables), 1990.
- Bridgman, Scott D.; Faulkner, Stephen P.; and Richardson, Curtis J.** Steel rod oxidation as a hydrologic indicator in wetland soils: Soil Science Society of America Journal, 55(3), p. 856-862, illus. (incl. 3 tables), 1991.
- Brilis, George Michael; and Marsden, Paul J.** Comparative evaluation of Soxhlet and sonication extraction in the determination of polynuclear aromatic hydrocarbons in soil: Chemosphere (Oxford), 21(1-2), p. 91-98, illus. (incl. 3 tables), 1990.
- Brito, Jorge Manuel Santos Sousa.** Phosphates in suspensions of alkaline, basaltic soils: 100 p., Doctoral, 1990, University of Arizona, Tucson, AZ. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Broderick, W. D.** Soil survey databases; Soil Conservation Service [abstr.]: *in* Information exchange on models and data needs relating to the impact of agricultural practices on water quality; workshop proceedings (U. S. Geological Survey; *et al.*), p. 57, 1990. *available from:* U. S. Geol. Surv., Off. Water Data Coord., Reston, VA, United States (Co-sponsored by U. S. Geol. Surv. and U. S. Dep. Agric., Agric. Res. Serv. and Soil. Conserv. Serv.).
- Bronswijk, J. J. B.** Shrinkage geometry of a heavy Clay soil at various stresses: Soil Science Society of America Journal, 54(5), p. 1500-1502, illus. (incl. 1 table), 1990.
- Bronswijk, J. J. B.** Drying, cracking, and subsidence of a clay soil in a lysimeter: Soil Science, 152(2), p. 92-99, illus., 1991.
- Broster, Bruce E.; and Seaman, Allen A.** Glacigenic rafting of weathered granite; Charlie Lake, New Brunswick: Canadian Journal of Earth Sciences = Journal Canadien des Sciences de la Terre, 28(4), p. 649-654 (incl. French sum.), illus. (incl. sketch map), 1991.

- Brown, G.** Structure, crystal chemistry, and origin of the phyllosilicate minerals common in soil clays: *in* Soil colloids and their associations in aggregates (De Boodt, Marcel F., editor; *et al.*), NATO ASI Series, Series B: Physics, 215, p. 7-38, illus. (incl. 10 tables), 1990. *NATO Advanced Research Workshop*.
- Brown, Thomas M.; and Beard, K. Christopher.** Systematic lateral variation in the distribution of fossil mammals in alluvial Paleosols, lower Eocene Willwood Formation, Wyoming: *in* Dawn of the age of mammals in the northern part of the Rocky Mountain interior, North America (Brown, Thomas M., editor; *et al.*), Special Paper - Geological Society of America, 243, p. 135-151, illus. (incl. 1 table, block diag., sketch map), 1990.
- Brownawell, Bruce J.; Chen, Hua; Collier, John M.; et al.** Adsorption of organic cations to natural materials: Environmental Science & Technology, ES & T, 24(8), p. 1234-1241, illus. (incl. 3 tables), 1990.
- Bruand, A.** Improved prediction of water-retention properties of clayey soils by pedological stratification: Journal of Soil Science, 41(3), p. 491-497, 5 tables, 1990.
- Bull, William B.** Stream-terrace genesis; implications for soil development: *in* Soils and landscape evolution; proceedings of the 21st annual Binghamton symposium in geomorphology (Kneupfer, Peter L. K., editor; *et al.*), Geomorphology, 3(3-4), p. 351-367, illus., 1990.
- Burns, R. G.** Microorganisms, enzymes and soil colloid surfaces: *in* Soil colloids and their associations in aggregates (De Boodt, Marcel F., editor; *et al.*), NATO ASI Series, Series B: Physics, 215, p. 337-361, illus. (incl. 7 tables), 1990. *NATO Advanced Research Workshop*.
- Butler, E. Rex.** Soil survey of Carter County, Missouri, northern and eastern parts: 97 p., illus. (incl. 18 tables, block diags., sketch map; soils maps 1:24,000; colored soils map 1:190,080; index map 1:190,080), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with U. S. For. Serv. and Mo. Agric. Exp. Stn.).
- Byzova, Ye. V.; Sokolova, T. A.; and Sinani, T. I.** Amorphous and weakly crystallized components of fine fractions in soils of the southern Far East: Soviet Soil Science, 22(3), p. 98-111, illus. (incl. 2 tables), 1990.
- Cai Zucong; and Liu Zheng.** Content and distribution of cobalt in the main soils in China: Acta Pedologica Sinica = T'u Jang Hsueh Pao, 27(3), p. 348-352 (Chinese), 6 tables, 1990.
- Calvert, S. E.** Geochemistry and origin of the Holocene sapropel in the Black Sea: *in* Facets of modern biogeochemistry (Ittekkot, V., editor; *et al.*), p. 326-352, illus. (incl. 9 tables, sketch map), Springer-Verlag, Berlin, Federal Republic of Germany, 1990.
- Cameron, K. C.; Harrison, D. F.; Smith, N. P.; et al.** A method to prevent edge-flow in undisturbed soil cores and lysimeters: Australian Journal of Soil Research, 28(6), p. 879-886, illus., 1990.
- Campbell, D. I.; and Murray, D. L.** Water balance of snow tussock grassland in New Zealand: Journal of Hydrology, 118(1-4), p. 229-245, illus. (incl. 4 tables, sketch map), 1990.
- Campbell, I. B.; and Claridge, G. G. C.** Classification of cold desert soils: *in* Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers (Kimbler, J. M., editor; *et al.*), Proceedings - International Soil Correlation Meeting (ISCOM), 4, p. 37-43, 1 table, 1990.
- Cannon, M. G.; and Murtha, Graham George.** Soils at sites selected for eucalypt research in the Lannercost and Murray Upper state forests, North Queensland: Division of Soils Divisional Report, 37 p., illus. (incl. 6 tables, sketch maps), 1991. (Rep. No. 112).
- Cardile, Clay M.; and Lewis, David G.** Mossbauer spectroscopic evidence of a $^{IV}\text{Fe}^{3+}$ intermediate in the oxidation of Fe(OH)_2 to $\alpha\text{-FeOOH}$: Australian Journal of Soil Research, 29(3), p. 399-402, illus. (incl. 1 table), 1991.
- Carew, James L.; and Mylroie, John E.** Some pitfalls in Paleosol interpretation in carbonate sequences: Carbonates and Evaporites, 6(1), p. 68-74, illus. (incl. 1 plate), 1991.
- Carter, Brian J.; and Ciolkosz, Edward J.** Slope gradient and aspect effects on soils developed from sandstone in Pennsylvania: Geoderma, 49(3-4), p. 199-213, 1991.
- Carter, Brian J.; Ward, Phil A., III; and Shannon, Jean T.** Soil and geomorphic evolution within the Rolling Red Plains using Pleistocene volcanic ash deposits: *in* Soils and landscape evolution; proceedings of the 21st annual Binghamton symposium in geomorphology (Kneupfer, Peter L. K., editor; *et al.*), Geomorphology, 3(3-4), p. 471-488, illus. (incl. 4 tables, sketch maps), 1990.

- Carter, Michael; and Bentley, Stephen P.** Correlations of soil properties: 130 p., 53 tables, Pentech Press, London, United Kingdom, 1991.
- Carter, R. W. G.; and Wilson, Peter.** The geomorphological, ecological and pedological development of coastal foredunes at Magilligan Point, Northern Ireland: *in Coastal dunes; form and process* (Nordstrom, Karl F., editor; *et al.*), p. 129-157, illus. (incl. 4 tables, sketch maps), John Wiley & Sons, Chichester, United Kingdom, 1990.
- Carvalho, Ilson Guimaraes; Mestrinho, Suely S. P.; Fontes, Vanice M. S.; et al.** Geochemical evolution of laterites from two areas of the semiarid region in Bahia State, Brazil: *in Geochemical exploration 1989; Part 1, Selected papers from the 13th international geochemical exploration symposium* (Rose, Arthur W., editor; *et al.*), Journal of Geochemical Exploration, 40(1-3), p. 385-411, illus. (incl. 5 tables, geol. sketch maps), 1991.
- Castro, Mark S.; and Galloway, James N.** A comparison of sulfur-free and ambient air enclosure techniques for measuring the exchange of reduced sulfur gases between soils and the atmosphere: Journal of Geophysical Research, D, Atmospheres, 96(8), p. 15,427-15,437, illus. (incl. 1 table, sketch map), 1991.
- Catt, John A. (editor).** Paleopedology manual: Quaternary International, 6, 94 p., illus. (incl. 25 tables), 1990.
- Cerling, Thure E.** Carbon dioxide in the atmosphere; evidence from Cenozoic and Mesozoic Paleosols: American Journal of Science, 291(4), p. 377-400, illus. (incl. 2 tables), 1991.
- Cerling, Thure E.; Solomon, D. Kip; Quade, Jay; et al.** On the isotopic composition of carbon in soil carbon dioxide: *Geochimica et Cosmochimica Acta*, 55(11), p. 3403-3405, illus., 1991.
- Chadwick, Oliver A.; Brimhall, George H.; and Hendricks, David M.** From a black to a gray box; a mass balance interpretation of pedogenesis: *in Soils and landscape evolution; proceedings of the 21st annual Binghamton symposium in geomorphology* (Kneupper, Peter L. K., editor; *et al.*), Geomorphology, 3(3-4), p. 369-390, illus. (incl. 5 tables, sketch map), 1990.
- Chandra, S.; Jha, A. K.; and Singh, R. P.** Three phase model for wave propagation through soils: Indian Geotechnical Journal, 21(2), p. 223-232, illus. (incl. 3 tables), 1991.
- Chang, Wen-Lian Tim.** Fractal analysis of wetting front instability in unsaturated soil: 102 p., Doctoral, 1990, University of California, Davis, CA. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Charbeneau, Randall J.; and Asgian, Robert G.** Simulation of the transient soil water content profile for a homogeneous bare soil: Water Resources Research, 27(6), p. 1271-1279, illus. (incl. 4 tables), 1991.
- Chelnokova, M. N.; and Gertsen, T. G.** Chemical atomic emission method of determining niobium and tantalum in soils: Soviet Soil Science, 23(3), p. 107-110, 2 tables, 1991.
- Chen, Chuan.** Two-domain simulation of water and chemical movement in macropore soils: 169 p., Doctoral, 1990, Cornell University, Ithaca, NY. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Chen Fahu; Li Jijun; and Zhang Weixin.** Loess stratigraphy of the Lanzhou profile and its comparison with deep-sea sediment and ice core record: *in Proceedings, 13th Congress of the International Union for Quaternary Research; Distribution and chronological problems of loess* (Pecsi, Marton, editor), GeoJournal, 24(2), p. 201-209, illus. (incl. sketch map), 1991.
- Chen Li.** The function $f(x_i, \Delta G_0)$ of soil absorbed hydrocarbons and its application in geochemical exploration of oil and gas near the Earth's surface: *in Proceedings of the Second conference on petroleum geochemistry and exploration in the Afro-Asian region* (Fan Pu, editor; *et al.*), Journal of Southeast Asian Earth Sciences, 5(1-4), p. 321-323, illus. (incl. 2 tables), 1991.
- Chen Shaorong.** Characteristics and classification of soils derived from red sandstone of Jiangxi: *Acta Pedologica Sinica = T'u Jang Hsueh Pao*, 27(3), p. 343-344 (Chinese), 2 tables, 1990.
- Chen Zhixiong; and Michel, Vauclin.** Research on soil water balance in Fengqiu region; II, Error analysis on soil water content measured by neutron probe method: *Acta Pedologica Sinica = T'u Jang Hsueh Pao*, 27(3), p. 309-317 (Chinese, incl. English sum.), 5 tables, charts, 1990.
- Chen Zongfu; and Zhou Dequan.** A preliminary discussion on the relations between soil erosion and stratigraphic lithologic features of Yangjiawan area in Bijie, Guizhou: *Guizhou Dizhi = Geology of Guizhou*, 8(1), p. 83-88 (Chinese, incl. English sum.), illus. (incl. 2 tables, sect., geol. sketch map), 1991.

- Cherkasov, G. N.; and Kosukhin, O. N.** Termobarogeokhimiya mineralov boksitov i lateritov nekotorykh mestorozhdeniy mira [Thermobarogegeochemistry of bauxite and laterite minerals of some deposits of the world]: Geokhimiya, 1991(4), p. 507-514 (incl. English sum.), 1991.
- Cherkinskiy, A. Ye.; Zaydel'man, F. R.; and Danilova, G. A.** Radiocarbon investigations of the stability and variability of humus in natural and cultivated Sod-Podzolic soils with various degrees of gleying: Soviet Soil Science, 22(1), p. 66-69, 1 table, 1990.
- Cheshire, M. V.; and Hayes, Michael H. B.** Composition, origins, structures, and reactivities of soil polysaccharides: *in* Soil colloids and their associations in aggregates (De Boodt, Marcel F., editor; *et al.*), NATO ASI Series, Series B: Physics, 215, p. 307-336, illus. (incl. 3 tables), 1990. *NATO Advanced Research Workshop*.
- Childs, C. W.; Palmer, R. W. P.; and Ross, C. W.** Thick iron oxide pans in soils of Taranaki, New Zealand: Australian Journal of Soil Research, 28(2), p. 245, illus. (incl. 5 tables, geol. sketch map), 1990.
- Chimittorzhiyeva, G. D.; and Abasheyeva, N. Ye.** Composition of humus in the soils of Transbaikalia: Soviet Soil Science, 22(6), p. 60-68, 3 tables, 1990.
- Chin, Yu-Ping; Weber, Walter J., Jr.; and Chiou, Cary T.** A thermodynamic partition model for binding of nonpolar organic compounds by organic colloids and implications for their sorption to soils and sediment: *in* Organic substances and sediments in water; Volume 1, Humics and soils (Baker, Robert Andrew, editor), p. 251-273, illus. (incl. 3 tables), Lewis Publ., Chelsea, MI, United States, 1991. *American Chemical Society meeting*.
- Chiou, Cary T.; Lee, Jiunn-Fwu; and Boyd, Stephen A.** The surface area of soil organic matter: Environmental Science & Technology, ES & T, 24(8), p. 1164-1166, illus., 1990.
- Choquet, Freddy; Ista, Emmanuel; and Verhasselt, Andre F.** The determination of calcium and magnesium carbonates in soils and aggregates: *in* Physico-chemical aspects of soil and related materials (Hoddinott, Keith B., editor; *et al.*), ASTM Special Technical Publication = American Society for Testing and Materials Special Technical Publication, 1095, p. 18-28, illus. (incl. 1 table), 1990. *Physico-chemical aspects of soil, rock and related materials*.
- Chrisman, N. R.; Mezera, D. F.; Moyer, D. D.; et al.** Soil erosion planning in Wisconsin; an application and evaluation of a multipurpose land information system: *in* Geographic and land information systems for practicing surveyors; a compendium (Onsrud, Harlan J., editor; *et al.*), p. 185-194, illus. (incl. sketch maps), Am. Congr. Surv. and Mapping, Bethesda, MD, United States, 1990.
- Christensen, Soren; Simkins, Stephen; and Tiedje, James M.** Spatial variation in denitrification; dependency of activity centers on the soil environment: Soil Science Society of America Journal, 54(6), p. 1608-1613, illus. (incl. 4 tables), 1990.
- Christensen, Soren; Simkins, Stephen; and Tiedje, James M.** Temporal patterns of soils denitrification; their stability and causes: Soil Science Society of America Journal, 54(6), p. 1614-1618, illus. (incl. 3 tables), 1990.
- Christophersen, Nils; and Neal, Colin.** Linking hydrological, geochemical, and soil chemical processes on the catchment scale; an interplay between modeling and field work: *in* Chapman conference on Hydrogeochemical responses of forested catchments (Sorooshian, Soroosh, editor), Water Resources Research, 26(12), p. 3077-3086, illus., 1990.
- Churchman, G. J.** Relevance of different intercalation tests for distinguishing halloysite from kaolinite in soils: Clays and Clay Minerals, 38(6), p. 591-599, 6 tables, charts, 1990.
- Churchman, G. J.; McIntosh, P. D.; Burke, C. M.; et al.** Clay mineralogy of soils formed in tuffaceous greywacke, Southland, New Zealand, in relation to genesis, soil properties and classification: Australian Journal of Soil Research, 29(4), p. 493-513, illus. (incl. 5 tables, geol. sketch map), 1991.
- Ciolkosz, Edward J.; Carter, Brian J.; Hoover, Michael T.; et al.** Genesis of soils and landscapes in the Ridge and Valley Province of central Pennsylvania: *in* Soils and landscape evolution; proceedings of the 21st annual Binghamton symposium in geomorphology (Kneupper, Peter L. K., editor; *et al.*), Geomorphology, 3(3-4), p. 245-261, illus. (incl. 4 tables, sketch map), 1990.
- Clothier, Brent.** Soil water sorptivity and conductivity: *in* Instrumentation for studying vegetation canopies for remote sensing in optical and thermal infrared regions (Goel, Narendra S., editor; *et al.*), Remote Sensing Reviews, 5(1), p. 281-291, illus. (incl. 1 table), 1990.

- Coleman, T. L.; Agbu, P. A.; Montgomery, O. L.; et al.** Spectral band selection for quantifying selected properties in highly weathered soils: *Soil Science*, 151(5), p. 355-361, illus. (incl. 6 tables), 1991.
- Colin, F.; and Vieillard, P.** Behavior of gold in the lateritic equatorial environment; weathering and surface dispersion of residual gold particles, at Dondo Mobi, Gabon: *Applied Geochemistry*, 6(3), p. 279-290, illus. (incl. 3 tables, sect., sketch maps), 1991.
- Collins, David N.** Glacial processes: *in Geomorphological techniques* (Goudie, Andrew S., editor), 2nd edition, p. 302-320, illus., Unwin Hyman, London, United Kingdom, 1990.
- Collins, James E.** Soil moisture regimes of rangeland; using datapads to record soil moisture: *in Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers* (Kimble, J. M., editor; *et al.*), *Proceedings - International Soil Correlation Meeting (ISCOM)*, 4, p. 217-225, illus. (incl. 2 tables), 1990.
- Collins, M. E.; Puckett, W. E.; Schellentrager, G. W.; et al.** Using GPR for micro-analyses of soils and karst features on the Chiefland limestone plain in Florida: *Geoderma*, 47(1-2), p. 159-170, illus. (incl. 1 table, sketch map), 1990.
- Comerford, N. B.; Harris, W. G.; and Lucas, D.** Release of nonexchangeable potassium from a highly weathered, forested Quartzipsamment: *Soil Science Society of America Journal*, 54(5), p. 1421-1426, illus. (incl. 3 tables), 1990.
- Comfort S. D.; Dick, R. P.; and Baham, J.** Air-drying and pretreatment effects on soil sulfate sorption: *Soil Science Society of America Journal*, 55(4), p. 968-973, illus. (incl. 7 tables), 1991.
- Conacher, Arthur J.** Salt of the Earth; secondary soil salinization in the Australian wheat belt: *Environment* (St. Louis), 32(6), p. 4-9, 40-42, illus. (incl. sketch map), 1990.
- Condron, L. M.; Moir, J. O.; Tiessen, H.; et al.** Critical evaluation of methods for determining total organic phosphorus in tropical soils: *Soil Science Society of America Journal*, 54(5), p. 1261-1266, 5 tables, 1990.
- Constantz, Jim; and Murphy, Fred.** The temperature dependence of ponded infiltration under isothermal conditions: *Journal of Hydrology*, 122(1-4), p. 119-128, illus. (incl. 2 tables), 1991.
- Conyers, M. K.; and Davey, B. G.** The variability of pH in acid soils of the Southern Highlands of New South Wales: *Soil Science*, 150(4), p. 695-704, illus. (incl. 5 tables), 1990.
- Cook-Talbot, Judith D.** Sorted circles, relative-age dating and palaeoenvironmental reconstruction in an alpine periglacial environment, eastern Jotunheimen, Norway; lichenometric and weathering-based approaches: *The Holocene*, 1(2), p. 128-141, illus. (incl. 3 tables, sketch map), 1991.
- Cooks, J.; and Otto, E.** The weathering effects of the lichen *Lecidea aff. Sarcogynoides* (Koerb.) on Magaliesberg quartzite: *Earth Surface Processes and Landforms*, 15(6), p. 491-500, illus. (incl. 1 table), 1990.
- Cooper, D. M.** Modelling soil moisture movement following drip irrigation of sugar cane: *in ModelCARE 1990; calibration and reliability in groundwater modelling* (Kovar, Karel, editor), IAHS-AISH Publication, 195, p. 385-396, illus. (incl. 3 tables), 1990.
- Cooper, J. D.; Gardner, C. M. K.; and MacKenzie, N.** Soil controls on recharge to aquifers: *in Transport processes in the soil*, *Journal of Soil Science*, 41(4), p. 613-630, illus. (incl. 2 tables, sketch map), 1990. *British-Israeli symposium*.
- Coude-Gaussen, Genevieve.** The loess and loess-like deposits along the sides of the western Mediterranean Sea; genetic and palaeoclimatic significance: *in Loess, aeolian deposits, and related Palaeosols in the Mediterranean region* (Cremaschi, Mauro, editor), *Quaternary International*, 5, p. 1-8, illus. (incl. sketch map), 1990. *INQUA Commission on Loess and INQUA Commission on Palaeogeography joint meeting*.
- Courchesne, F.; and Hendershot, W. H.** The role of basic aluminum sulfate minerals in controlling sulfate retention in the mineral horizons of two Spodosols: *Soil Science*, 150(3), p. 571-578, illus. (incl. 4 tables), 1990.
- Courchesne, F.; and Hendershot, W. H.** Kinetics of sulfate desorption from two Spodosols of the Laurentians, Quebec: *Soil Science*, 150(6), p. 858-866, illus. (incl. 3 tables), 1990.
- Cremaschi, Mauro (editor).** Loess, aeolian deposits, and related Palaeosols in the Mediterranean region: Sep. 26-Oct. 1, 1988, Italy. *Quaternary International*, 5, 137 p., illus., 1990.

- Cremaschi, Mauro; Federoff, Nicolas; Guerreschi, Antonio; et al.** Sedimentary and pedological processes in the upper Pleistocene loess of northern Italy; the Bagaggera Sequence: *in Loess, aeolian deposits, and related Palaeosols in the Mediterranean region* (Cremaschi, Mauro, editor), Quaternary International, 5, p. 23-38, illus. (incl. sketch map), 1990. *INQUA Commission on Loess and INQUA Commission on Palaeogeography joint meeting*.
- Crossley, D. A., Jr.; Coleman, D. C.; Hendrix, P. F. (editors); et al.** Modern techniques in soil ecology; proceedings of the international workshop on Modern techniques in soil ecology relevant to organic matter breakdown, nutrient cycling and soil biological processes: Sept. 11-15, 1989, United States. 510 p., illus., Elsevier, Amsterdam, Netherlands, 1991.
- Cryer, R.; and Trudgill, S. T.** Solutes: *in Geomorphological techniques* (Goudie, Andrew S., editor), 2nd edition, p. 260-279, illus., Unwin Hyman, London, United Kingdom, 1990.
- Cunningham, Harry N., Jr.; and Tucker, Eva, Jr.** Physical and biotic analysis of soils of various ages from Presque Isle State Park, Erie County, Pennsylvania; a preliminary report [abstr.]: *in Proceedings of the 66th annual meeting of the Pennsylvania Academy of Science* (Majumdar, Shyamal K., editor), Proceedings of the Pennsylvania Academy of Science, 63, p. 209, 1990.
- Curtin, D.; Naidu, R.; and Syers, J. K.** Chemical and mineralogical characteristics of some strongly weathered Fijian soils; fertility implications: *Geoderma*, 48(3-4), p. 363-372, illus. (incl. 2 tables), 1991.
- Curtin, D.; and Syers, J. K.** Influence of nitrate and chloride on the adsorption and transport of sulphate in soils: *Journal of Soil Science*, 41(3), p. 433-442, illus. (incl. 1 table), 1990.
- Dahlgren, R. A.; and Ugolini, F. C.** Distribution and characterization of short-range-order minerals in Spodosols from the Washington Cascades: *Geoderma*, 48(3-4), p. 391-413, illus. (incl. 5 tables), 1991.
- Dahlgren, R. A.; Ugolini, F. C.; Shoji, S.; et al.** Soil-forming processes in Alic Melanudands under Japanese pampas grass and oak: *Soil Science Society of America Journal*, 55(4), p. 1049-1056, illus. (incl. 4 tables), 1991.
- DaMoude, Dean W.; Haneman, Robert; Stecker, John; et al.** Soil survey of Saline County, Nebraska: 160 p., illus. (incl. 20 tables, block diagrs., sketch map; soils maps 1:20,000; colored soils map 1:190,080; index map 1:190,080), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Univ. Nebr., Conserv. and Surv. Div.).
- Dan, Joel.** The effect of dust deposition on the soils of the land of Israel: *in Loess, aeolian deposits, and related Palaeosols in the Mediterranean region* (Cremaschi, Mauro, editor), Quaternary International, 5, p. 107-113, illus. (incl. sketch map), 1990. *INQUA Commission on Loess and INQUA Commission on Palaeogeography joint meeting*.
- Dardis, George (editor).** Soil erosion and host materials in Africa: *GeoJournal*, 23(1), 90 p., 1991.
- Dardis, George F.; and Beckedahl, Heinrich R.** The role of rock properties in the development of bedrock-incised rills and gullies; examples from Southern Africa: *in Soil erosion and host materials in Africa* (Dardis, George, editor), *GeoJournal*, 23(1), p. 35-40, illus. (incl. sects., sketch map), 1991.
- Datta, S. C.; and Sastry, T. G.** Hysteresis effect in K-(Ca + Mg) exchange in soils dominated by different clay minerals: *Journal of the Indian Society of Soil Science*, 38(2), p. 201-205, illus., 1990.
- Daughtry, C. S. T.; Kustas, W. P.; Moran, M. S.; et al.** Spectral estimates of net radiation and soil heat flux: *Remote Sensing of Environment*, 32(3), p. 111-124, illus. (incl. 8 tables), 1990.
- Daux, V.; Crovisier, J. L.; and Petit, J. C.** Rare earth elements behaviour during alteration of basaltic glasses; case of the weathering of Icelandic hyaloclastites: *in Materials Research Society symposium proceedings; Scientific basis for nuclear waste management XIV* (Abrajano, Teofilo A., Jr., editor; et al.), *Materials Research Society Symposia Proceedings*, 212, p. 107-114, illus. (incl. 3 tables), 1991.
- David, Mark B.; Fasth, William J.; and Vance, George F.** Forest soil response to acid and salt additions of sulfate; I, Sulfur constituents and net retention: *in Neutron probe standards; transport shields or a large drum of water?* (Hodnett, M. G.; et al.), *Soil Science*, 151(2), p. 136-145, illus. (incl. 3 tables), 1991.
- David, Mark B.; Vance, George F.; and Fasth, William J.** Forest soil response to acid and salt additions of sulfate; II, Aluminum and base cations: *Soil Science*, 151(3), p. 208-219, illus. (incl. 4 tables), 1991.
- Davies, J. R.** Karstification and pedogenesis on a late Dinantian carbonate platform, Anglesey, North Wales: *Proceedings of the Yorkshire Geological Society*, 48, Part 3, p. 297-321, illus. (incl. sects., geol. sketch map), 1991.

- Davis, Keith O.** Soil survey of Andrew County, Missouri: 129 p., illus. (incl. 18 tables, block diags., sketch map; soils maps 1:24,000; colored soils map 1:190,080; index map 1:190,080), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Mo. Agric. Exp. Stn.).
- Davis, W.; Rope, E. L.; Nilles, J. T.; et al.** Influence of wavelength, antenna height, and soil roughness in nearfield microwave detection of buried dielectric objects [abstr.]: in *Third international conference on Ground penetrating radar* (Lucius, Jeffrey E., editor; *et al.*), Open-File Report (United States Geological Survey, 1978), p. 17, 1990. (Rep. No. OF 90-0414) *available from:* U. S. Geol. Surv., Denver, CO, United States.
- Dawson, Bernard S. W.; Fergusson, Jack E.; Campbell, Alistair S.; et al.** Depletion of first-row transition metals in a chronosequence of soils in the Reefton area of New Zealand: *Geoderma*, 48(3-4), p. 271-296, illus. (incl. 6 tables), 1991.
- De Boodt, Marcel F.; Hayes, Michael H. B.; and Herbillon, Adrien J. (editors).** Soil colloids and their associations in aggregates: Sept. 1-7, 1984, Belgium. NATO ASI Series, Series B: Physics, 215, 598 p., illus. (incl. tables), 1990.
- de Lima, M. I. L. P.; and de Lima, J. L. M. P.** Water erosion of soils containing rock fragments: in *The hydrological basis for water resources management* (Shamir, Uri, editor; *et al.*), IAHS-AISH Publication, 197, p. 141-147 (incl. French sum.), illus. (incl. sketch map), 1990. *International symposium.*
- De Roo, A. P. J.** The use of ^{137}Cs as a tracer in an erosion study in South Limburg (The Netherlands) and the influence of Chernobyl fallout: *Hydrological Processes*, 5(2), p. 215-227, illus. (incl. 6 tables, sketch maps), 1991.
- de Villiers, J. M.** The nature of pedological evidence for climatic change during the Quaternary: in *Palaeoecology of Africa and the surrounding islands* (Maud, Rodney R., editor), *Palaeoecology of Africa and of the Surrounding Islands*, 21, p. 225-234, 1990. *IXth biennial conference of the Southern African Society for Quaternary Research.*
- Deines, P.; Hull, L. C.; and Stowe, Schuyler S.** Study of soil and ground-water movement using stable hydrogen and oxygen isotopes: in *Water resources in Pennsylvania; availability, quality and management* (Majumdar, Shyamal K.; *et al.*), p. 121-140, illus. (incl. 4 tables), Pa. Acad. Sci., Easton, PA, United States, 1990.
- DeJolsvay, Dianne J.; Data, Bithin; Tayfur, Gokmen; et al.** Hydrology and sedimentology of dynamic rill networks; Volume III, Simulation of random rill network geometries on agricultural soils: Research Report - University of Kentucky, Water Resources Research Institute, 116 p., illus. (incl. 2 tables), 1990. (Rep. No. 180).
- Delvaux, B.; Herbillon, A. J.; Dufey, Joseph E.; et al.** Surface properties and clay mineralogy of hydrated halloysitic soil clays; I, Existence of interlayer K^+ specific sites: *Clay Minerals*, 25(2), p. 129-139, illus. (incl. 4 tables), 1990.
- Delvaux, B.; Herbillon, A. J.; Vielvoye, L.; et al.** Surface properties and clay mineralogy of hydrated halloysitic soil clays; II, Evidence for the presence of halloysite/smectite (H/Sm) mixed-layer clays: *Clay Minerals*, 25(2), p. 141-160, illus. (incl. 3 tables), 1990.
- Deng, S.; and Dick, R. P.** Sulfur oxidation and rhodanese activity in soils: *Soil Science*, 150(2), p. 552-560, illus. (incl. 2 tables), 1990.
- DesLauriers, Lynn L.** Soil survey of McHenry County, North Dakota: 245 p., illus. (incl. 18 tables, block diags., sketch map; soils maps 1:20,000; colored soils map 1:316,800; index map 1:316,800), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with N.D. Agric. Exp. Stn., N.D. Coop. Ext. Serv., and N.D. State Soil Conserv. Comm.).
- Dhillon, S. K.; and Dhillon, K. S.** Kinetics of release of non-exchangeable potassium by cation-saturated resins from Red (Alfisols), Black (Vertisols) and Alluvial (Inceptisols) soils of India: *Geoderma*, 47(3-4), p. 283-300, illus. (incl. 7 anal., 5 tables), 1990.
- Dhillon, S. K.; and Dhillon, K. S.** Exchange equilibrium of potassium in some red, black and alluvial soils of India; I, Effect of displacing cations: *Australian Journal of Soil Research*, 29(1), p. 75-86, illus. (incl. 3 tables), 1991.
- Dhillon, S. K.; and Dhillon, K. S.** Exchange equilibrium of potassium in some red, black and alluvial soils of India; II, Effect of temperature on $\text{K}^+ \cdot \text{Ca}^{2+}$ exchange: *Australian Journal of Soil Research*, 29(1), p. 87-94, illus. (incl. 2 tables), 1991.

- Dhillon, S. K.; and Dhillon, K. S.** Characterisation of potassium in Red (Alfisols), Black (Vertisols) and Alluvial (Inceptisols and Entisols) soils of India using electro-ultrafiltration: *Geoderma*, 50(3), p. 185-196, 1991.
- Dimo, V. N.** A provincial-facies separation of soils: *Soviet Soil Science*, 22(6), p. 47-51, sketch map, 1990.
- Dinel, H.; Mathur, S. P.; and Levesque, M.** Improvements of physical properties of degraded shallow organic soils by admixing organic overlays and mineral sublayers: *Canadian Journal of Soil Science*, 71(1), p. 101-117 (incl. French sum.), illus. (incl. 9 tables), 1991.
- Dinel, Henri.** The influence of soil organic matter components on the aggregation and structural stability of a lacustrine silty clay: Doctoral, 1990, McGill University, Montreal, PQ, Canada. *available from:* Natl. Libr. Can., Ottawa, ON, Canada.
- Dixon, J. B.** Roles of clays in soils: *in* Some applications of selected clay minerals; proceedings of the 24th annual meeting of the Clay Minerals Society (Murray, Haydn H., editor), *Applied Clay Science*, 5(5-6), p. 489-503, illus., 1991.
- Dixon, J. B.; Golden, D. C.; Uzochukwu, G. A.; et al.** Soil manganese oxides: *in* Soil colloids and their associations in aggregates (De Boodt, Marcel F., editor; et al.), *NATO ASI Series, Series B: Physics*, 215, p. 141-163, illus. (incl. 3 tables), 1990. *NATO Advanced Research Workshop*.
- Dobos, Robert R.; Ciolkosz, Edward J.; and Waltman, William J.** The effect of organic carbon, temperature, time, and redox conditions on soil color: *Soil Science*, 150(2), p. 506-512, 4 tables, 1990.
- Dobrovolskiy, V. V.** Geochemistry of soils of Spitsbergen: *Soviet Soil Science*, 22(6), p. 1-15, 5 tables, 1990.
- Dodd, Jerry A.** Soil survey of Webster County, Missouri: 154 p., illus. (incl. 18 tables, block diags., sketch map; soils maps 1:24,000; colored soils map 1:190,080; index map 1:190,080), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Mo. Agric. Exp. Stn.).
- Donkin, M. J.; and Fey, M. V.** Factor analysis of familiar properties of some Natal soils with potential for afforestation: *Geoderma*, 48(3-4), p. 297-304, 3 tables, 1991.
- Donovan, Stephen K.; Jackson, Trevor A.; and Pickerill, Ron K. (leaders).** A field guide to selected localities in the Parish of Portland: 9 p., illus. (incl. sketch maps), *Geol. Soc. Jamaica*, Jamaica, 1990.
- Doornkamp, J. C.; and Ibrahim, H. A. M.** Salt weathering: *Progress in Physical Geography*, 14(3), p. 335-348, 1990.
- Dorn, R. I.; and Dragovich, D.** Interpretation of rock varnish in Australia; case studies from the arid zone: *Australian Geographer*, 21(1), p. 18-32, illus. (incl. 1 table, sketch map), 1990.
- Dorn, R. I.; and Krinsley, D. H.** Cation-leaching sites in rock varnish: *Geology (Boulder)*, 19(11), p. 1077-1080, illus., 1991.
- Douglas, Lowell A. (prefacer).** 75th anniversary; 1916-1991: *Soil Science*, 151(1), 109 p., illus., 1991.
- Dragun, James; Mason, Sharon A.; and Barkach, John H.** Where do organic chemicals found in soil systems come from?: *in* Hydrocarbon contaminated soils and groundwater; analysis, fate, environmental and public health effects remediation; Volume 1 (Kostecki, Paul T., editor; et al.), p. 161-166, illus., Lewis Publ., Chelsea, MI, United States, 1991. *First annual West Coast conference on Hydrocarbon contaminated soils and groundwater*.
- Dregne, H. E.** Erosion and soil productivity in Africa: *Journal of Soil and Water Conservation*, 45(4), p. 431-436, illus. (incl. sketch map), 1990.
- Dregne, H. E.** Wind erosion and soil productivity: *in* Sand transport and desertification in arid lands (El-Baz, Farouk, editor; et al.), p. 149-160, illus. (incl. sketch map), World Sci., Singapore, Singapore, 1990. *First international workshop*.
- Drijber, Rhae A.; and Lowe, L. E.** Nature of humus in Andosols under differing vegetation in the Sierra Nevada, Mexico: *Geoderma*, 47(3-4), p. 221-231, 5 tables, 1990.
- Drijber, Rhae A.; and Lowe, L. E.** Bound phenolic acids in humus fractions of Andosols under varying vegetation in the Sierra Nevada, Mexico: *Geoderma*, 48(3-4), p. 431-442, illus. (incl. 5 tables), 1991.
- Dubey, D. D.; and Sharma, O. P.** Salt affected soils in flood plain area of Gujarat: *Journal of the Indian Society of Soil Science*, 38(1), p. 122-125, 3 tables, 1990.

- Dubois, J. P.** Measurement of cadmium speciation in soil by electrothermal atomic absorption spectrometry (GFAAS) with Zeeman effect background correlation: *Journal of Trace and Microprobe Techniques*, 9(2-3), p. 149-163, illus. (incl. 4 tables), 1991.
- Dubois, Jean-Marie M.; Martel, Yvon A.; Cote, Danielle; et al.** Les Ortsteins du Quebec; répartition géographique, relations geomorphologiques et essai de datation [Ortsteins of Quebec; geographic distribution, geomorphologic relations and attempt at getting dates]: *The Canadian Geographer = Le Géographe Canadien*, 34(4), p. 303-317 (incl. English sum.), illus. (incl. 3 tables), 1990.
- Duguay, Claude R.; and LeDrew, Ellsworth F.** Mapping surface albedo in the east slope of the Colorado Front Range, U.S.A., with Landsat thematic mapper: *Arctic and Alpine Research*, 23(2), p. 213-223, illus. (incl. 4 tables, 1 plate, sketch map), 1991.
- Durar, Abdulrazag Ali.** Simulation of soil-water dynamics for wind erosion modeling: 177 p., Doctoral, 1991, Kansas State University, Manhattan, KS. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Eckhardt, D. A.; and Barnes, P. L.** Spatial variability in hydraulic conductivity of a silt-loam soil near Topeka, Kansas [abstr.]: *in U.S. Geological Survey Toxic Substances Hydrology Program; abstracts of the technical meeting, Monterey, California, March 11-15, 1991* (Mallard, Gail E., compiler; *et al.*), Open-File Report - U. S. Geological Survey, p. 14, 1991. (Rep. No. OF 91-0088) *available from:* U. S. Geol. Surv., Denver, CO, United States.
- Edinger, Susan Beth.** Polygenesis and calcite micromorphology of Aridisols on a granitic pediment, East Mojave Desert, California: 179 p., Doctoral, 1990, University of California, Riverside, CA. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Edwards, L. M.** The effect of alternate freezing and thawing on aggregate stability and aggregate size distribution of some Prince Edward Island soils: *Journal of Soil Science*, 42(2), p. 193-204, illus. (incl. 6 tables), 1991.
- Effland, William Russell.** Genesis of clayey sediments and associated upland soils near the upper Iowa River, Northeast Iowa: 228 p., Doctoral, 1990, Iowa State University, Ames, IA. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Eick, Matthew J.; Bar-Tal, Asher; Sparks, Donald L.; et al.** Analyses of adsorption kinetics using a stirred-flow chamber; II, Potassium-calcium exchange on clay minerals: *Soil Science Society of America Journal*, 54(5), p. 1278-1282, illus., 1990.
- Ekwue, E. I.** Effects of peat content, rainfall duration and aggregate size on soil crust strength: *Earth Surface Processes and Landforms*, 16(6), p. 485-498, illus. (incl. 5 tables), 1991.
- El Baz, Farouk.** Do people make deserts?: *New Scientist* (1971), 128(1738), p. 41-44, illus. (incl.), 1990.
- El-Falaky, A. A.; Aboulroos, S. A.; and Lindsay, W. L.** Measurement of cadmium activities in slightly acidic to alkaline soils: *Soil Science Society of America Journal*, 55(4), p. 974-979, illus. (incl. 5 tables), 1991.
- El Sheikh, H. A.; and Amer, M.** Paleoenvironments of the Quaternary soils in El Bahariya Oasis, Egypt: *Annals of the Geological Survey of Egypt*, 16, p. 255-258, illus. (incl. 1 table), 1990.
- Ellis, S.; and Newsome, D.** Chalkland soil formation and erosion on the Yorkshire wolds, northern England: *Geoderma*, 48(1-2), p. 59-72, illus. (incl. 2 tables, sketch map), 1991.
- Ellsworth, T. R.; and Jury, W. A.** A three-dimensional field study of solute transport through unsaturated, layered, porous media; 2, Characterization of vertical dispersion: *Water Resources Research*, 27(5), p. 967-981, illus. (incl. 2 tables), 1991.
- Ellsworth, T. R.; Jury, W. A.; Ernst, F. F.; et al.** A three-dimensional field study of solute transport through unsaturated, layered, porous media; 1, Methodology, mass recovery, and mean transport: *Water Resources Research*, 27(5), p. 951-965, illus. (incl. 1 table), 1991.
- Emeis, K. C.** Pleistocene/upper Pliocene sapropels in the Tyrrhenian Sea: *in Facets of modern biogeochemistry* (Ittekot, V., editor; *et al.*), p. 279-295, illus. (incl. 2 tables, geol. sketch maps), Springer-Verlag, Berlin, Federal Republic of Germany, 1990.
- Emerson, W. W.; and Greenland, D. J.** Soil aggregates; formation and stability: *in Soil colloids and their associations in aggregates* (De Bocht, Marcel F., editor; *et al.*), NATO ASI Series, Series B: Physics, 215, p. 485-511, illus., 1990. *NATO Advanced Research Workshop*.

- Ensz, Edgar H.** Soil survey of Custer and Pennington counties, Black Hills parts, South Dakota: 295 p., illus. (incl. 19 tables; colored soils 1:316,800; soils maps 1:24,000), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with U. S. Dep. Agric., For. Serv., and S.D. Agric. Exp. Stn.).
- Entz, T.; and Chang, C.** Evaluation of soil sampling schemes for geostatistical analyses; a case study for soil bulk density: *Canadian Journal of Soil Science*, 71(2), p. 165-176 (incl. French sum.), illus. (incl. 2 tables), 1991.
- Erickson, B.; and Myrabo, S.** Studies of the relationship between soil moisture and topography in a small catchment: *in Computational methods in subsurface hydrology* (Gambolati, Giuseppe, editor; *et al.*), p. 551-559, Comput. Mech. Publ., Southampton, United Kingdom, 1990. *Eighth international conference.*
- Escadafal, Richard; Huete, Alfredo; and Post, Donald.** Estimating soil spectral properties (visible and NIR) from color and roughness field data: *in Proceedings of the Twenty-third international symposium on Remote sensing of environment*; Volume II (Parker, Alan K., chairperson), *Proceedings of the International Symposium on Remote Sensing of Environment*, 23, p. 1263-1273, illus. (incl. 2 tables), 1990.
- Espeby, Bengt.** An analysis of saturated hydraulic conductivity in a forested glacial till slope: *Soil Science*, 150(2), p. 485-494, illus. (incl. 6 tables, sketch map), 1990.
- Essa, Salman Khalaf.** An investigation of the characteristics of ferromanganese concretions from a hydrosequence of soils at Shinfield, Berkshire: 217 p., Doctoral, 1990, University of Reading, Reading, United Kingdom. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Eswaran, H.; De Coninck, F.; and Varghese, T.** Role of plinthite and related forms in soil degradation: *in Soil degradation* (Lal, R., editor; *et al.*), *Advances in Soil Science*, 11, p. 109-127, illus. (incl. 6 tables, sketch maps), 1990.
- Eswaran, Hari.** Rationale for classification of Aridisols, in the 1987 ICOMID proposal: *in Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers* (Kimbler, J. M., editor; *et al.*), *Proceedings - International Soil Correlation Meeting (ISCOM)*, 4, p. 129-134, 1 table, 1990.
- Eswaran, Hari; and Gong Zi-Tong.** Properties, genesis, classification, and distribution of soils with gypsum: *in Occurrence, characteristics, and genesis of carbonate, gypsum, and silica accumulations in soils* (Nettleton, W. D., editor), *SSSA Special Publication*, 26, p. 89-119, illus. (incl. 9 tables, sketch maps), 1991. *Division S-5 of the Soil Science Society of America symposium.*
- Evans, A., Jr.** The interaction of aliphatic acids with basic aluminum sulfates in a forested Ultisol: *Soil Science*, 152(1), p. 53-60, illus. (incl. 2 tables), 1991.
- Evans, A., Jr.; and Zelazny, Lucian W.** Kinetics of aluminum and sulfate release from Forest soil by mono- and diprotic aliphatic acids: *Soil Science*, 149(6), p. 324-330, illus. (incl. 3 tables), 1990.
- Evans, R.** Soils at risk of accelerated erosion in England and Wales: *Soil Use and Management*, 6(3), p. 125-131, 2 tables, 1990.
- Evans, R.** Water erosion in British farmers' fields; some causes, impacts, predictions: *Progress in Physical Geography*, 14(2), p. 199-219, illus. (incl. 3 tables), 1990.
- Everaert, Wilfried.** Empirical relations for the sediment transport capacity of interrill flow: *Earth Surface Processes and Landforms*, 16(6), p. 513-532, illus. (incl. 4 tables), 1991.
- Eze, O. C.; and Loganathan, P.** Effects of pH on phosphate sorption of some Paleudults of southern Nigeria: *Soil Science*, 150(3), p. 613-621, illus. (incl. 2 tables), 1990.
- Fan, Shifang.** Selenite adsorption/desorption in ten California soils: 270 p., Doctoral, 1991, University of California, Davis, Davis, CA. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Farmer, V. C.; McHardy, W. J.; Palmieri, F.; et al.** Synthetic allophanes formed in calcareous environments; nature, conditions of formation, and transformations: *in Poorly crystalline and X-ray amorphous inorganic components in soils and clays* (Ross, G. John, prefacer), *Soil Science Society of America Journal*, 55(4), p. 1162-1166, illus., 1991. *American Society of Agronomy symposium.*
- Farmer, V. C.; and Russell, J. D.** Structure and genesis of allophanes and imogolite and their distribution in non-volcanic soils: *in Soil colloids and their associations in aggregates* (De Boodt, Marcel F., editor; *et al.*), *NATO ASI Series, Series B: Physics*, 215, p. 165-178, illus., 1990. *NATO Advanced Research Workshop.*

- Fastovsky, David E.; and McSweeney, Kevin.** Paleocene Paleosols of the petrified forests of Theodore Roosevelt National Park, North Dakota; a natural experiment in compound pedogenesis: *Palaios*, 6(1), p. 67-80, illus. (incl. 2 tables, strat. cols., sketch map), 1991.
- Fehrenbacher, Donald J.** Soil survey of Ford County, Illinois: 131 p., illus. (incl. 18 tables, block diags., sketch map; soils maps 1:15,840; colored soils map 1:253,440; index map 1:253,440), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Ill. Agric. Exp. Stn.).
- Feigenbaum, Sala; Bar-Tal, Asher; Portnoy, Rita; et al.** Binary and ternary exchange of potassium on calcareous montmorillonite soils: *Soil Science Society of America Journal*, 55(1), p. 49-56, illus. (incl. 4 tables), 1991.
- Feng Qiancheng; and Wang Huanbang.** Study on assessment method of soil water resources: *Shuiwen = Hydrology*, 1990(4 (58)), p. 28-32 (Chinese, incl. English sum.), 5 tables, 1990.
- Fenwick, I.** Palaeosols: *in Geomorphological techniques* (Goudie, Andrew S., editor), 2nd edition, p. 475-482, illus., Unwin Hyman, London, United Kingdom, 1990.
- Fevraleva, L. T.; Fedorova, T. A.; and Bobrikova, Ye. T.** Removal of natural radionuclides from soil in lysimetric water: *Soviet Soil Science*, 22(1), p. 58-60, 3 tables, 1990.
- Fies, J. C.; and Bruand, A.** Textural porosity analysis of a silty Clay soil using pore volume balance estimation, mercury porosimetry and quantified backscattered electron scanning image (BESI): *Geoderma*, 47(3-4), p. 209-219, illus. (incl. 4 tables), 1990.
- Finke, P. A.; Mucher, H. J.; and Witter, J. V.** Reliability of point counts of pedological properties on thin sections: *Soil Science*, 151(3), p. 249-253, illus. (incl. 2 tables), 1991.
- Flaig, Eric George.** Spatial variability of solute leaching in a sandy soil: 239 p., Doctoral, 1990, University of Florida, Gainesville, FL. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Floren, H. Gerald, Jr.** Soil survey of Traverse County, Minnesota: 153 p., illus. (incl. 17 tables, block diags., sketch map; soils maps 1:20,000; colored soils map 1:253,440; index map 1:253,440), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Minn. Agric. Exp. Stn.).
- Fontes, M. P. F.; Bowen, L. H.; and Weed, S. B.** Iron oxides in selected Brazilian Oxisols; II, Mossbauer studies: *Soil Science Society of America Journal*, 55(4), p. 1150-1155, illus. (incl. 4 tables), 1991.
- Fontes, M. P. F.; and Weed, S. B.** Iron oxides in selected Brazilian Oxisols; I, Mineralogy: *Soil Science Society of America Journal*, 55(4), p. 1143-1149, illus. (incl. 5 tables, sect., sketch maps), 1991.
- Fontes, Marissa Rezende.** Interactions of goethite and humic acid in some Oxisols from Brazil: 87 p., Doctoral, 1990, North Carolina State University, Raleigh, NC. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Foos, Annabelle M.** Aluminous lateritic soils, Eleuthera, Bahamas; a modern analog to carbonate Paleosols: *Journal of Sedimentary Petrology*, 61(3), p. 340-348, illus. (incl. 3 tables, geol. sketch map), 1991.
- Ford, A. B.** Chemical characteristics of greywacke and Palaeosol of early Oligocene or older sedimentary breccia, Ross Sea DSDP Site 270: *in Geological evolution of Antarctica; proceedings of the Fifth international symposium on Antarctic earth sciences* (Thomson, Michael Robert A., editor; *et al.*), International Symposium on Antarctic Earth Sciences, 5, p. 293-297, illus. (incl. 1 table, sketch map), 1991.
- Ford, Richard D.; Robbins, John M., Jr.; Werner, Jeffrey T.; et al.** Soil survey of Polk County, Florida: 235 p., illus. (incl. 23 tables, sects., sketch maps; soils maps 1:20,000; colored soils map 1:380,160; index map 1:380,160), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Univ. Fla., Inst. Food and Agric. Sci., Agric. Exp. Stn., and Soil Sci. Dep.; and Fla. Dep. Agric. and Consum. Serv.).
- Forsyth, J. L.** Correlation of the three tills of Logan County, Ohio: *The Ohio Journal of Science*, 91(1), p. 77-82, illus. (incl. 2 tables), 1991.
- Fortun, A.; Benayas, J.; and Fortun, C.** The effects of fulvic and humic acids on soil aggregation; a micromorphological study: *Journal of Soil Science*, 41(4), p. 563-572, 5 tables, 2 plates, 1990.
- Foster, George R.** Advances in wind and water erosion prediction: *Journal of Soil and Water Conservation*, 46(1), p. 27-29, illus., 1991.

- Fox, T. R.; Comerford, N. B.; and McFee, W. W.** Kinetics of phosphorus release from Spodosols; effects of oxalate and formate: *Soil Science Society of America Journal*, 54(5), p. 1441-1447, illus. (incl. 2 tables), 1990.
- Fox, T. R.; Comerford, N. B.; and McFee, W. W.** Phosphorous and aluminum release from a spodic horizon mediated by organic acids: *Soil Science Society of America Journal*, 54(6), p. 1763-1767, illus. (incl. 3 tables), 1990.
- Franzmeier, D. P.; and Steinhardt, G. C.** Relation of cation exchange capacity to clay and organic carbon contents of Indiana soils: *Proceedings of the Indiana Academy of Science*, 99(1), p. 107-112, 1 table, 1990.
- Fraser, S. J.** Discrimination and identification of ferric oxides using satellite thematic mapper data; a Newman case study: *International Journal of Remote Sensing*, 12(3), p. 635-641, illus. (incl. 1 table, 1 plate, sketch map), 1991.
- Freebairn, D. M.; Gupta, S. C.; and Rawls, W. J.** Influence of aggregate size and microrelief on development of surface soil crusts: *Soil Science Society of America Journal*, 55(1), p. 188-195, illus. (incl. 2 tables), 1991.
- Fritton, D. D.** Characterizing water flow in unsaturated soil: *in Water resources in Pennsylvania; availability, quality and management* (Majumdar, Shyamal K.; *et al.*), p. 60-70, illus. (incl. 3 tables), Pa. Acad. Sci., Easton, PA, United States, 1990.
- Frost, Louie W.** Soil survey of Oglethorpe County, Georgia: 124 p., illus. (incl. 18 tables; colored soils map 1:190,080; soils maps 1:20,000), 1991. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Univ. Ga., Coll. Agric., Agric. Exp. Stn.).
- Fu, Gongmin; Allen, Herbert E.; and Cowan, Christina E.** Adsorption of cadmium and copper by manganese oxide: *Soil Science*, 152(2), p. 72-81, illus. (incl. 5 tables), 1991.
- Fujinuki, Tadashi.** Determination of Nb and Ta in weathering soils from Brazilian carbonatite complexes: *in Special issue for overseas geology and mineral resources*; 4, Research on mineral deposits associated with carbonatite in Brazil (Fujii, Keizo, editor), Chishitsu Chosajo Geppo = Bulletin - Japan, Geological Survey, 41(11), p. 627-629 (incl. Japanese sum.), charts, 1990.
- Fujitake, Nobuhide; Azuma, Junzo; Hamasaki, Takashi; *et al.*** Determination of chrysotalunin, a predominant soil anthraquinone pigment, by high-performance liquid chromatography: *Geoderma*, 48(1-2), p. 83-91, illus. (incl. 2 tables), 1991.
- Furley, Peter A.; and Ratter, James A. I.** Pedological and botanical variations across the forest-savanna transition on Maraca Island: *in The Maraca Rainforest Project* (Hemming, John H., leader), *Geographical Journal*, 156, Part 3, p. 251-266, illus. (incl. sketch maps), 1990.
- Furst, Thomas Harold.** Typic Durocrepts of the Goose Creek area of northwestern Utah and the determination of hardpan cement composition: 135 p., Doctoral, 1990, Utah State University, Logan, UT. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Gagarina, E. I.; Zuyev, V. S.; and Chizhikova, N. P.** Description of the clay fraction of soils on lacustrine-glacial clays: *Soviet Soil Science*, 22(7), p. 25-35, 4 tables, 1991.
- Galin, T.; McDowell, C.; and Yaron, B.** The effect of volatilization on the mass flow of a non-aqueous pollutant liquid mixture in an inert porous medium; experiments with kerosene: *in Transport processes in the soil*, *Journal of Soil Science*, 41(4), p. 631-641, illus. (incl. 4 tables), 1990. *British-Israeli symposium*.
- Gan, Huamin.** Factors affecting the interparticle bond energy of Na-montmorillonite: 175 p., Doctoral, 1990, Purdue University, West Lafayette, IN. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Gao Yunfu; Liang Dingwei; and Ren Shucui.** A new method of determining the specific yield of layered soils in shallow layer under surface: *Earth Science. Journal of China University of Geoscience*, 15(2), p. 196-202 (Chinese, incl. English sum.), 1990.
- Gardner, L. R.; and Nelson, G. K.** "Ghost" core stones in granite saprolite near Liberty Hill, South Carolina: *Journal of Geology*, 99(5), p. 776-779, illus. (incl. geol. sketch map), 1991.
- Gardner, Leonard Robert.** Geochemical analysis of silicate rocks and soils by XRF using pressed powders and a two-stage calibration procedure: *Chemical Geology*, 88(1-2), p. 169-182, illus. (incl. 8 tables), 1990.

- Gardner, Leonard Robert.** The role of rock weathering in the phosphorus budget of terrestrial watersheds: *Biogeochemistry*, 11(2), p. 97-110, illus. (incl. 3 tables), 1990.
- Gardner, W. R.** Soil science as a basic science: *in* 75th anniversary; 1916-1991 (Douglas, Lowell A., prefacer), *Soil Science*, 151(1), p. 2-6, 1991.
- Gaston, L. A.; and Selim, H. M.** Predicting cation mobility in montmorillonitic media based on exchange selectivities of montmorillonite: *Soil Science Society of America Journal*, 54(6), p. 1525-1530, illus. (incl. 2 tables), 1990.
- Gee, Glendon W.; and Campbell, Melvin D.** A wick tensiometer to measure low tensions in coarse soils: *Soil Science Society of America Journal*, 54(5), p. 1498-1500, illus. (incl. 1 table), 1990.
- Geng, G. Q.; and Coote, D. R.** The residual effect of soil loss on the chemical and physical quality of three soils: *Geoderma*, 48(3-4), p. 415-429, illus. (incl. 5 tables), 1991.
- Gennadiyev, Aleksandr Nikolayevich.** Pochvy i vremya; modeli razvitiya [Soils and time; models of evolution]: 232 p., illus. (incl. 49 tables, sects.), Izd. Mosk. Univ., Moscow, USSR, 1990.
- Gerrard, A. J.** Variations within and between weathered granite and head on Dartmoor: *in* 29th annual meeting of the Ussher Society (Nicholas, Clive, chairperson), *Proceedings of the Ussher Society*, 7(3), p. 285-288, illus. (incl. 2 tables), 1990.
- Gerrard, A. John.** Soil variations on hillslopes in humid temperate climates: *in* Soils and landscape evolution; proceedings of the 21st annual Binghamton symposium in geomorphology (Kneupfer, Peter L. K., editor; *et al.*), *Geomorphology*, 3(3-4), p. 225-244, illus. (incl. 4 tables), 1990.
- Ghebreiyessus, Yemane Tedla.** Evaluation of concentrated flow erosion and hydraulic shear stress relationships: 218 p., Doctoral, 1990, University of Missouri, Columbia, MO. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Ghuman, Gian S.** Antimony adsorption and desorption in acid sandy soils [abstr.]: *in* Georgia Academy of Science, 68th annual meeting (O'Neal, Floyd B., president), *Bulletin of the Georgia Academy of Science*, 49(1), p. 36, 1991.
- Giani, Luise; and Giani, Dieter.** Characteristics of a marshland soil built up from marine and peat material: *Geoderma*, 47(1-2), p. 151-157, illus. (incl. 2 tables, sketch map), 1990.
- Gill, M. P. S.** Changes in soil manganese fractions of an Alluvial soil under different levels of salinity, sodicity and submergence: *Journal of the Indian Society of Soil Science*, 38(1), p. 158-160, illus. (incl. 1 table), 1990.
- Gillette, D. A.** A physically based wind erosion estimation method: *in* Sand transport and desertification in arid lands (El-Baz, Farouk, editor; *et al.*), p. 297-308, illus. (incl. 2 tables), World Sci., Singapore, 1990. *First international workshop.*
- Girty, Gary H.** A note on the composition of plutoniclastic sand produced in different climatic belts: *Journal of Sedimentary Petrology*, 61(3), p. 428-433, illus. (incl. 3 tables, geol. sketch map), 1991.
- Gjessing, Egil T.; Efraimsen, Harry; Grande, Magne; et al.** Change in properties of humic substances by H_2SO_4 acidification: *in* Organic substances and sediments in water; Volume 1, Humics and soils (Baker, Robert Andrew, editor), p. 89-98, illus. (incl. 5 tables), Lewis Publ., Chelsea, MI, United States, 1991. *American Chemical Society meeting.*
- Glushankova, N. I.** Pleistotsenovoye pochvoobrazovaniye v basseyne Dnepra, Dona, Sredney Volgi [Pleistocene pedogenesis in the Dnieper, Don and middle Volga basins]: *Vestnik Moskovskogo Universiteta*, Seriya 5: *Geografiya*, 1990(3), p. 48-57, 1 table, 1990.
- Golbert, A. V.; and Osiyuk, V. A.** Granulometric and mineral composition of the loess-Paleosol formation in Moldova: *in* Proceedings, 13th Congress of the International Union for Quaternary Research; Distribution and chronological problems of loess (Pecsi, Marton, editor), *GeoJournal*, 24(2), p. 175-180, illus., 1991.
- Goldberg, Sabine; Kapoor, B. S.; and Rhoades, J. D.** Effect of aluminum and iron oxides and organic matter on flocculation and dispersion of arid zone soils: *Soil Science*, 150(3), p. 588-593, illus. (incl. 3 tables), 1990.
- Goldstein, Robert H.** Stable isotope signatures associated with Palaeosols, Pennsylvanian Holder Formation, New Mexico: *Sedimentology*, 38(1), p. 67-77, illus. (incl. 1 table, sketch map), 1991.

- Gollany, H. T.; Schumacher, T. E.; Evenson, P. D.; et al.** Aggregate stability of an eroded and desurfaced Typic Argistoll: *Soil Science Society of America Journal*, 55(3), p. 811-816, illus. (incl. 3 tables), 1991.
- Gong Zitong; and Lei Wenjing.** Aridisols of China: *in Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers* (Kimbler, J. M., editor; *et al.*), *Proceedings - International Soil Correlation Meeting (ISCOM)*, 4, p. 111-119, illus. (incl. 3 tables, sketch maps), 1990.
- Goodman, B. A.** The use of Mossbauer spectroscopy in the study of soil colloidal materials: *in Soil colloids and their associations in aggregates* (De Boodt, Marcel F., editor; *et al.*), *NATO ASI Series, Series B: Physics*, 215, p. 119-140, illus. (incl. 3 tables), 1990. *NATO Advanced Research Workshop*.
- Gor'kovets, V. Ya.** Usloviya obrazovaniya pozdnearehnykh zhelezistykh kvartsitov (Karel'skiy region) [Conditions of the genesis of the upper Archean ferruginous quartzites, Karelia]: *Geologicheskiy Zhurnal* (Kiev, 1968), 1990(6), p. 67-73, illus., 1990 [1990].
- Goudie, Andrew S.** Denudation and weathering: *in Geomorphological techniques* (Goudie, Andrew S., editor), 2nd edition, p. 195-224, illus. (incl. 5 tables), Unwin Hyman, London, United Kingdom, 1990.
- Govers, Gerard.** Empirical relationships for the transport capacity of overland flow: *in Erosion, transport and deposition processes* (Walling, Des E., editor; *et al.*), *IAHS-AISH Publication*, 189, p. 45-63, illus. (incl. 2 tables), 1990.
- Govindaraju, Rao S.; and Kavvas, M. Levent.** Modeling the erosion process over steep slopes; approximate analytical solutions: *Journal of Hydrology*, 127(1-4), p. 279-305, illus., 1991.
- Graber, Steven P.; Campbell, Howard V.; and Tricks, Bobby D.** Soil survey of Wabaunsee County, Kansas: 132 p., illus. (incl. 19 tables, block diags.; colored soils map 1:253,440; soils maps 1:20,000), 1991. *available from:* U. S. Soil Conserv. Serv., United States (Prep. in coop. with Kans. Agric. Exp. Stn.).
- Graham, R. C.; and Buol, S. W.** Soil geomorphic relations on the Blue Ridge front; II, Soil characteristics and pedogenesis: *Soil Science Society of America Journal*, 54(5), p. 1367-1377, illus. (incl. 3 tables), 1990.
- Graham, R. C.; Daniels, R. B.; and Buol, S. W.** Soil-geomorphic relations on the Blue Ridge front; I, Regolith types and slope processes: *Soil Science Society of America Journal*, 54(5), p. 1362-1367, illus. (incl. 1 table, sects., sketch map), 1990.
- Graham, R. C.; Diallo, M. M.; and Lund, L. J.** Soils and mineral weathering on phyllite colluvium and serpentinite in northwestern California: *Soil Science Society of America Journal*, 54(6), p. 1682-1690, illus. (incl. 4 tables, sketch map), 1990.
- Grauer, Ulrich E.; Horst, Walter J.; Fey, M. V.; et al.** The calcium-aluminum balance (CAB): *Soil Science Society of America Journal*, 55(3), p. 897-898, illus., 1991.
- Green, R. E.; and Karickhoff, S. W.** Sorption estimates for modeling: *in Pesticides in the soil environment; processes, impacts, and modeling* (Cheng, H. H., editor), *Soil Science Society of America Book Series*, 2, p. 79-101, illus. (incl. 4 tables), 1990.
- Grew, Robert Gordon.** Sediment yields and sources over short and medium time scales in a small agricultural catchment in N. Warwickshire, UK: 239 p., Doctoral, 1990, Council for National Academic Awards, United Kingdom. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Grigal, D. F.; McRoberts, R. E.; and Ohmann, L. F.** Spatial variation in chemical properties of forest floor and surface mineral soil in the north central United States: *Soil Science*, 151(4), p. 282-290, illus. (incl. 3 tables), 1991.
- Grimvall, A.; Boren, H.; and Asplund, G.** Occurrence and speciation of naturally produced organohalogens in soil and water: *in Organic substances and sediments in water; Volume 1, Humics and soils* (Baker, Robert Andrew, editor), p. 339-350, illus. (incl. sketch maps), Lewis Publ., Chelsea, MI, United States, 1991. *American Chemical Society meeting*.
- Groenendijk, H.** Compilation of a soil data set for Europe: *in Proceedings of the International conference, Soils and the greenhouse effect* (Bouwman, A. F., editor), p. 535-539, illus. (incl. 1 table), John Wiley & Sons, Chichester, United Kingdom, 1990.
- Grossman, R. B.; Fenwick, R. W.; Pringle, F. B.; et al.** Soil water field description and its applications to consistency documentation: *in Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers* (Kimbler, J. M., editor; *et al.*), *Proceedings - International Soil Correlation Meeting (ISCOM)*, 4, p. 177-189, illus. (incl. 8 tables), 1990.

- Grossman, R. B.; and Kimble, J. M.** Particle size characterization of carbonate-containing soil materials: *in Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers* (Kimble, J. M., editor; *et al.*), Proceedings - International Soil Correlation Meeting (ISCOM), 4, p. 197-200, 1 table, 1990.
- Guertal, W. R.; and Hall, G. F.** Relating soil color to soil water table levels: *The Ohio Journal of Science*, 90(4), p. 118-124, illus. (incl. 1 table), 1990.
- Gulii, V. N.; and Levlev, A. A.** Composition and aspects of formation of phosphates in the Birikeen Deposit (Aldan Shield): *Lithology and Mineral Resources (USSR)*, 25(6), p. 513-523, illus. (incl. 5 tables), 1990 [1991].
- Gundlach, Howard F.; Gilbertson, Randall R.; Johannes, Richard M.; et al.** Soil survey of Juneau County, Wisconsin: 205 p., illus. (incl. 20 tables; soils maps 1:15,840; colored soils map 1:253,440), 1991. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Univ. Wis., Coll. Agric. and Life Sci.).
- Gupta, Raj K.; Singh, R. R.; and Tanji, K. K.** Phosphorus release in sodium ion dominated soils: *Soil Science Society of America Journal*, 54(5), p. 1254-1260, illus. (incl. 1 table), 1990.
- Gupta, S. K.; Sharma, P.; Juyal, N.; et al.** Loess-Palaeosol sequence in Kashmir; correlation of mineral magnetic stratigraphy with the marine palaeoclimatic record: *JQS. Journal of Quaternary Science*, 6(1), p. 3-12, illus. (incl. strat. cols., sketch map), 1991.
- Gustavson, Thomas C.** Buried Vertisols in lacustrine facies of the Pliocene Fort Hancock Formation, Hueco Bolson, West Texas and Chihuahua, Mexico: *Geological Society of America Bulletin*, 103(4), p. 448-460, illus. (incl. strat. cols., block diag., sketch map), 1991.
- Gvaliya, M. V.; and Zonn, S. V.** Genetic differences and productivity of Red and Yellow earths in relation to relief: *Soviet Soil Science*, 22(6), p. 16-27, 5 tables, 1990.
- Gvirtzman, H.; and Gorelick, S. M.** Dispersion and advection in unsaturated porous media enhanced by anion exclusion: *Nature (London)*, 352(6338), p. 793-795, illus. (incl. 1 table), 1991.
- Haagen, Edward.** Soil survey of Skamania County area, Washington: 430 p., illus. (incl. 17 tables, block diag., strat. cols., sketch map; soils maps 1:24,000; colored soils map 1:253,440; index map 1:253,440), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Wash. State Dep. Nat. Resour. and Wash. State Univ. Agric. Res. Cent.).
- Haile-mariam, Shawel.** Mineralogy of fine-loamy and sandy hydrosequences in Michigan: 139 p., Doctoral, 1991, Michigan State University, East Lansing, MI. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Hajrasuliha, S.; Cassel, D. K.; and Rezainejad, Y.** Estimation of chloride ion concentration in saline soils from measurement of electrical conductivity of saturated soil extracts: *Geoderma*, 49(1-2), p. 117-127, illus. (incl. 4 tables, sketch map), 1991.
- Hall, Adrian M.** Pre-Quaternary landscape evolution in the Scottish Highlands: *Transactions of the Royal Society of Edinburgh: Earth Sciences*, 82(1), p. 1-26, illus. (incl. sects., geol. sketch maps), 1991.
- Hall, Kevin; and Otte, Wulf.** A note on biological weathering on nunataks of the Juneau Icefield, Alaska: *Permafrost and Periglacial Processes*, 1(2), p. 189-196 (incl. French sum.), 1990.
- Hamilton, W. L.; and Chambers, R. L.** Soil mercury and streambed-temperature anomalies in the Norris-Mammoth-La Duke corridor: *in Effects of potential geothermal development in the Corwin Springs Known Geothermal Resources Area, Montana, on the thermal features of Yellowstone National Park* (Sorey, Michael L., editor), *Water-Resources Investigations*, p. E1-E24, illus. (incl. sketch maps), 1991. (Rep. No. WRI 91-4052) *available from:* U. S. Geol. Surv., Denver, CO, United States.
- Hampton, D. R.** A method to fit the soil hydraulic curves in models of flow in unsaturated soils: *in Computational methods in subsurface hydrology* (Gambolati, Giuseppe, editor; *et al.*), p. 175-180, illus., Comput. Mech. Publ., Southampton, United Kingdom, 1990. *Eighth international conference*.
- Hanvey, Patricia; Dardis, George F.; and Beckedahl, Heinrich R.** Soil erosion on a sub-tropical coastal dune complex, Transkei, Southern Africa: *in Soil erosion and host materials in Africa* (Dardis, George, editor), *GeoJournal*, 23(1), p. 41-48, illus. (incl. sketch maps), 1991.
- Harden, J. W.; Taylor, E. M.; McFadden, L. D.; et al.** Calcic, gypsic, and siliceous soil chronosequences in arid and semiarid environments: *in Occurrence, characteristics, and genesis of carbonate, gypsum, and silica accumulations in soils* (Nettleton, W. D., editor), *SSSA Special Publication*, 26, p. 1-16, illus. (incl. 3 tables, sketch map), 1991. *Division S-5 of the Soil Science Society of America symposium*.

- Harden, Jennifer W.** Soil development on stable landforms and implications for landscape studies: *in* Soils and landscape evolution; proceedings of the 21st annual Binghamton symposium in geomorphology (Kneupfer, Peter L. K., editor; *et al.*), *Geomorphology*, 3(3-4), p. 391-398, illus., 1990.
- Harden, Jennifer W.; Slate, Janet L.; Lamothe, Paul J.; et al.** Soil formation on the Trail Canyon alluvial fan, Fish Lake valley, Nevada: Open-File Report - U. S. Geological Survey, 29 p., 3 tables, 1991. (Rep. No. OF 91-0291) available from: U. S. Geol. Surv., Denver, CO, United States.
- Harden, Jennifer W.; Taylor, Emily M.; Hill, Cindy; et al.** Rates of soil development from four soil chronosequences in the southern Great Basin: *Quaternary Research* (New York), 35(3, Part 1), p. 383-399, 3 tables, charts, 1991.
- Harrison, J. B. J.; McFadden, Leslie D.; and Weldon, R. J., III.** Spatial soil variability in the Cajon Pass chronosequence; implications for the use of soils as a geochronological tool: *in* Soils and landscape evolution; proceedings of the 21st annual Binghamton symposium in geomorphology (Kneupfer, Peter L. K., editor; *et al.*), *Geomorphology*, 3(3-4), p. 399-416, illus. (incl. 7 tables, sketch maps), 1990.
- Harrison, R.; Swift, R. S.; Campbell, A. S.; et al.** A study of two soil development sequences located in a montane area of Canterbury, New Zealand; I, Clay mineralogy and cation exchange properties: *Geoderma*, 47(3-4), p. 261-282, illus. (incl. 8 anal., 10 tables, sketch map), 1990.
- Harrison, R.; Swift, R. S.; and Tonkin, P. J.** A study of two soil development sequences located in a montane area of Canterbury, New Zealand; II, Soil development indices based on major element analyses: *Geoderma*, 48(1-2), p. 163-177, illus. (incl. 4 tables), 1991.
- Hatano, Ryusuke; and Sakuma, Toshio.** A plate model for solute transport through aggregated soil columns; I, Theoretical description: *Geoderma*, 50(1-2), p. 13-23, 1991.
- Hatano, Ryusuke; and Sakuma, Toshio.** A plate model for solute transport through aggregated soil columns; II, Experimental results and application of the model: *Geoderma*, 50(1-2), p. 25-36, 1991.
- Hatta, T.; Noro, H.; Nakai, M.; et al.** Stability fields of several minerals in the conditions of weathering and hydrothermal alteration; shift of the fields by the changes in water activity and Gibbs free energy of formation: *Kobutsugaku Zasshi* = Journal of the Mineralogical Society of Japan, 19, p. 121-130 (Japanese, incl. English sum.), illus. (incl. 2 tables, charts), 1990. (Hydrothermal alteration and formation of clay minerals).
- Hayes, Michael H. B.; and Swift, R. S.** Genesis, isolation, composition and structures of soil humic substances: *in* Soil colloids and their associations in aggregates (De Boodt, Marcel F., editor; *et al.*), NATO ASI Series, Series B: Physics, 215, p. 245-305, illus. (incl. 4 tables), 1990. *NATO Advanced Research Workshop*.
- Haynes, R. J.; and Swift, R. S.** Concentrations of extractable Cu, Zn, Fe and Mn in a group of soils as influenced by air- and oven-drying and rewetting: *Geoderma*, 49(3-4), p. 319-333, 1991.
- Hazelden, J.** Soils in Norfolk; VIII, Sheet TG40 (Halvergate): Soil Survey Record - Rothamsted Experimental Station, 115, 40 p., 1 sheet, 3 tables, sketch map, soils map 1:25,000, 1990.
- Hazlett, P. W.; English, M. C.; and Foster, N. W.** A volume recorder for lysimeter waters: *Soil Science Society of America Journal*, 54(5), p. 1503-1505, illus. (incl. 2 tables), 1990.
- Healy, R. W.; Reimer, G. M.; Been, J. M.; et al.** A new method for determining soil macroporosity [abstr.]: *in* U.S. Geological Survey Toxic Substances Hydrology Program; abstracts of the technical meeting, Monterey, California, March 11-15, 1991 (Mallard, Gail E., compiler; *et al.*), Open-File Report - U. S. Geological Survey, p. 84, 1991. (Rep. No. OF 91-0088) available from: U. S. Geol. Surv., Denver, CO, United States.
- Hebbert, R. H. B.; and Smith, R. E.** Hillslope parameter estimation using the inverse procedure: *Journal of Hydrology*, 119(1-4), p. 307-334, illus. (incl. 3 tables, sketch maps), 1990.
- Heimovaara, T. J.; and Bouten, W.** A computer-controlled 36-channel time domain reflectometry system for monitoring soil water contents: *Water Resources Research*, 26(10), p. 2311-2316, illus., 1990.
- Heinen, M.; and Raats, P. A. C.** Evaluation of two models describing the steady discharge from a constant head well permeameter into unsaturated soil: *Soil Science*, 150(1), p. 401-412, illus. (incl. 7 tables), 1990.
- Heller, Friedrich; Liu Xiuming; Liu Tungsheng; et al.** Magnetic susceptibility of loess in China: *Earth and Planetary Science Letters*, 103(1-4), p. 301-310, illus. (incl. strat. col., sketch map), 1991.

- Hendershot, Robert L.** Soil survey of Pike County, Ohio: 252 p., illus. (incl. 21 tables, sketch map; soils maps 1:15,840; colored soils map 1:190,080; index map 1:190,080), 1990. *available from:* U.S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Ohio Dep. Nat. Resour., Div. Soil and Water Conserv., and Ohio Agric. Res. and Dev. Cent.).
- Hendrickx, J. M. H.** Determination of hydraulic soil properties: *in* Process studies in hillslope hydrology (Anderson, M. G., editor; *et al.*), p. 43, illus. (incl. 5 tables). John Wiley and Sons, Chichester, United Kingdom, 1990.
- Hendrickx, J. M. H.; Khan, A. S.; Bannink, M. H.; et al.** Numerical analysis of groundwater recharge through stony soils using limited data: *Journal of Hydrology*, 127(1-4), p. 173-192, illus. (incl. 5 tables, sketch map), 1991.
- Herkelrath, W. N.; Hamburg, S. P.; and Murphy, Fred.** Automatic, real-time monitoring of soil moisture in a remote field area with time domain reflectometry: *Water Resources Research*, 27(5), p. 857-864, illus., 1991.
- Hewitt, Alan D.; and Reynolds, C. M.** Dissolution of metals from soils and sediments with a microwave-nitric acid digestion technique: *Atomic Spectroscopy*, 11(5), p. 187-192, illus. (incl. 5 tables), 1990.
- Higgitt, David L.** Soil erosion and soil problems: *Progress in Physical Geography*, 15(1), p. 91-100, 1991.
- Hinkle, M. E.** Factors affecting concentrations of helium and carbon dioxide in soil gases: *in* Geochemistry of gaseous elements and compounds (Durrance, E. M.; *et al.*), p. 421-448, illus. (incl. sketch map), Theophrastus Publ., Athens, Greece, 1990.
- Hipple, Karl W.; Logan, Glen H.; and Fosberg, Maynard.** Aridisols with cryic soil temperature regimes: *in* Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers (Kimbler, J. M., editor; *et al.*), Proceedings - International Soil Correlation Meeting (ISCOM), 4, p. 99-109, illus. (incl. 8 tables, sketch maps), 1990.
- Hoag, George E.; Marley, Michael C.; Cliff, Bruce L.; et al.** Soil vapor extraction research developments: *in* Hydrocarbon contaminated soils and groundwater; analysis, fate, environmental and public health effects remediation; Volume 1 (Kostecki, Paul T., editor; *et al.*), p. 187-202, illus., Lewis Publ., Chelsea, MI, United States, 1991. *First annual West Coast conference on Hydrocarbon contaminated soils and groundwater.*
- Hodder, A. P. W.; De Lange, P. J.; and Lowe, D. J.** Dissolution and depletion of ferromagnesian minerals from Holocene tephra layers in an acid bog, New Zealand, and implications for tephra correlation: *JQS. Journal of Quaternary Science*, 6(3), p. 195-208, illus. (incl. 4 tables, sketch map), 1991.
- Hoddinott, Keith B.; and Lamb, Robert O. (editors).** Physico-chemical aspects of soil and related materials: June 29, 1989, United States. ASTM Special Technical Publication = American Society for Testing and Materials Special Technical Publication, 1095, 195 p., 1990.
- Hodge, C. A. H.** Soils in Suffolk; II, Sheet TM06 (Finningham): *Soil Survey Record - Rothamsted Experimental Station*, 108, 36 p., 1 sheet, 3 tables, sketch map, soils map 1:25,000, 1991.
- Hodge, C. A. H.** Soils in Suffolk; I, Sheet TL76E/86W (Risby): *Soil Survey Record - Rothamsted Experimental Station*, 107, 68 p., 2 sheets, 3 tables, sketch map, soils maps 1:25,000, 1991.
- Hodges, Mack S.** Soil survey of Macoupin County, Illinois: 145 p., illus. (incl. 19 tables, block diags., sketch map; soils maps 1:15,840; colored soils map 1:253,440; index map 1:253,440), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Ill. Agric. Exp. Stn.).
- Hogfeldt, Erik.** Application of a simple three-parameter model to inorganic ion exchangers; the system $\text{TL}^+ \cdot \text{H}^-$ on Putnam clay and bentonite: *Soil Science*, 149(6), p. 393-394, illus. (incl. 1 table), 1990.
- Holden, Lisa Joan.** Singular perturbation problems in the soil and biological sciences: 111 p., Doctoral, 1990, Northwestern University, Evanston, IL. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Holford, I. C. R.; Chater, M.; and Mattingly, G. E. G.** Effects of decalcification on the phosphate sorption characteristics of eight Calcareous soils: *Australian Journal of Soil Research*, 28(6), p. 919-928, 1990.

- Holgye, Z.** Determination of plutonium in soil: *in* Proceedings of the 12th radiochemical conference (Prasil, Zdenek, chairperson), Journal of Radioanalytical and Nuclear Chemistry, 149(2), p. 275-280, 1 table, 1991.
- Holiday, Vance T.** Pedology in archaeology: *in* Archaeological geology of North America (Laska, Norman P., editor; *et al.*), 4, p. 525-540, illus. (incl. 3 tables, strat. col., sect.), Geol. Soc. Am., Boulder, CO, United States, 1990.
- Holliday, Vance T.** Soils and landscape evolution of eolian plains; the Southern High Plains of Texas and New Mexico: *in* Soils and landscape evolution; proceedings of the 21st annual Binghamton symposium in geomorphology (Kneupper, Peter L. K., editor; *et al.*), Geomorphology, 3(3-4), p. 489-515, illus. (incl. 8 tables, sketch map), 1990.
- Holzhey, C. S.; and Peterson, F.** The massive and hard-drying ochric epipedon in the xeric-aridic transition in California: *in* Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers (Kimble, J. M., editor; *et al.*), Proceedings - International Soil Correlation Meeting (ISCOM), 4, p. 227-243, illus. (incl. 11 tables), 1990.
- Hopkins, D. G.; Sweeney, M. D.; and Richardson, J. L.** Dispersive erosion and Entisol-panspot genesis in sodium-affected landscapes: Soil Science Society of America Journal, 55(1), p. 171-177, illus. (incl. 3 tables, sect., sketch map), 1991.
- Hornberger, George M.; Germann, Peter F.; and Beven, Keith J.** Throughflow and solute transport in an isolated sloping soil block in a forested catchment: Journal of Hydrology, 124(1-2), p. 81-99, illus. (incl. 3 tables, sketch map), 1991.
- Hornung, M.; Le-Grice, S.; Brown, N.; et al.** The role of geology and soils in controlling surface water acidity in Wales: *in* Acid waters in Wales (Edwards, Ron W., editor; *et al.*), Monographiae Biologicae, 66, p. 55-66, illus. (incl. 3 tables, sketch maps), 1990.
- Hosono, Mamoru; Oba, Yutaka; Sase, Takashi; et al.** Holocene volcanic ash soils at Waimangu Road tephra section, North Island, New Zealand; soil formation-vegetation relationship: Daiyonki-Kenkyu = Quaternary Research, 30(2), p. 91-101 (Japanese, incl. English sum.), 2 tables, 1 plate, charts, 1991.
- Howard, Richard F.; and Bowman, Roy H.** Soil survey of Mendocino County, eastern part, and Trinity County, southwestern part, California: 419 p., illus. (incl. 17 tables; colored soils map 1:316,800; soils maps 1:24,000), 1991. *available from:* U.S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with U. S. Dep. Agric., For. Serv.; U. S. Dep. Inter., Bur. Land Manage. and Bur. Indian Aff.; and Univ. Calif. Agric. Exp. Stn.).
- Howell, David A.; and Williams, Christopher A.** Soil survey of Madison County, Florida: 160 p., illus. (incl. 18 tables, sects.; colored soils map 1:190,080; soils maps 1:15,840), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Univ. Fla., Inst. Food and Agric. Sci., Agric. Exp. Stn., and Soil Sci. Dep.; and Fla. Dep. Agric. and Consum. Serv.).
- Huang, Chi-hua; and Bradford, Joe M.** Portable laser scanner for measuring soil surface roughness: Soil Science Society of America Journal, 54(5), p. 1402-1406, illus., 1990.
- Huang Furong.** Secondary enrichment of phosphorite in eastern Yunnan and its formation mechanism: Mineral Deposits = K'uang Ch'uang Ti Chih / Kuangchuang Dizhi, 10(2), p. 179-186 (Chinese, incl. English sum.), illus. (incl. 1 table, sects.), 1991.
- Huang, P. M.** Organo-alumino polymer associations and their significance in soil and environmental sciences: *in* Soil colloids and their associations in aggregates (De Boord, Marcel F., editor; *et al.*), NATO ASI Series, Series B: Physics, 215, p. 179-237, illus. (incl. 12 tables), 1990. *NATO Advanced Research Workshop.*
- Huang, P. M.** Ionic factors affecting the formation of short-range ordered aluminosilicates: *in* Poorly crystalline and X-ray amorphous inorganic components in soils and clays (Ross, G. John, prefacer), Soil Science Society of America Journal, 55(4), p. 1172-1180, illus. (incl. 4 tables), 1991. *American Society of Agronomy symposium.*
- Hubbard, R. K.; Asmussen, Loris E.; and Perkins, H. F.** Use of ground-penetrating radar on upland coastal plain soils: Journal of Soil and Water Conservation, 45(3), p. 399-405, illus. (incl. 5 tables, geol. sketch maps), 1990.

- Hudson, Charles A.; and Panuska, Bruce C.** Paleomagnetic correlation of Pleistocene Paleosols; San Salvador Islands, Bahamas: *The Compass*, 67(4), p. 240-247, illus. (incl. 1 table, strat. col., sketch maps), 1990.
- Huntley, Brian.** European vegetation history; palaeovegetation maps from pollen data; 13 000 yr BP to present: *JQS. Journal of Quaternary Science*, 5(2), p. 103-122, illus. (incl. 4 tables, sketch maps), 1990.
- Hussain, Samir K.** Prediction of hydrodynamic dispersion coefficient of saturated soil: 138 p., Doctoral, 1990, University of Nebraska, Lincoln, NE. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Ibrahim, Ibrahim Mahmoud.** Centrifugal modeling of water movement in unsaturated soils: 202 p., Doctoral, 1990, Colorado State University, Fort Collins, CO. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Ichihashi, Hideki; Morita, Hideyoshi; Honda, Katsuhisa; et al.** Distribution of rare earth elements in non-cultivated soil in the western part of Shikoku Island, Japan: *Chikyu Kagaku* (Tokyo, 1967) = *Geochemistry* (Tokyo, 1967), 24(2), p. 115-121 (Japanese, incl. English sum.), 5 tables, charts, 1990.
- Ildefonse, Philippe; Muller, Jean-Pierre; Clozel, Blandine; et al.** Record of past contact between altered rocks and radioactive solutions through radiation-induced defects in kaolinite: *in Materials Research Society symposium proceedings; Scientific basis for nuclear waste management XIV* (Abrajano, Teofilo A., Jr., editor; *et al.*), *Materials Research Society Symposia Proceedings*, 212, p. 749-756, illus., 1991.
- Il'inskaya, N. B.; and Romm, E. S.** Reliability of statistical estimates of porosity in quantitative analysis of the microstructure of soils: *Soviet Engineering Geology*, 1990(3), p. 101-106, illus. (incl. 1 table), 1990.
- Ilyas, Mohammad.** Some saline-sodic soils of Pakistan and their reclamation; a case study: 249 p., Doctoral, 1990, Utah State University, Logan, UT. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Indorante, Samuel John.** Comparison of soil properties on eroded and native central Missouri deep loess soils: 464 p., Doctoral, 1990, University of Missouri, Columbia, Columbia, MO. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Inoue, K.; and Huang, P. M.** Perturbation of imogolite formation by humic substances: *Soil Science Society of America Journal*, 54(5), p. 1490-1497, illus. (incl. 4 tables), 1990.
- Inoue, K.; and Naruse, T.** Asian long-range eolian dust deposited on soils and Paleosols along the Japan Sea coast: *Daiyonki-Kenkyu = Quaternary Research*, 29(3), p. 209-222 (Japanese, incl. English sum.), illus. (incl. 3 tables, charts, sketch maps), 1990.
- Isbell, R. F.** Soils of the Australian arid zone: *in Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers* (Kimble, J. M., editor; *et al.*), *Proceedings - International Soil Correlation Meeting (ISCOM)*, 4, p. 67-72, sketch map, 1990.
- Ishchenko, G. S.; and Butnik, A. S.** Forms of occurrence of ^{238}U and ^{232}Th in soils of Central Asia: *Soviet Soil Science*, 22(4), p. 45-49, illus., 3 tables, 1990.
- Ishida, T.** Effect of organic matter and allophane on adsorption of polyethylene glycols onto some soils: *Australian Journal of Soil Research*, 29(4), p. 515-525, illus. (incl. 2 tables, sketch map), 1991.
- Ito, Toyoaki; Shoji, Sadao; Shirato, Yasuhito; et al.** Differentiation of a spodic horizon from a buried A horizon: *Soil Science Society of America Journal*, 55(2), p. 438-442, illus. (incl. 1 table), 1991.
- Jabro, J. D.; and Fritton, D. D.** Simulation of water flow from a percolation test hole in layered soil: *Soil Science Society of America Journal*, 54(5), p. 1214-1218, illus., 1990.
- Jacob, John S.; and Nordt, Lee C.** Soil and landscape evolution; a paradigm for pedology: *Soil Science Society of America Journal*, 55(4), p. 1194, 1991.
- Jaillard, B.; Guyon, A.; and Maurin, A. F.** Structure and composition of calcified roots, and their identification in Calcareous soils: *Geoderma*, 50(3), p. 197-210, 1991.
- Janczuk, Bronislaw; Bialopiotrowicz, Tomasz; Kliszcz, Anna; et al.** Influence of polyacrylamide on the surface free energy and wettability of a Chernozem soil: *Geoderma*, 50(3), p. 173-184, 1991.
- Janczuk, Bronislaw; Hajnos, Mieczyslaw; Bialopiotrowicz, Tomasz; et al.** Hydrophobization of the soil by dodecylammonium hydrochloride and changes of the components of its surface free energy: *Soil Science*, 150(5), p. 753-762, illus. (incl. 4 tables), 1990.

- Jaramillo J., Daniel F.** Relacion fisiografia-suelos en la parte plana del valle del Cauca en el sector de Buga-Sonso [Relationship between physiography and soils in the Buga-Sonso sector of the Cauca River valley floodplains]: Boletin de Ciencias de la Tierra, 9, p. 1-11 (incl. English sum.), illus. (incl. 2 tables, sketch map), 1990.
- Jaramillo J., Daniel F.; and Gonzalez S., Luis Hernan.** Relacion fisiografia-suelos en la zona aledana a la autopista Medellin-Bogota, entre el Rio Claro y el Rio Magdalena [Relationship between soils and landscapes in the zone bordering the Medellin-Bogota Highway, between the Claro and Magdalena rivers]: Boletin de Ciencias de la Tierra, 9, p. 26-38 (incl. English sum.), illus. (incl. 1 table, sketch map), 1990.
- Jaynes, Dan B.** Soil water hysteresis; models and implications: *in* Process studies in hillslope hydrology (Anderson, M. G., editor; *et al.*), p. 93-126, illus., John Wiley and Sons, Chichester, United Kingdom, 1990.
- Jeanroy, E.; Rajot, J. L.; Pillon, P.; et al.** Differential dissolution of hematite and goethite in dithionite and its implication on soil yellowing: *Geoderma*, 50(1-2), p. 79-94, 1991.
- Jenkinson, D. S.; Adams, D. E.; and Wild, A.** Model estimates of CO₂ emissions from soil in response to global warming: *Nature* (London), 351(6324), p. 304-306, illus. (incl. 1 table), 1991.
- Jensen, Earnest L.** Soil survey of Carroll County, Indiana: 284 p., illus. (incl. 20 tables; soils maps 1:15,840; colored soils map 1:190,080), 1991. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Purdue Univ., Agric. Exp. Stn., and Indiana Dep. Nat. Resour., State Soil Conserv. Board and Div. Soil Conserv.).
- Jerwood, L. C.; Robinson, D. A.; and Williams, R. B. G.** Experimental frost and salt weathering of chalk; I: Earth Surface Processes and Landforms, 15(7), p. 611-624, illus. (incl. 8 tables), 1990.
- Jin Xiuhua; Cheung, Y. Y.; and Date, A. R.** Determination of minor and trace elements in soil samples by inductively coupled plasma source mass spectrometry (ICP-MS): Chung-kuo Huan Ching k'o Hsueh = China Environmental Science, 10(3), p. 224-228 (Chinese, incl. English sum.), illus. (incl. 3 tables, charts), 1990.
- Jing Enchun; Zhang Xiaohe; Xia Shushen; et al.** An introduction to the Model WM-1 tensiometer system: Shuiwendizi gongchendizhi = Bulletin of the Institute of Hydrogeology and Engineering Geology, 6, p. 182-194 (Chinese, incl. English sum.), charts, 1990.
- Jocteur Monrozier, L.; Ladd, J. N.; Fitzpatrick, R. W.; et al.** Components and microbial biomass content of size fractions in soils of contrasting aggregation: *Geoderma*, 50(1-2), p. 37-62, 1991.
- Joeckel, R. M.** Paleosol stratigraphy of the Eskridge Formation; Early Permian pedogenesis and climate in southeastern Nebraska: *Journal of Sedimentary Petrology*, 61(2), p. 234-255, illus., 1991.
- Johnson, Donald L.; and Watson-Stegner, Donna.** The soil-evolution model as a framework for evaluating pedoturbation in archaeological site formation: *in* Archaeological geology of North America (Laska, Norman P., editor; *et al.*), 4, p. 541-560, illus. (incl. 1 table, sects., sketch map), Geol. Soc. Am., Boulder, CO, United States, 1990.
- Johnson, Erik P.** Soil survey of Ogemaw County, Michigan: 252 p., illus. (incl. 20 tables, sketch map; soils maps 1:15,840; colored soils map 1:190,080; index map 1:190,080), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with U. S. Forest Serv., Mich. Dep. Agric., Mich. Agric. Exp. Stn., and Mich. Technol. Univ.).
- Johnson, Mark E.** Soil survey of Blaine County area, Idaho: 368 p., illus. (incl. 17 tables; colored soils map 1:316,800; soils maps 1:24,000), 1991. *available from:* U. S. Soil Conserv. Serv., United States (Prep. in coop. with U. S. Bur. Land Manage., Univ. Idaho, Coll. Agric., and Idaho Soil Conserv. Comm.).
- Johnson, William M.** The Argids: *in* Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers (Kimble, J. M., editor; *et al.*), Proceedings - International Soil Correlation Meeting (ISCOM), 4, p. 15-20, 3 tables, 1990.
- Johnsson, Holger; and Lundin, Lars-Christer.** Surface runoff and soil water percolation as affected by snow and soil frost: *Journal of Hydrology*, 122(1-4), p. 141-159, illus. (incl. 1 table), 1991.
- Johnsson, Mark J.; Stallard, Robert F.; and Lundberg, Neil.** Controls on the composition of fluvial sands from a tropical weathering environment; sands of the Orinoco River drainage basin, Venezuela and Colombia: *Geological Society of America Bulletin*, 103(12), p. 1622-1647, illus. (incl. 5 table, sects., sketch maps), 1991.

- Jones, Robert L.** Uranium in Illinois surface soils: *Soil Science Society of America Journal*, 55(2), p. 549-550, 1991.
- Jones, T. L.; Gee, G. W.; and Heller, P. R.** Psychrometric measurement of soil water potential; stability of calibration and test of pressure-plate samples: *Soil Science*, 150(2), p. 535-541, illus., 1990.
- Jongmans, A. G.; Feijtel, T. C. J.; Miedema, R.; et al.** Soil formation in a Quaternary terrace sequence of the Allier, Limagne, France; macro- and micromorphology, particle size distribution, chemistry: *Geoderma*, 49(3-4), p. 215-239, 1991.
- Jouaffre, Didier; Bruckert, Sylvain; Williams, Alan F.; et al.** Rubefaction post-wurmienne en climat montagnard humide jurassien; rôle du pedoclimat et actualité du processus [Post-Wurmian rubefaction in a humid montane climate, Jura, France; role of pedoclimate and current processes]: *Geoderma*, 50(3), p. 239-257 (incl. English sum.), 1991.
- Kaemmerer, Michel; and Revel, Jean Claude.** Calcium carbonate accumulation in deep strata and calcrete in Quaternary alluvial formations of Morocco: *Geoderma*, 48(1-2), p. 43-57 (incl. English sum.), illus. (incl. sects., sketch map), 1991.
- Kalyuznyy, I. L.; and Pavlova, K. K. (editors).** Voprosy gidrofiziki pochv [Problems in soil hydrophysics]: Trudy Gosudarstvennogo Ordona Trudovogo Krasnogo Znameni Gidrologicheskogo Instituta, 334, 144 p., illus. (incl. 38 tables), 1990 [1990].
- Kapustin, Yu. L.** Raspredeleniye niobiya i tantala v fergusonitonosnykh karbonatitakh i ikh kore vyvetrivanija [Distribution of niobium and tantalum in fergusonite-bearing carbonatites and their weathering crust]: *Geokhimiya*, 1990(4), p. 558-569 (incl. English sum.), 4 tables, 1990.
- Karathanasis, A. D.** Seasonal variation in solution composition and mineral stability of two Kentucky Alfisols: *Soil Science Society of America Journal*, 55(3), p. 881-890, illus. (incl. 7 tables), 1991.
- Karathanasis, A. D.; and Golrick, P. A.** Soil formation on loess/sandstone toposequences in west-central Kentucky, I, Morphology and physicochemical properties: *Soil Science*, 152(1), p. 14-24, illus. (incl. 1 table, sect., sketch map), 1991.
- Karetin, Lev Nikolayevich.** Pochvy Tyumenskoy oblasti [The soils of the Tyumen region]: 286 p., illus. (incl. 167 tables, sketch maps), Izd. Nauka, Sib. Otd., Novosibirsk, USSR, 1990.
- Karimian, N.; and Razmi, K.** Influence of perennial plants on chemical properties of arid Calcareous soils in Iran: *Soil Science*, 150(4), p. 717-721, 4 tables, 1990.
- Karlstrom, E. T.** Relict periglacial features east of Waterton-Glacier parks, Alberta and Montana, and their paleoclimatic significance: *Permafrost and Periglacial Processes*, 1(3-4), p. 221-234 (incl. French sum.), illus. (incl. 2 tables, sects., geol. sketch maps), 1990.
- Karlstrom, Eric T.** Paleoclimatic significance of late Cenozoic Paleosols east of Waterton-Glacier parks, Alberta and Montana: *Palaeogeography, Palaeoclimatology, Palaeoecology*, 85(1-2), p. 71-100, illus. (incl. 6 tables, charts, sketch map), 1991.
- Karnaukhov, A. I.; Tkachenko, V. M.; and Shestidesyatnaya, N. L.** Adsorption of copper by certain soil types of the Ukraine: *Soviet Soil Science*, 22(5), p. 36-41, illus. (incl. 3 tables), 1990.
- Karpukhin, A. I.** Classification and nomenclature of coordination compounds in soils: *Soviet Soil Science*, 22(8), p. 54-62, 2 tables, 1990.
- Kashiwagi, James H.; and Hokholt, Lisa A.** Soil survey of San Mateo County, eastern part, and San Francisco County, California: 120 p., illus. (incl. 11 tables, block diagrs., sketch maps; soils maps 1:24,000; colored soils map 1:190,080; index map 1:190,080), 1991. available from: U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Regents Univ. Calif. (Agric. Exp. Stn.)).
- Katyai, J. C.; and Sharma, B. D.** DTPA-extractable and total Zn, Cu, Mn, and Fe in Indian soils and their association with some soil properties: *Geoderma*, 49(1-2), p. 165-179, illus. (incl. 6 tables), 1991.
- Keersebilck, N. C.** Erosion control in the tropics: in *Soil colloids and their associations in aggregates* (De Boodt, Marcel F., editor; et al.), NATO ASI Series, Series B: Physics, 215, p. 567-576, illus. (incl. 8 tables), 1990. *NATO Advanced Research Workshop*.
- Keller, Michael; Mitre, Martin E.; and Stallard, Robert F.** Consumption of atmospheric methane in soils of central Panama; effects of agricultural development: *Global Biogeochemical Cycles*, 4(1), p. 21-27, illus. (incl. 1 table, sketch map), 1990.

- Kelley, John A.** Soil survey of Pike County, Kentucky: 160 p., illus. (incl. 21 tables, block diag., sketch map; soils maps 1:24,000; colored soils map 1:253,440; index map 1:253,440), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep in coop. with Ky. Nat. Resour. and Environ. Prot. Cabinet and Ky. Agric. Exp.Stn.).
- Kelly, Martyn G.; and Huntley, Brian.** An 11000-year record of vegetation and environment from Lago di Martignano, Latium, Italy: JQS. Journal of Quaternary Science, 6(3), p. 209-224, illus. (incl. sketch maps), 1991.
- Kenny, Jerry F.** Measurement and prediction of tillage effects on hydraulic and thermal properties of Palouse silt loam soil: 209 p., Doctoral, 1990, Washington State University, Pullman, WA. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Keren, R.** Specific effect of magnesium on soil erosion and water infiltration: Soil Science Society of America Journal, 55(3), p. 783-787, illus. (incl. 1 table), 1991.
- Keren, R.; and Singer, M. J.** Hydroxy-aluminum's effect on permeability of clay-sand mixtures: Soil Science Society of America Journal, 55(1), p. 61-65, illus., 1991.
- Keren, R.; and Singer, Michael J.** Effect of pH on permeability of clay-sand mixture containing hydroxy polymers: Soil Science Society of America Journal, 54(5), p. 1310-1315, illus., 1990.
- Kerenyi, A.; and Csorba, P.** Assessment of the sensitivity of the landscape in a sample area in Hungary for climate variability: Earth Surface Processes and Landforms, 16(7), p. 663-673, illus. (incl. 1 table, sketch maps), 1991.
- Khalili, Fawwaz.** Preparation and characterization of selected metal-humate complexes: Soil Science, 150(3), p. 565-570, illus. (incl. 4 tables), 1990.
- Khanbilvardi, Reza M.; Akhtar, Muhammad W.; and Rogowski, Andrew S.** Low flow local scour for cylindrical objects: *in* Proceedings; 1990 national symposium on mining (Graves, Donald H., editor), p. 247-251, illus. (incl. 1 table), Univ. Ky., Coll. Eng., Off. Eng. Serv., Lexington, KY, United States, 1990. (UKY BU153).
- Khandal, R. K.; Thoisy-Dur, J. C.; and Terce, M.** Adsorption characteristics of flumequine on kaolinitic clay: Geoderma, 50(1-2), p. 95-107, 1991.
- Khosrowpanah, Shahram.** Defining USLE factors for the southern Guam: *in* Proceedings from the technical sessions of the regional conference on Nonpoint source pollution; the unfinished agenda for the protection of our water quality, Report - Washington State University, Water Research Center, p. 329-338, illus. (incl. sketch maps), 1991. (Rep. No. 78).
- Khublarian, M. G.; Putyrskiy, V. E.; and Frolov, A. P.** Modelling of interrelated water flows in the unsaturated-saturated soil-river system: *in* Groundwater monitoring and management (Jones, G. P., editor), IAHS-AISH Publication, 173, p. 255-263, illus., 1990.
- Kiernan, Kevin.** Weathering as an indicator of the age of Quaternary glacial deposits in Tasmania: Australian Geographer, 21(1), p. 1-17, illus. (incl. 4 tables), 1990.
- Kimble, J. M.; and Nettleton, W. D. (editors).** Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers: Oct. 3-17, 1987, United States. Proceedings - International Soil Correlation Meeting (ISCOM), 4, 250 p., 1990.
- King, Hen-Biau.** Genesis and classification of three forest soils in central Taiwan: Doctoral, 1990, Carleton University, Ottawa, ON, Canada. *available from:* Natl. Libr. Can., Ottawa, ON, Canada.
- King, Lorenz.** Soil and rock temperatures in discontinuous permafrost; Gornergrat and Unterrothorn, Wallis, Swiss Alps: Permafrost and Periglacial Processes, 1(2), p. 177-188 (incl. French sum.), illus. (incl. sketch maps), 1990.
- Kirk, G. J. D.** Diffusion of inorganic materials in soil: *in* Quantitative theory in soil productivity and environmental pollution (Greenwood, D. J., editor; *et al.*), Philosophical Transactions of the Royal Society of London, Series B: Biological Sciences, 329(1255), p. 331-342, illus. (incl. 2 tables), 1990.
- Kirk, G. J. D.; Ahmad, A. R.; and Nye, P. H.** Coupled diffusion and oxidation of ferrous iron in soils; II, A model of the diffusion and reaction of O_2 , Fe^{2+} , H^+ and HCO_3^- in soils and a sensitivity analysis of the model: Journal of Soil Science, 41(3), p. 411-431, illus. (incl. 1 table), 1990.

- Kirkby, Mike J.** A simulation model for desert runoff and erosion: *in* Erosion, transport and deposition processes (Walling, Des E., editor; *et al.*), IAHS-AISH Publication, 189, p. 87-104, illus. (incl. sketch maps), 1990.
- Kirkby, Mike J.; Atkinson, Ken; and Lockwood, John.** Aspect, vegetation cover and erosion on semi-arid hillslopes: *in* Vegetation and erosion; processes and environments (Thornes, John Barrie, editor), p. 25-39, illus., John Wiley and Sons, Chichester, United Kingdom, 1990.
- Kirkwood, D. E.; and Nesbitt, H. W.** Formation and evolution of soils from an acidified watershed; Plastic Lake, Ontario, Canada: Geochimica et Cosmochimica Acta, 55(5), p. 1295-1308, illus. (incl. 8 tables, sketch map), 1991.
- Kishi, H.; Kogure, N.; and Hashimoto, Y.** Contribution of soil constituents in adsorption coefficient of aromatic compounds, halogenated alicyclic and aromatic compounds to soil: Chemosphere (Oxford), 21(7), p. 867-876, illus. (incl. 5 tables), 1990.
- Kjeldsen, Peter; Kjolholt, Jesper; Schultz, Birgit; et al.** Sorption and degradation of chlorophenols, nitrophenols and organophosphorus pesticides in the subsoil under landfills; laboratory studies: Journal of Contaminant Hydrology, 6(2), p. 165-184, illus. (incl. 7 tables), 1990.
- Klenke, John M.; and Flint, Alan L.** Collimated neutron probe for soil water content measurements: Soil Science Society of America Journal, 55(4), p. 916-923, illus. (incl. 1 table), 1991.
- Kneupfer, Peter L. K.; and McFadden, Leslie D. (editors).** Soils and landscape evolution; proceedings of the 21st annual Binghamton symposium in geomorphology: Oct. 5-7, 1990, United States. Geomorphology, 3(3-4), 386 p., 1990.
- Knott, P.; and Warren, A.** Aeolian processes: *in* Geomorphological techniques (Goudie, Andrew S., editor), 2nd edition, p. 321-350, illus. (incl. 3 tables), Unwin Hyman, London, United Kingdom, 1990.
- Kneupfer, Peter L. K.; and McFadden, Leslie D. (editors).** Soils and landscape evolution; proceedings of the 21st Binghamton symposium in geomorphology: Oct. 6-7, 1990, United States. Binghamton Symposia in Geomorphology: International Series, 21(3-4), 575 p., illus., 1990.
- Knyazev, S. A.** Molybdenum and tungsten in weathered crust of granites: Soviet Geology and Geophysics, 31(8), p. 90-97, illus. (incl. 3 tables), 1990.
- Knyazev, S. A.** Distribution of molybdenum and tungsten in weathering crusts of basic rocks: Soviet Geology and Geophysics, 31(12), p. 82-88, illus. (incl. 1 table, sects.), 1990.
- Kodama, Hideomi; and Ross, G. John.** Tiron dissolution method used to remove and characterize inorganic components in soils: *in* Poorly crystalline and X-ray amorphous inorganic components in soils and clays (Ross, G. John, prefacer), Soil Science Society of America Journal, 55(4), p. 1180-1187, illus. (incl. 8 tables), 1991. American Society of Agronomy symposium.
- Koehnken, Lois.** The composition of fine-grained weathering products in a large tropical river system, and the transport of metals in fine-grained sediments in a temperate estuary: 253 p., Doctoral, 1990, Princeton Univ., Princeton, NJ. available from: Univ. Microfilms, Ann Arbor, MI, United States.
- Kogel-Knabner, Ingrid; Hatcher, Patrick G.; and Zech, Wolfgang.** Chemical structural studies of forest soil humic acids; aromatic carbon fraction: Soil Science Society of America Journal, 55(1), p. 241-247, illus. (incl. 5 tables), 1991.
- Kolb, Michael F.; Lasca, Norman P.; and Goldstein, Lynne G.** A soil-geomorphic analysis of the midden deposits at the Aztlán site, Wisconsin: *in* Archaeological geology of North America (Lasca, Norman P., editor; *et al.*), 4, p. 199-218, illus. (incl. sects., strat. cols., sketch maps), Geol. Soc. Am., Boulder, CO, United States, 1990.
- Konta, J.** Minerals in soils and in suspended matter of rivers and their climatic zonation: *in* Facets of modern biogeochemistry (Ittekot, V., editor; *et al.*), p. 91-101, illus., Springer-Verlag, Berlin, Federal Republic of Germany, 1990.
- Kool, J. B.; Huyakorn, P. S.; and Wierenga, P. J.** Model calibration and simulation of flow in a heterogeneous soil: *in* ModelCARE 1990; calibration and reliability in groundwater modelling (Kovar, Karel, editor), IAHS-AISH Publication, 195, p. 321-330, illus. (incl. 2 tables), 1990.
- Koren'kov, D. A.; Borisova, N. I.; Zertsalov, V. V.; et al.** Isotopic composition of nitrogen in several soil groups of the USSR and its spatial variation: Soviet Soil Science, 22(1), p. 54-57, 4 tables, 1990.

- Kosmas, C.; Moustakas, N.; Kallianou, C.; et al.** Cracking patterns, bypass flow and nitrate leaching in Greek irrigated soils: *Geoderma*, 49(1-2), p. 139-152, illus. (incl. 2 tables), 1991.
- Kovar, J. L.; and Barber, S. A.** Potassium supply characteristics of thirty-three soils as influenced by seven rates of potassium: *Soil Science Society of America Journal*, 54(5), p. 1356-1361, illus. (incl. 2 tables), 1990.
- Krairapanond, N.; DeLaune, R. D.; and Patrick, W. H., Jr.** Sulfur dynamics in Louisiana coastal freshwater marsh soils: *Soil Science*, 151(4), p. 261-273, illus. (incl. 2 tables), 1991.
- Krairapanond, Nawarat.** Sulfur chemistry of Louisiana tidal marsh soils: 185 p., Doctoral, 1990, Louisiana State Univ., Baton Rouge, LA. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Kramer, Larry A.; Alberts, E. Eugene; Hjelmfelt, Allen T.; et al.** Effect of soil conservation systems on ground water nitrate levels from three corn-cropped watersheds in Southwest Iowa: *in Agricultural impacts on ground water quality*, *Ground Water Management*, 1, p. 175-189, illus. (incl. 4 tables), 1990.
- Krantz, William B.** Self-organization manifest as patterned ground in recurrently frozen soils: *in Self-organization in geological systems; proceedings of a workshop* (Ortoleva, Peter J., editor), *Earth-Science Reviews*, 29(1-4), p. 117-130, illus. (incl. sects.), 1990.
- Krishnasamy, R.; and Krishnamoorthy, K. K.** Cationic interferences on zinc adsorption: *Australian Journal of Soil Research*, 29(4), p. 527-531, 3 tables, 1991.
- Krivonosova, G. M.; Yanova, G. N.; and Verveyko, Ye. I.** Composition of precipitation and inputs of chemical elements into the soils of the western forest steppe of the Ukraine: *Soviet Soil Science*, 22(8), p. 48-53, 2 tables, 1990.
- Kuchina, S.; Sakamoto, Y.; Matsukura, Y.; et al.** Selective chemical-weathering in conglomerate and Tsubo-ishii: *Kobutsugaku Zasshi = Journal of the Mineralogical Society of Japan*, 19, p. 93-99 (Japanese, incl. English sum.), illus. (incl. 2 tables, charts), 1990. (Hydrothermal alteration and formation of clay minerals).
- Kuiters, A. T.; and Mulder, W.** Metal complexation by water-soluble organic substances in forest soils: *in Metals speciation, separation, and recovery; Volume II* (Patterson, James William, editor; *et al.*), *International Symposium on Metals Speciation, Separation, and Recovery*, 2, p. 283-299, illus. (incl. 3 tables), 1990. *Second international symposium*.
- Kukal, S. S.; Sur, H. S.; and Gill, S. S.** Factors responsible for soil erosion hazard in submontane Punjab, India: *Soil Use and Management*, 7(1), p. 38-44, illus. (incl. 8 tables, sketch maps), 1991.
- Kumar, S.; and Malik, R. S.** Verification of quick capillary rise approach for determining pore geometrical characteristics in soils of varying texture: *Soil Science*, 150(6), p. 883-888, illus. (incl. 3 tables), 1990.
- Kumar, Suman; and Sharma, A. K.** Numerical classification of some soils of Indian tarai: *Journal of the Indian Society of Soil Science*, 38(2), p. 265-271, illus. (incl. 3 tables), 1990.
- Kwaad, F. J. P. M.** Summer and winter regimes of runoff generation and soil erosion on cultivated loess soils (The Netherlands): *Earth Surface Processes and Landforms*, 16(7), p. 653-662, illus. (incl. 1 table, sketch map), 1991.
- Lal, R.** Soil erosion and land degradation; the global risks: *in Soil degradation* (Lal, R., editor; *et al.*), *Advances in Soil Science*, 11, p. 129-172, illus., 1990.
- Lal, R.; and Stewart, B. A. (editors).** Soil degradation: *Advances in Soil Science*, 11, 1990.
- Lal, Rattan.** Soil erosion in the tropics; principles and management: 580 p., illus. (incl. 253 tables, sects., sketch maps), McGraw-Hill, New York, NY, United States, 1990.
- Lamb, Robert O.** Geotechnical aspects of leaching of carbonates from loessial soils: *in Physico-chemical aspects of soil and related materials* (Hoddingott, Keith B., editor; *et al.*), *ASTM Special Technical Publication = American Society for Testing and Materials Special Technical Publication*, 1095, p. 29-43, illus. (incl. sketch map), 1990. *Physico-chemical aspects of soil, rock and related materials*.
- Lammers, Duane A.** Soil survey of Canyonlands area, Utah, parts of Grand and San Juan counties: 293 p., illus. (incl. 14 tables, sketch map; soils maps 1:24,000; colored soils map 1:443,520; index map 1:443,520), 1991. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with U. S. Forest. Serv., U. S. Bur. Land Manage., and Utah Agric. Exp. Stn.).

- Lancaster, Justin.** Carbon-13 fractionation in carbon dioxide emitting diurnally from soils and vegetation at ten sites on the North American continent: 197 p., Doctoral, 1990, Univ. of California, San Diego, La Jolla, CA. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Lander, R. H.; Bloch, S.; Mehta, S.; et al.** Burial diagenesis of Paleosols in the giant Yacheng gas field, People's Republic of China; bearing on illite reaction pathways: *Journal of Sedimentary Petrology*, 61(2), p. 256-268, illus. (incl. 5 tables, sketch map), 1991.
- Laslett, G. M.; and McBratney, A. B.** Estimation and implications of instrumental drift, random measurement error and nugget variance of soil attributes; a case study for soil pH: *Journal of Soil Science*, 41(3), p. 451-471, illus. (incl. 2 tables), 1990.
- Laslett, G. M.; and McBratney, A. B.** Further comparison of spatial methods for predicting soil pH: *Soil Science Society of America Journal*, 54(6), p. 1553-1558, illus. (incl. 2 tables), 1990.
- Lavee, Hanoch; and Yair, Aaron.** Spatial variability of overland flow in a small arid basin: *in Erosion, transport and deposition processes* (Walling, Des E., editor; *et al.*), IAHS-AISH Publication, 189, p. 105-120, illus. (incl. 1 table), 1990.
- Law, K. R.; Nesbitt, H. W.; and Longstaffe, F. J.** Weathering of granitic tills and the genesis of a Podzol: *American Journal of Science*, 291(10), p. 940-955, illus., 1991.
- Le Roux, J. S.** Spatial variations in the rate of fluvial erosion (sediment production) over South Africa: *Water S.A.*, 16(3), p. 185-194, illus. (incl. 1 table, geol. sketch maps), 1990.
- Leab, Roger J.** Soil survey of Bladen County, North Carolina: p. 179, illus. (incl. 17 tables, block diagrs., sketch map; soils maps 1:24,000; colored soils map 1:253,440; index map 1:253,440), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with N.C. Dep. Nat. Resour. and Commun. Dev., N.C. Agric. Res. Serv., N.C. Agric. Ext. Serv. and Bladen Cty. Board Comm.).
- Leach, Lowell E.; and Kerr, Robert S.** An aseptic procedure for soil sampling in heaving sands using special hollow-stem auger coring: *in Proceedings of the First international symposium on Microbiology of the deep subsurface* (Fliermans, Carl B., editor; *et al.*), p. 2.3-2.18, illus., WSRC Inf. Serv. Sect. Publ. Group, United States, 1990.
- Lee, Dar-Yuan; Farmer, Walter J.; and Aochi, Y.** Sorption of napropamide on clay and soil in the presence of dissolved organic matter: *Journal of Environmental Quality*, 19(3), p. 567-573, illus. (incl. 5 tables), 1990.
- Leiberg, John B.** Bitterroot Forest Reserve: U. S. Geol. Surv., Annu. Rep., 19(5), p. 253-282, 2 plates, 1898.
- Leij, Feike; Dane, J. H.; and van Genuchten, M. T.** Mathematical analysis of one-dimensional solute transport in a layered soil profile: *Soil Science Society of America Journal*, 55(4), p. 944-953, illus. (incl. 1 table), 1991.
- Leij, Feike J.; and Dane, J. H.** Determination of exchange isotherms for modeling cation transport in soils: *Soil Science*, 150(5), p. 816-826, illus. (incl. 3 tables), 1990.
- Leij, Feike J.; and Dane, J. H.** The effect of transverse dispersion on solute transport in soils: *Journal of Hydrology*, 122(1-4), p. 407-422, illus. (incl. 1 table), 1991.
- Lentz, Rodrick David.** A landscape perspective of ephemeral erosion; topographic parameters associated with soil property, soil productivity, and precipitation patterns: 201 p., Doctoral, 1991, University of Minnesota, Minneapolis, Minneapolis, MN. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Leonard, R. A.; Knisel, W. G.; Davis, F. M.; et al.** Application of the GLEAMS model at the Plains, Georgia, agricultural-management site [abstr.]: *in U.S. Geological Survey Toxic Substances Hydrology Program; abstracts of the technical meeting, Monterey, California, March 11-15, 1991* (Mallard, Gail E., compiler; *et al.*), Open-File Report - U. S. Geological Survey, p. 90, 1991. (Rep. No. OF 91-0088) *available from:* U. S. Geol. Surv., Denver, CO, United States.
- Lerman, Abraham.** Transport and kinetics in surficial processes: *in Aquatic chemical kinetics; reaction rates of processes in natural waters* (Stumm, Werner, editor), p. 505-534, illus. (incl. 6 tables), John Wiley & Sons, New York, NY, United States, 1990. (A Wiley-Intersci. Publ.).
- Lezhava, V. V.; Machavariani, L. G.; and Makashvili, R. I.** Mineral corpuscular components in subtropical podzolic soils: *Sooobshcheniya Akademii Nauk Gruzinskoy SSR*, 139(1), p. 153-156 (Georgian, incl. Russian, English sum.), 1990.

- Lezhava, V. V.; Skvortsova, Ye. B.; Machavariani, L. G.; et al.** Stroyeniye porovogo prostranstva ortshteynovykh pochv Zapadnoy Gruzii [The structure of pore space of ortstein soils in the western Georgian Republic]: Soobshcheniya Akademii Nauk Gruzinskoy SSR, 138(1), p. 113-116 (incl. Georgian, English sum.), 2 tables, 1990.
- Lezine, A. M.; and Chateauneuf, J. J.** Peat in the "Niayes" of Senegal; depositional environment and Holocene evolution: in Sedimentary and diagenetic dynamics of continental Phanerozoic sediments in Africa (Lang, J. L., editor), Journal of African Earth Sciences, and the Middle East, 12(1-2), p. 171-179 (incl. French sum.), illus. (incl. 1 table, charts, geol. sketch maps), 1991.
- Li Baoping; and Do Yunshe.** On the method for determination of field capacity: Shuiwendizhi Gongchengdizhi = Hydrogeology and Engineering Geology, 1990(4), p. 46-49 (Chinese, incl. English sum.), illus. (incl. charts), 1990.
- Li, C. B.; and Yu, T. R.** Interactions of anions with the clay fraction of variable charge soils as inferred from conductivity dispersion: Soil Science, 150(6), p. 831-835, illus. (incl. 3 tables), 1990.
- Li Liqun; and Wang Zunqin.** Salt-affected soils type and saline-geochemical features in Qaidam Basin: Acta Pedologica Sinica = Tu Jiang Hsueh Pao, 27(1), p. 53 (Chinese, incl. English sum.), illus. (incl. 7 tables, charts), 1990.
- Li Shuding; and Zhang Shaolan.** Transformation of the ^{75}Se in low-Se soil: Acta Pedologica Sinica = Tu Jiang Hsueh Pao, 27(3), p. 280-285 (Chinese, incl. English sum.), 4 tables, 1990.
- Li Shuyi; Tong Jinxuan; and Li Meiling.** The mineral composition of the soil in the Dinghu Mountain Natural Reservation: Mountain Research, 9(1), p. 41-48 (Chinese, incl. English sum.), 3 tables, charts, 1991.
- Lima, L. A.; Grismer, Mark E.; and Nielsen, D. R.** Salinity effects on Yolo loam hydraulic properties: Soil Science, 150(1), p. 451-458, illus. (incl. 2 tables), 1990.
- Lindbo, David Lloyd.** Nature and properties of fragipans in Massachusetts: 662 p., Doctoral, 1990, University of Massachusetts, Amherst, MA. available from: Univ. Microfilms, Ann Arbor, MI, United States.
- Linder, Walter M.** Channel response in clay soils to downstream modifications: in Proceedings of the Fifth Federal interagency Sedimentation conference (Fan, Shou-Shan, editor; et al.), Proceedings - Federal Inter-Agency Sedimentation Conference, 5, p. 10.17-10.24, 1991.
- Lindner, Sharon Ruth.** Sorption of volatile organic compounds and their mixtures on synthetic and natural soils: 249 p., Doctoral, 1990, Cornell Univ., Ithaca, NY. available from: Univ. Microfilms, Ann Arbor, MI, United States.
- Littke, Ralf; Klussmann, U.; Krooss, B.; et al.** Quantification of loss of calcite, pyrite, and organic matter due to weathering of Toarcian black shales and effects on kerogen and bitumen characteristics: Geochimica et Cosmochimica Acta, 55(11), p. 3369-3378, illus. (incl. 6 tables), 1991.
- Liu, C. K.; Feng, J. S.; and Chen, W.** System modeling approach for solute transport through upper soils: in Watermatex '91; Proceedings of the Second international conference on Systems analysis in water quality management (Barnwell, T. O., editor; et al.), Water Science and Technology, 24(6), p. 67-72, 1991.
- Liu Tungsheng; and Han Jiamao.** Recent developments in research on the loess in China: in Greenhouse effect, sea level and drought (Paepe, Roland, editor; et al.), NATO Advanced Study Institutes Series. Series C: Mathematical and Physical Sciences, p. 217-224, illus. (incl. sketch maps), 1990. NATO advanced research workshop on Geohydrological management of sea level and mitigation of drought.
- Liu Zhongyi.** Discussions on soil erosion and control in ancient books of China: Journal of Sediment Research, 1990(2), p. 96-98 (Chinese), 1990.
- Lobartini, J. C.; Tan, K. H.; Asmussen, L. E.; et al.** Chemical and spectral differences in humic matter from swamps, streams and soils in the Southeastern United States: Geoderma, 49(3-4), p. 241-254, 1991.
- Logan, T. J.** Chemical degradation of soil: in Soil degradation (Lal, R., editor; et al.), Advances in Soil Science, 11, p. 187-221, illus. (incl. 4 tables), 1990.
- Lonergan, Debra J.; and Lovley, Derek R.** Microbial oxidation of natural and anthropogenic aromatic compounds coupled to Fe(III) reduction: in Organic substances and sediments in water; Volume 1, Humics and soils (Baker, Robert Andrew, editor), p. 327-338, illus. (incl. 1 table), Lewis Publ., Chelsea, MI, United States, 1991. American Chemical Society meeting.

- Lopes, Luciana Maria; and Carvalho, Adilson.** Genese da bauxita de Mirai, MG [Bauxite genesis at Mirai, Minas Gerais]: Revista Brasileira de Geociencias, 19(4), p. 462-469 (incl. English sum.), illus. (incl. sects., strat. cols., sketch maps), 1990.
- Lorenz, Howard E.; Kroll, Terry L.; Leonard, Charles F.; et al.** Soil survey of Marinette County, Wisconsin: 263 p., illus. (incl. 20 tables; colored soils map 1:316,800; soils maps 1:20,000), 1991. available from: U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Univ. Wis., Coll. Agric. and Life Sci., Res. Div.).
- Loumagne, C.; Michel, C.; and Normand, M.** Etat hydrique du sol et prevision des debits [Soil moisture regime and discharge forecasting]: Journal of Hydrology, 123(1-2), p. 1-17 (incl. English sum.), illus. (incl. 5 tables, sketch map), 1991.
- Lucassen, John A.** Soil survey of Davis County, Idaho: 235 p., illus. (incl. 18 tables, block diagrs., sketch map; soils maps 1:15,840; colored soils map 1:190,080; index map 1:190,080), 1991. available from: U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Iowa Agric. and Home Econ. Exp. Stn., Iowa State Univ., Coop. Ext. Serv. and Iowa Dep. Agric. and Land Stewardship, Div. Soil Conserv.).
- Luepke, Gretchen.** Mineralogical and geochemical analyses of three Paleosols from the Merced Formation, near San Francisco, California: Open-File Report - U. S. Geological Survey, 13 p., illus. (incl. 3 tables, sketch map), 1991. (Rep. No. OF 91-0104) available from: U. S. Geol. Surv., Denver, CO, United States.
- Lui Zhongyi; Jie Yanqin; and Zhang Qintian.** The effects of Huangtu Plateau's neotectonics on soil erosion in Shensi: Journal of Sediment Research, 1990(1), p. 73-78 (Chinese), 1 table, 1990.
- Lundin, Lars-Christer.** Hydraulic properties in an operational model of frozen soil: Journal of Hydrology, 118(1-4), p. 289-310, illus. (incl. 1 table), 1990.
- Lundstrom, U.; and Ohman, L. O.** Dissolution of feldspars in the presence of natural, organic solutes: Journal of Soil Science, 41(3), p. 359-369, illus. (incl. 4 tables), 1990.
- Lysenko, M. P.** Regional genetic types of loess rocks: Soviet Engineering Geology, 1990(4), p. 37-41, 1 table, 1990.
- Ma Ainai; Zhang Yanlong; and Liu Qinsheng.** Quantitative analysis of soil erosion in Liuhe region: Soil and Water Conservation in China = Chung-Kuo Shui T'u Pao Ch'ih, 1990(1(94)), p. 39-40 (Chinese, incl. English sum.), 2 tables, 1990.
- MacDonald, G. M.; Larsen, C. P. S.; Szeicz, J. M.; et al.** The reconstruction of boreal forest fire history from lake sediments; a comparison of charcoal, pollen, sedimentological, and geochemical indices: Quaternary Science Reviews, 10(1), p. 53-71, illus. (incl. 5 tables, sketch map), 1991.
- Macphail, Richard I.; Courty, Marie-Angnes; and Goldberg, Paul.** Soil micromorphology in archaeology: Endeavour, New Series, 14(4), p. 163-171, illus., 1990.
- Madrid, L.; Diaz-Barrientos, E.; and Contreras, M. C.** Relationships between zinc and phosphate adsorption on montmorillonite and an iron oxyhydroxide: Australian Journal of Soil Research, 29(2), p. 239-247, illus. (incl. 1 table), 1991.
- Mahaney, W. C.; and Sanmugadas, K.** Extractable Fe-Al in Quaternary Paleosols on Mount Kenya, East Africa: Journal of African Earth Sciences, and the Middle East, 10(4), p. 739-744, illus. (incl. 3 tables, sketch map), 1990.
- Mahaney, W. C.; Slowpoke, R. G. V. Hancock; Rutter, N.; et al.** Stratigraphy and geochemistry of a sequence of Quaternary Palaeosols in the lower Teleki Valley, Mount Kenya, East Africa; implications for interregional correlations: JQS. Journal of Quaternary Science, 6(3), p. 245-256, illus. (incl. 129 anal., strat. col., sketch map), 1991.
- Mahaney, William C.; and Hancock, R. G. V.** Geochemistry of Holocene and late Pleistocene soils in the Rouge River and Scarborough Bluffs areas, south-central Ontario, Canada: Journal of Radioanalytical and Nuclear Chemistry, 148(1), p. 81-92, illus. (incl. 5 tables, sketch map), 1990.
- Maher, Barbara A.; and Thompson, Roy.** Mineral magnetic record of the Chinese loess and Paleosols: Geology (Boulder), 19(1), p. 3-6, illus., 1991.
- Malik, Hameed Ullah.** Characterization and mineralogical interpretation of shrink-swell behavior of Hawaiian kaolinitic Vertisols: 163 p., Doctoral, 1990, University of Hawaii, Honolulu, HI. available from: Univ. Microfilms, Ann Arbor, MI, United States.

- Malik, M.; and Letey, J.** Adsorption of polyacrylamide and polysaccharide polymers on soil materials: *Soil Science Society of America Journal*, 55(2), p. 380-383, illus. (incl. 2 tables), 1991.
- Manrique, L. A.; and Jones, C. A.** Bulk density of soils in relation to soil physical and chemical properties: *Soil Science Society of America Journal*, 55(2), p. 476-481, illus. (incl. 5 tables), 1991.
- Mansell, R. S.; Bloom, S. A.; and Aylmore, L. A. G.** Simulating cation transport during unsteady, unsaturated water flow in sandy soil: *Soil Science*, 150(4), p. 730-744, illus. (incl. 1 table), 1990.
- Marinsky, Jacob A.; and Reddy, Michael M.** Vapor-pressure osmometric study of the molecular weight and aggregation tendency of a reference-soil fulvic acid: *Analytica Chimica Acta*, 232, p. 123-130, illus. (incl. 5 tables), 1990.
- Marius, C.; and Lucas, J.** Holocene mangrove swamps of West Africa; sedimentology and soils: *in* Sedimentary and diagenetic dynamics of continental Phanerozoic sediments in Africa (Lang, J. L., editor), *Journal of African Earth Sciences, and the Middle East*, 12(1-2), p. 41-54 (incl. French sum.), illus. (incl. 3 tables, charts, sects., blocks, geol. sketch maps), 1991.
- Marker, A.; Friedrich, G.; Carvalho, A.; et al.** Control of the distribution of Mn, Co, Zn, Zr, Ti and REEs during the evolution of lateritic covers above ultramafic complexes: *in* Geochemical exploration 1989; Part 1, Selected papers from the 13th international geochemical exploration symposium (Rose, Arthur W., editor; *et al.*), *Journal of Geochemical Exploration*, 40(1-3), p. 361-383, illus. (incl. 4 tables, geol. sketch maps), 1991.
- Markewich, H. W.; Pavich, M. J.; and Buell, G. R.** Contrasting soils and landscapes of the Piedmont and coastal plain, Eastern United States: *in* Soils and landscape evolution; proceedings of the 21st annual Binghamton symposium in geomorphology (Kneupper, Peter L. K., editor; *et al.*), *Geomorphology*, 3(3-4), p. 417-447, illus. (incl. 2 tables, sketch maps), 1990.
- Marsh, Julian S.** REE fractionation and Ce anomalies in weathered Karoo dolerite: *Chemical Geology*, 90(3-4), p. 189-194, illus. (incl. 1 table), 1991.
- Martin Neto, Landislau; Nascimento, Otaciro R.; Talamoni, Jose; et al.** EPR of micronutrients - humic substances complexes extracted from a Brazilian soil: *Soil Science*, 151(5), p. 369-376, illus. (incl. 3 tables), 1991.
- Martinez Lobo, A.; and Palomares, J.** On the determination of ^{226}Ra in soils and uranium ores by direct gamma-ray spectrometry: *Journal of Radioanalytical and Nuclear Chemistry*, 147(2), p. 225-234, illus. (incl. 3 tables), 1991.
- Masaki, Katsuhiko; and Uehara, Seiichiro.** On the weathered products of serpentinite in Sasaguri, Fukuoka Prefecture, Japan: *Kobutsugaku Zasshi = Journal of the Mineralogical Society of Japan*, 20(1-2), p. 33-42 (Japanese, incl. English sum.), 1991.
- Masscheleyen, Patrick Henri.** Speciation and redox chemistry of selenium and arsenic in wetland soils and sediments: 167 p., Doctoral, 1990, Louisiana State University, Baton Rouge, LA. available from: Univ. Microfilms, Ann Arbor, MI, United States.
- Matsumoto, Genki I.; Akiyama, Masaru; Watanuki, Kunihiko; et al.** Unusual distributions of long-chain n-alkanes and n-alkenes in Antarctic soil: *Organic Geochemistry*, 15(4), p. 403-412, illus. (incl. 1 table, sketch maps), 1990.
- Matsumoto, Genki I.; Hirai, Akio; Hirota, Koitsu; et al.** Organic geochemistry of the McMurdo Dry Valleys soil, Antarctica: *in* Advances in organic geochemistry, 1989; Part II, Molecular geochemistry; proceedings of the 14th international meeting on Organic geochemistry (Durand, B., editor; *et al.*), *Organic Geochemistry*, 16(4-6), p. 781-791, illus. (incl. 5 tables, sketch map), 1990.
- Matsumoto, Genki I.; Watanuki, Kunihiko; and Torii, Tetsuya.** Geochemical features of hydroxy acids in soil samples from the McMurdo Dry Valleys, Antarctica: *in* Proceedings of the NIPR symposium on Antarctic geosciences (Kaminuma, Katsutada, editor), *Proceedings of the NIPR Symposium on Antarctic Geosciences*, 4, p. 165-171, illus. (incl. 1 table, sketch maps), 1990. *Tenth symposium*.
- Mausel, P. W.; Kalaluka, G. Y.; Lee, J. K.; et al.** Multispectral video analysis of micro-relief dominated poorly drained soils in western Indiana: *Journal of Imaging Technology*, 16(3), p. 113-119, illus. (incl. 5 tables), 1990.
- May, David W.** Radiocarbon ages of the Elba Valley fill in Cooper's Canyon, Elba, Nebraska [abstr.]: *in* Proceedings of the 101st annual meeting of the Nebraska Academy of Sciences; 91 including the NATS & TER-QUA Divisions and affiliated societies, *Proceedings of the Nebraska Academy of Sciences and Affiliated Societies*, 101, p. 59-60, 1991.

- Mayland, H. F.; Gough, L. P.; and Stewart, K. C.** Selenium mobility in soils and its absorption, translocation, and metabolism in plants: *in Proceedings of the 1990 Billings land reclamation symposium on Selenium in arid and semiarid environments, Western United States* (Severson, R. C., editor; *et al.*), U. S. Geological Survey Circular, p. 57-64, illus. (incl. 2 tables), 1991. (Rep. No. C 1064).
- Mazhitova, G. G.** Soil formation on the yedomas of the Kolyma Lowland: *Soviet Soil Science*, 22(3), p. 12-23, illus. (incl. 4 tables, sects.), 1990.
- McBee, Richard E.** Soil survey of Dallas County, Missouri: 137 p., illus. (incl. 18 tables; colored soils map 1:190,080; soils maps 1:24,000), 1991. *available from:* U.S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Mo. Agric. Exp. Stn.).
- McCahon, Thomas J.** Pleistocene soils in the Medicine Bow Mountains, Wyoming: 179 p., Doctoral, 1990, University of Wyoming, Laramie, WY. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- McCarroll, Danny.** Differential weathering of feldspar and pyroxene in an arctic-alpine environment: *Earth Surface Processes and Landforms*, 15(7), p. 641-651, illus., 1990.
- McCray, J. M.; Radcliffe, D. E.; and Sumner, M. E.** Influence of solution Ca on water retention and soil strength of typical Hapludults: *Soil Science*, 151(4), p. 312-316, illus. (incl. 2 tables), 1991.
- McCrea, A. F.; Anand, R. R.; and Gilkes, R. J.** Mineralogical and physical properties of lateritic pallid zone materials developed from granite and dolerite: *Geoderma*, 47(1-2), p. 33-57, illus., 1990.
- McDaniel, Donald.** Soil survey of Livingston Parish, Louisiana: 159 p., illus. (incl. 21 tables; soils maps 1:20,000; colored soils map 1:253,440), 1991. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with La. Agric. Exp. Stn.).
- McDaniel, P. A.; and Buol, S. W.** Manganese distributions in acid soils of the North Carolina Piedmont: *Soil Science Society of America Journal*, 55(1), p. 152-158, illus. (incl. 4 tables), 1991.
- McDonald, Eric V.; and Busacca, Alan J.** Interaction between aggrading geomorphic surfaces and the formation of a late Pleistocene Paleosol in the Palouse Loess of eastern Washington State: *in Soils and landscape evolution; proceedings of the 21st annual Binghamton symposium in geomorphology* (Kneuper, Peter L. K., editor; *et al.*), *Geomorphology*, 3(3-4), p. 449-470, illus. (incl. 1 table, sketch map), 1990.
- McFadden, Leslie D.; and Knueper, Peter L. K.** Soil geomorphology; the linkage of pedology and surficial processes: *in Soils and landscape evolution; proceedings of the 21st annual Binghamton symposium in geomorphology* (Kneuper, Peter L. K., editor; *et al.*), *Geomorphology*, 3(3-4), p. 197-205, 1990.
- McFadden, Leslie E.; Amundson, Ronald G.; and Chadwick, Oliver A.** Numerical modeling, chemical, and isotopic studies of carbonate accumulation in soils of arid regions: *in Occurrence, characteristics, and genesis of carbonate, gypsum, and silica accumulations in soils* (Nettleton, W. D., editor), SSSA Special Publication, 26, p. 17-35, illus., 1991. *Division S-5 of the Soil Science Society of America symposium.*
- McFarland, E. Randolph; and Sherwood, W. Cullen.** Description and origin of the calcite-rich Massanetta variant soil series at Mount Crawford, Virginia: *in Travertine-marl; stream deposits in Virginia* (Herman, Janet S., editor; *et al.*), Virginia Division of Mineral Resources Publication, p. 151-161, illus. (incl. 3 tables, sects., geol. sketch map), 1990. (Rep. No. 101).
- McFarlane, M. J.** Some sedimentary aspects of lateritic weathering profile development in the major bioclimatic zones of tropical Africa: *in Sedimentary and diagenetic dynamics of continental Phanerozoic sediments in Africa* (Lang, J. L., editor), *Journal of African Earth Sciences, and the Middle East*, 12(1-2), p. 267-282 (incl. French sum.), illus., 1991.
- McGarry, Gail A.; and Haddad, Kenneth D.** Applications of GIS soil data layers in resource research and management in a Florida estuarine watershed: *in Countdown to the 21st century; 1990 ACSM-ASPRS annual convention; ACSM 50th annual meeting; ASPRS 56th annual meeting, Technical Papers of the American Congress of Surveying and Mapping*, 50, Vol. 3, p. 202-213, illus. (incl. 2 tables, sketch maps), 1990.
- McIntosh, P. D.; and Kemp, R. A.** Consolidated horizons in soils formed in aeolian deposits in Southland, New Zealand: *Geoderma*, 50(1-2), p. 109-124, 1991.
- McIntyre, Michael P.; Eilers, H. Peter; and Mairs, John W.** Physical geography, 5th edition: 536 p., illus. (incl. 4 plates; colored soils map; colored climatol. maps; colored biogeogr. map), John Wiley & Sons, New York, NY, United States, 1991.

- McIntyre, Sherwood C.; Naney, James W.; and Cooper, James R.** Long-term Cs-137 and soil loss from field plots: *in* Proceedings of the Fifth Federal interagency Sedimentation conference (Fan, Shou-Shan, editor; *et al.*), Proceedings - Federal Inter-Agency Sedimentation Conference, 5, p. 5.33-5.39, illus. (incl. 2 tables), 1991.
- McKeague, J. A.; Wang, C.; Ross, C. J.; et al.** Test of guidelines for field estimates of water retention properties of soils derived from volcanic materials in northern Tanzania: Canadian Journal of Soil Science, 71(1), p. 1-10 (incl. French sum.), illus. (incl. 3 tables), 1991.
- McNeal, James M.** The mode of occurrence of extractable elements in soils from the Northern Great Plains: *in* Proceedings of a U.S. Geological Survey workshop on Environmental geochemistry (Doe, Bruce R., editor), U. S. Geological Survey Circular, p. 37-38, 1 table, 1990. (Rep. No. C 1033).
- McTainsh, G. H.; Lynch, A. W.; and Burgess, R. C.** Wind erosion in eastern Australia: Australian Journal of Soil Research, 28(2), p. 323-339, illus. (incl. sketch maps), 1990.
- Mees, F.; and Stoops, G.** Mineralogical study of salt efflorescences on soils of the Jequetepeque Valley, northern Peru: Geoderma, 49(3-4), p. 255-272, 1991.
- Menges, Christopher M.** Soils and geomorphic evolution of bedrock facets on a tectonically active mountain front, western Sangre de Christo Mountains, New Mexico: *in* Soils and landscape evolution; proceedings of the 21st annual Binghamton symposium in geomorphology (Kneupper, Peter L. K., editor; *et al.*), Geomorphology, 3(3-4), p. 301-332, illus. (incl. 1 table, sketch maps), 1990.
- Meyer, L. Donald; Line, Daniel E.; and Harmon, W. Cody.** Particle sizes of sediment from cropland soils: *in* Proceedings of the Fifth Federal interagency Sedimentation conference (Fan, Shou-Shan, editor; *et al.*), Proceedings - Federal Inter-Agency Sedimentation Conference, 5, p. PS.64-PS.71, illus. (incl. 6 tables), 1991.
- Micklethwaite, Robert Kenneth.** The effect of simulated acid rain on the mobilization of organic matter and metals in two Canadian Shield soils: Doctoral, 1990, Queen's University, Kingston, ON, Canada. *available from:* Natl. Libr. Can., Ottawa, ON, Canada.
- Miles, Ray L.; and Leonard, Stephen G.** Use of soil taxonomy on rangelands: *in* Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers (Kimble, J. M., editor; *et al.*), Proceedings - International Soil Correlation Meeting (ISCOM), 4, p. 73-77, 1990.
- Miller, J. W.; and Angui, K. T. P.** Indirect determination of bromide at trace levels in soil extracts: Soil Science Society of America Journal, 55(2), p. 384-388, illus. (incl. 3 tables), 1991.
- Milnes, A. R.; Thiry, M.; and Wright, M. J.** Silica accumulations in saprolites and soils in South Australia: *in* Occurrence, characteristics, and genesis of carbonate, gypsum, and silica accumulations in soils (Nettleton, W. D., editor), SSSA Special Publication, 26, p. 121-149, illus. (incl. 2 tables, sect., geol. sketch maps), 1991. *Division S-5 of the Soil Science Society of America symposium.*
- Mironov, I. V.** Determination of mobile molybdenum in soils by atomic absorption spectroscopy: Soviet Soil Science, 22(7), p. 84-88, 2 tables, 1991.
- Mishra, B. K.; and Misra, C.** Leaching of ammonium nitrate under field conditions; studies on kinetics of nitrification and nitrate reduction in an Ultisol profile: Journal of Hydrology, 124(1-2), p. 185-195, illus. (incl. 3 tables), 1991.
- Misra, U. K.; Das, C. P.; and Mitra, G. N.** Forms of sulphur in some soils of Orissa in relation to relevant soil properties: Journal of the Indian Society of Soil Science, 38(1), p. 61-69, 4 tables, 1990.
- Mitchell, Alan Rex.** Water infiltration in a cracked soil during flood irrigation: 235 p., Doctoral, 1990, University of California, Riverside, CA. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Mizota, C.; Endo, H.; Um, K. T.; et al.** The eolian origin of silty mantle in sedentary soils from Korea and Japan: Geoderma, 49(1-2), p. 153-164, illus. (incl. 2 tables, sketch map), 1991.
- Mizota, C.; Itoh, M.; Kusakabe, M.; et al.** Oxygen isotope ratios of opaline silica and plant opal in three Recent volcanic ash soils: Geoderma, 50(3), p. 211-217, 1991.
- Mizutani, Sinjiro.** Change rate in the near-surface of Earth: Chishitsu News, 1991(4(440)), p. 34-46 (English), charts, 1991.
- Moberg, J. P.; and Esu, I. E.** Characteristics and composition of some savanna soils in Nigeria: Geoderma, 48(1-2), p. 113-129, illus. (incl. 3 tables, sects., sketch maps), 1991.

- Moberg, J. P.; Esu, I. E.; and Malgwi, W. B.** Characteristics and constituent composition of Harmattan dust falling in Northern Nigeria: *Geoderma*, 48(1-2), p. 73-81, illus. (incl. 3 tables, sketch map), 1991.
- Mohamoud, Yusuf M.** Evaluating the Green and Ampt infiltration parameter values for tilled and crusted soils: *Journal of Hydrology*, 123(1-2), p. 25-38, illus. (incl. 3 tables), 1991.
- Mokma, D. L.; and Cremeens, D. L.** Relationships of saturation and B horizon colour patterns in soils of three hydrosequences in south-central Michigan, USA: *Soil Use and Management*, 7(1), p. 56-61, illus. (incl. 4 tables), 1991.
- Mokma, Delbert L.; and Doolittle, James A.** Soil surveys; a guide for ground-penetrating radar applications [abstr.]: in Third international conference on Ground penetrating radar (Lucius, Jeffrey E., editor; et al.), Open-File Report (United States Geological Survey, 1978), p. 43, 1990. (Rep. No. OF 90-0414) available from: U. S. Geol. Surv., Denver, CO, United States.
- Monger, H. Curtis; Daugherty, LeRoy A.; and Gile, Leland H.** A microscopic examination of pedogenic calcite in an Aridisol of southern New Mexico: in Occurrence, characteristics, and genesis of carbonate, gypsum, and silica accumulations in soils (Nettleton, W. D., editor), SSSA Special Publication, 26, p. 37-60, illus. (incl. 1 table), 1991. *Division S-5 of the Soil Science Society of America symposium*.
- Monger, H. Curtis; Daugherty, LeRoy A.; Lindemann, William C.; et al.** Microbial precipitation of pedogenic calcite: *Geology* (Boulder), 19(10), p. 997-1000, illus. (incl. 1 table, block diag.), 1991.
- Monger, Hugh Curtis.** Soil mineral transformations in a southern New Mexico Aridisol, pedogenic palygorskite, mineral dissolution, and microbial-related calcite: 168 p., Doctoral, 1990, New Mexico State University, Las Cruces, NM. available from: Univ. Microfilms, Ann Arbor, MI, United States.
- Monteith, Steven E.** Soil survey of Lauderdale County, Tennessee: 161 p., illus. (incl. 18 tables, block diags., sketch map; soils maps 1:24,000; colored soils map 1:190,080; index map 1:190,080), 1990. available from: U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Tenn. Agric. Exp. Stn., Lauderdale Cty. Board Comm., Tenn. Valley Auth. and Tenn. Dep. Agric.).
- Moody, Ula L.; and Dort, Wakefield, Jr.** Microstratigraphic analysis of sediments and soils; Wasden archaeological site, eastern Snake River plain, Idaho: in Archaeological geology of North America (Laska, Norman P., editor; et al.), 4, p. 361-382, illus. (incl. 6 tables, strat. col., sketch map), Geol. Soc. Am., Boulder, CO, United States, 1990.
- Moore, Peter D.** Ecology; ups and downs in peatland: *Nature* (London), 353(6342), p. 299-300, illus., 1991.
- Moran, Chris J.; and McBratney, Alex B.** STRUCTURA; a C program for estimating attributes of two-phase, heterogeneous structures digitized from planar specimens: *Computers & Geosciences*, 17(3), p. 335-350, illus. (incl. 4 tables), 1991.
- Morra, M. J.; Hall, M. H.; and Freeborn, L. L.** Carbon and nitrogen analysis of soil fractions using near-infrared reflectance spectroscopy: *Soil Science Society of America Journal*, 55(1), p. 288-291, illus. (incl. 3 tables), 1991.
- Morrison, R. J.** Some Andisols from Savai'i, Western Samoa: *Soil Science Society of America Journal*, 55(1), p. 159-164, illus. (incl. 3 tables), 1991.
- Morrison, R. J.** Variability of the Fagaga Series soils of Western Samoa: *Geoderma*, 49(1-2), p. 105-116, 4 tables, sketch map, 1991.
- Moses, Carl O.; and Herman, Janet S.** Pyrite oxidation at circumneutral pH: *Geochimica et Cosmochimica Acta*, 55(2), p. 471-482, illus. (incl. 9 tables), 1991.
- Motuzova, G. V.; and Popova, A. A.** Determination of equilibrium concentration of zinc in soil from sorption isotherms: *Soviet Soil Science*, 22(7), p. 89-97, illus. (incl. 4 tables), 1991.
- Mourato, Diana.** The influence of polysaccharides on subsurface soil properties and interactions: Doctoral, 1990, McGill University, Montreal, PQ, Canada. available from: Natl. Libr. Can., Ottawa, ON, Canada.
- Moussa, O. M.; Bedford, Keith W.; and Smith, S. E.** Determination of soil erodibility factor by using the AVHRR-NOAA satellite data: in Countdown to the 21st century; 1990 ACSM-ASPRS annual convention; ACSM 50th annual meeting; ASPRS 56th annual meeting, Technical Papers of the American Congress of Surveying and Mapping, 50, Vol. 5, p. 96-103, illus. (incl. sketch maps), 1990.

- Msaky, J. J.; and Calvet, R.** Adsorption behavior of copper and zinc in soils; influence of pH on adsorption characteristics: *Soil Science*, 150(2), p. 513-522, illus. (incl. 2 tables), 1990.
- Mucher, Herman; Sevink, Jan; Bergkamp, Ger; et al.** A pedological and micromorphological study on Mediterranean loessial deposits near Gerona, NE-Spain: *in Loess, aeolian deposits, and related Palaeosols in the Mediterranean region* (Cremaschi, Mauro, editor), *Quaternary International*, 5, p. 9-22, illus. (incl. 1 table, sketch maps), 1990. *INQUA Commission on Loess and INQUA Commission on Palaeogeography joint meeting*.
- Muckell, Gary B.** Application of proposed Gypsids to selected New Mexico soils: *in Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers* (Kibble, J. M., editor; *et al.*), *Proceedings - International Soil Correlation Meeting (ISCOM)*, 4, p. 7-14, 4 tables, 1990.
- Muir, I. J.; and Nesbitt, H. W.** Effects of aqueous cations on the dissolution of labradorite feldspar: *Geochimica et Cosmochimica Acta*, 55(11), p. 3181-3189, illus. (incl. 1 table), 1991.
- Muldoon, Maureen A.; Madison, Frederick W.; and Johnson, Mark D.** Soils, geologic, and hydrogeologic influences on lake water quality in northwestern Wisconsin: *Open-File Report - University of Wisconsin-Extension*, 74 p., illus. (incl. 4 tables, geol. sketch map), 1990. (Rep. No. 90-1).
- Mullins, C. E.; Macleod, D. A.; Northcote, K. H.; et al.** Hardsetting soils; behavior, occurrence, and management: *in Soil degradation* (Lal, R., editor; *et al.*), *Advances in Soil Science*, 11, p. 37-108, illus. (incl. 14 tables), 1990.
- Munn, L. C.; and Spackman, L. K.** Soil genesis associated with periglacial ground wedges, Laramie Basin, Wyoming: *Soil Science Society of America Journal*, 55(3), p. 772-777, illus. (incl. 6 tables), 1991.
- Murray, R. S.; and Quirk, J. P.** Interparticle forces in relation to the stability of soil aggregates: *in Soil colloids and their associations in aggregates* (De Boodt, Marcel F., editor; *et al.*), *NATO ASI Series, Series B: Physics*, 215, p. 439-461, illus. (incl. 3 tables), 1990. *NATO Advanced Research Workshop*.
- Nadler, A.; Dasberg, S.; and Lapid, I.** Time domain reflectometry measurements of water content and electrical conductivity of layered soil columns: *Soil Science Society of America Journal*, 55(4), p. 938-943, illus. (incl. 4 tables), 1991.
- Nadler, Arie; Magaritz, Mordeckai; and Naor, Amos.** Effect of instrument parameters on the accuracy of bulk soil electrical conductivity measurement: *Soil Science*, 150(1), p. 413-418, illus. (incl. 2 tables), 1990.
- Nagel, Byron G.** Soil survey of Jackson County, Indiana: 238 p., illus. (incl. 20 tables, block diag., sketch map; soils maps 1:15,840; colored soils map 1:190,080; index map 1:190,080), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with U. S. For. Serv., Purdue Univ. Agric. Exp. Stn. and Indiana Dep. Nat. Resour., Soil and Water Conserv. Comm.).
- Nahon, Daniel B.** Introduction to the petrology of soils and chemical weathering: 313 p., illus. (incl. 9 tables, sects.), John Wiley and Sons, New York, NY, United States, 1991.
- Nakamura, K.** Carbon isotopes of soil gases and related organic matter in an agroecosystem with special reference to Paddy Field: *in Geochemistry of gaseous elements and compounds* (Durrance, E. M.; *et al.*), p. 455-484, illus. (incl. 4 tables), Theophrastus Publ., Athens, Greece, 1990.
- Naney, J. W.; Kent, D. C.; Smith, S. J.; et al.** Characterizing ground-water quality impacted by tillage and cropping practices: *in Agricultural impacts on ground water quality*, *Ground Water Management*, 1, p. 97-111, illus. (incl. 3 tables, sketch map), 1990.
- Nash, M. H.; and Daugherty, L. A.** Statistical comparison of soil map-unit boundaries: *Soil Science Society of America Journal*, 54(6), p. 1677-1681, illus. (incl. 2 tables), 1990.
- Nash, Mohammad Hassoun Hamoudi.** The effect of anisotropy on selected soil properties in a deep alluvial soil: 154 p., Doctoral, 1990, New Mexico State University, Las Cruces, NM. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Navas, A.** The effect of simulated runoff on the erosion of gypsumiferous soils: *Land Degradation and Rehabilitation*, 2(2), p. 117-126, illus. (incl. 7 tables), 1990.
- Nearing, M. A.; Bradford, J. M.; and Parker, S. C.** Soil detachment by shallow flow at low slopes: *Soil Science Society of America Journal*, 55(2), p. 339-344, illus. (incl. 4 tables), 1991.

- Nearing, M. A.; Lane, L. J.; Alberts, E. E.; et al.** Prediction technology for soil erosion by water; status and research needs: *Soil Science Society of America Journal*, 54(6), p. 1702-1711, 1990.
- Nelson, Gary D.** Soil survey of Murray County, Minnesota: 187 p., illus. (incl. 17 tables, block diags., sect., geol. sketch maps; soil maps 1:20,000; colored soils map 1:190,080; index map 1:190,080), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Minn. Agric. Exp. Stn.).
- Nelson, R. G.; and Haigh, J. H.** Geophysical investigations of sinkholes in lateritic terrains: *in* Geotechnical and environmental geophysics; Volume 3, Geotechnical (Ward, Stanley H., editor), Investigations in Geophysics, 5(3), p. 133-153, illus. (incl. sects., sketch maps), 1991.
- Nesbitt, H. W.; MacRae, N. D.; and Shotyk, W.** Congruent and incongruent dissolution of labradorite in dilute, acidic, salt solutions: *Journal of Geology*, 99(3), p. 429-442, illus. (incl. 1 table), 1991.
- Nettleton, W. D. (editor).** Occurrence, characteristics, and genesis of carbonate, gypsum, and silica accumulations in soils: Nov. 29, 1988, United States. SSSA Special Publication, 26, 149 p., 1991.
- Nettleton, W. D.; Brasher, B. R.; and Baird, S. L.** Carbonate clay characterization by statistical methods: *in* Occurrence, characteristics, and genesis of carbonate, gypsum, and silica accumulations in soils (Nettleton, W. D., editor), SSSA Special Publication, 26, p. 75-88, illus. (incl. 7 tables), 1991. *Division S-5 of the Soil Science Society of America symposium*.
- Nettleton, W. D.; Brasher, B. R.; Lanagan, L. N.; et al.** Relationship of salinity and sodicity to the classification and use of Aridisols in the U.S.A.: *in* Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers (Kibble, J. M., editor; et al.), Proceedings - International Soil Correlation Meeting (ISCOM), 4, p. 135-143, illus. (incl. 3 tables), 1990.
- Nettleton, W. D.; and Chadwick, Oliver A.** Soil-landscape relationships in the Wind River basin, Wyoming: *in* Report on the Second workshop on geologic applications of remote sensing to the study of sedimentary basins (Lang, Harold R., editor; et al.), *The Mountain Geologist*, 28(2-3), p. 3-11, illus. (incl. 3 tables, sketch map), 1991.
- Nettleton, W. D.; Grossman, R. B.; and Brasher, B. R.** Concept of argillic horizons in Aridisols; taxonomic implications: *in* Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers (Kibble, J. M., editor; et al.), Proceedings - International Soil Correlation Meeting (ISCOM), 4, p. 167-175, illus. (incl. 4 tables), 1990.
- Newman, A. C. D.; and Hayes, Michael H. B.** Some properties of clays and of other soil colloids and their influences on soils: *in* Soil colloids and their associations in aggregates (De Boodt, Marcel F., editor; et al.), NATO ASI Series, Series B: Physics, 215, p. 39-55, 1990. *NATO Advanced Research Workshop*.
- Nguyen, Tam T.; Janik, Leslie J.; and Raupach, Maxwell.** Diffuse reflectance infrared Fourier transform (DRIFT) spectroscopy in soil studies: *Australian Journal of Soil Research*, 29(1), p. 49-67, illus. (incl. 2 tables), 1991.
- Nichols, J. D.; Allen, B. L.; and Nielsen, G. A.** Aridisols of the Southern United States and the aridic-ustic moisture transition: *in* Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers (Kibble, J. M., editor; et al.), Proceedings - International Soil Correlation Meeting (ISCOM), 4, p. 145-149, sketch maps, 1990.
- Nicholson, Frank H.** Carbon dioxide in soil, cave air and cave water [abstr.]: *in* Abstracts from the BCRA cave science symposium, Geo², 17(1), p. 13-14, 1990.
- Nick, Kevin; Xia, Kedong; and Elmore, R. D.** Paleomagnetic and petrographic evidence for early magnetizations in successive Terra rosa Paleosols, Lower Pennsylvanian Black Prince Limestone, Arizona: *Journal of Geophysical Research, B, Solid Earth and Planets*, 96(6), p. 9873-9885, illus. (incl. 2 tables, strat. col., sketch map), 1991.
- Nimlos, Thomas J.; and Hillery, Pamela A.** The strength/moisture relations and hydraulic conductivity of Mexican tepetate: *Soil Science*, 150(1), p. 425-430, illus. (incl. 4 tables), 1990.
- Nizeyimana, Egide.** An assessment of morphological, physical, chemical, and mineralogical properties of soils derived from volcanic deposits in Rwanda: 230 p., Doctoral, 1990, University of Illinois, Urbana, Urbana, IL. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.

- Noe, Harley R.** Soil survey of Elmore County area, Idaho, parts of Elmore, Owyhee, and Ada counties: 500 p., illus. (incl. 16 tables, block diags., sketch map; soils maps 1:24,000; colored soils map 1:570,240; index map 1:570,240), 1991. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with U. S. Forest Serv., U. S. Bur. Land Manage., Univ. Idaho, Coll. Agric. and Idaho Soil Conserv. Comm.).
- Nogina, N. A.** Uniqueness of soils and soil-forming processes in the Central Asian facies; taiga, steppe, desert: Soviet Soil Science, 22(3), p. 1-11, illus. (incl. 4 tables), 1990.
- Noor, Mohammad.** A simulation study of runoff and soil loss from ungrazed and grazed riparian areas: 153 p., Doctoral, 1990, Colorado State University, Fort Collins, CO. *available from:* Univ. Microfilms, Ann Arbor MI, United States.
- Nortcliff, Stephen; Ross, Sheila M.; and Thernes, John Barrie.** Soil moisture, runoff and sediment yield from differentially cleared tropical rainforest plots: *in* Vegetation and erosion; processes and environments (Thernes, John Barrie, editor), p. 419-436, illus. (incl. 4 tables), John Wiley and Sons, Chichester, United Kingdom, 1990.
- Novak, J. M.; and Smeck, N. E.** Comparisons of humic substances extracted from contiguous Alfisols and Mollisols of southwestern Ohio: Soil Science Society of America Journal, 55(1), p. 96-102, illus. (incl. 5 tables, sketch map), 1991.
- Novik, N. N.** O vozmozhnosti opredeleniya vozrasta rechnykh terras po moshnosti vyvetrelogo sloya v gal'kakh allyuviya [The possibility of determining the age of river terraces from the thickness of weathered layers in alluvial pebbles]: Geologicheskiy Zhurnal (Kiev, 1968), 1990(5), p. 57-62 (incl. Ukrainian, English sum.), 1 table, 1990.
- Nullet, Dennis; Ikawa, Haruyoshi; and Kilham, Phoebe.** Local differences in soil temperature and soil moisture regimes on a mountain slope, Hawaii: Geoderma, 47(1-2), p. 171-184, 3 tables, sketch maps, 1990.
- Nunes, Elias; and Espindola, Carlos Roberto.** Mineralogia da fracao argila de Latossolos desenvolvidos sobre a Formacao Serra do Martins no Rio Grande do Norte [Mineralogy of clay fraction in Latosols of the Serra do Martins Formation, Rio Grande do Norte]: Geociencias (Sao Paulo), 9, p. 179-187 (incl. English sum.), illus., 1990.
- Nyman, J. A.; Delaune, R. D.; and Patrick, W. H., Jr.** Wetland soil formation in the rapidly subsiding Mississippi River deltaic plain; mineral and organic matter relationships: Estuarine, Coastal and Shelf Science, 31(1), p. 57-69, illus. (incl. 1 table, sketch map), 1990.
- Nyobe, Jean Blaise.** Application of normative calculations in quantitative comparative mineralogical studies of bauxite: Ore Geology Reviews, 6(1), p. 45-50, illus. (incl. 3 tables), 1991.
- Oades, J. M.** Associations of colloids in soil aggregates: *in* Soil colloids and their associations in aggregates (De Bocht, Marcel F., editor; *et al.*), NATO ASI Series, Series B: Physics, 215, p. 463-483, illus. (incl. 7 tables), 1990. *NATO Advanced Research Workshop.*
- O'Connor, Thomas P.** Soil survey of Sioux County, Iowa: 145 p., illus. (incl. 17 tables, block diags., sketch map; soils maps 1:15,840; colored soils map 1:190,080; index map 1:190,080), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Iowa Agric. and Home Econ. Exp. Stn., Iowa State Univ. Coop. Ext. Serv. and Iowa Dep. Agric. and Land Stewardship, Div. Soil Conserv.).
- Odeh, I. O. A.; Chittleborough, D. J.; and McBratney, Alex B.** Elucidation of soil-landform interrelationships by canonical ordination analysis: Geoderma, 49(1-2), p. 1-32, illus. (incl. 8 tables, sketch map), 1991.
- Odeh, I. O. A.; McBratney, A. B.; and Chittleborough, D. J.** Design of optimal sample spacings for mapping soil using fuzzy-k-means and regionalized variable theory: Geoderma, 47(1-2), p. 93-122, illus. (incl. 7 tables), 1990.
- Ohmori, Hiroo; and Jia, Hengyi.** Dark colored organic soil formation and environmental changes since latest Pleistocene time in the upper Qingshui-he Basin, at Loess Plateau, China: Chigaku Zasshi = Journal of Geography, 99(4(905)), p. 307-329 (Japanese, incl. English sum.), illus. (incl. charts, sketch maps), 1990.
- Ohno, Tsuomu; and Zibilske, Larry M.** Determination of low concentrations of phosphorous in soil extracts using malachite green: Soil Science Society of America Journal, 55(3), p. 892-895, illus. (incl. 4 tables), 1991.

Ohnuki, Toshihiko. Characteristics of migration on ^{85}Sr and ^{137}Cs in alkaline solution through sandy soil: in Materials Research Society symposium proceedings; Scientific basis for nuclear waste management XIV (Abrajano, Teofilo A., Jr., editor; et al.), Materials Research Society Symposia Proceedings, 212, p. 609-616, illus. (incl. 3 tables), 1991.

Okamoto, Katsuo; Fukuhara, Michikazu; and Hatanaka, Tetsuya. Mapping method of soil organic matter content of Obihiro area using Landsat TM data: Journal of the Japan Society of Photogrammetry and Remote Sensing = Shashin Sokuryo to Rimoto Senshingu, 29(6), p. 45-52 (Japanese, incl. English sum.), charts, 1990.

Okeke, P. O.; and Okoro, M. P. Geochemical changes due to lateritic weathering of Middle Niger Basin sediments, Nigeria: Journal of African Earth Sciences, and the Middle East, 11(1-2), p. 169-175, illus. (incl. 4 tables, geol. sketch map), 1990.

O'Leary, Richard M.; and Chao, T. T. Determination of gold, tellurium, and thallium, in rock, stream-sediment, and soil samples by flame, and gold by graphite furnace, atomic absorption spectrophotometry following dissolution by HF, aqua regia, and HBr-Br₂: in Quality assurance manual for the Branch of Geochemistry, U.S. Geological Survey (Arbogast, Belinda F., editor), Open-File Report - U. S. Geological Survey, p. 52-59, 4 tables, 1990. (Rep. No. OF 90-0668) available from: U. S. Geol. Surv., Denver, CO, United States.

O'Leary, Richard M.; and Hopkins, Delmont M. Determination of fluoride in rock, soil, and stream-sediment samples by ion-selective electrode following Na₂CO₃-K₂CO₃-KNO₃ fusion and dissolution with citric acid: in Quality assurance manual for the Branch of Geochemistry, U.S. Geological Survey (Arbogast, Belinda F., editor), Open-File Report - U. S. Geological Survey, p. 127-130, 1 table, 1990. (Rep. No. OF 90-0668) available from: U. S. Geol. Surv., Denver, CO, United States.

O'Leary, Richard M.; and Meier, Allen L. Determination of gold in samples of rock, soil, stream sediment and heavy-mineral concentrate by flame and graphite furnace atomic absorption spectrophotometry following dissolution by HBr-Br₂: in Quality assurance manual for the Branch of Geochemistry, U.S. Geological Survey (Arbogast, Belinda F., editor), Open-File Report - U. S. Geological Survey, p. 46-51, 4 tables, 1990. (Rep. No. OF 90-0668) available from: U. S. Geol. Surv., Denver, CO, United States.

O'Leary, Richard M.; and Welsch, Eric P. Determination of tungsten in rock, soil, and stream-sediment samples by visible absorption spectrophotometry: in Quality assurance manual for the Branch of Geochemistry, U.S. Geological Survey (Arbogast, Belinda F., editor), Open-File Report - U. S. Geological Survey, p. 157-160, 1990. (Rep. No. OF 90-0668) available from: U. S. Geol. Surv., Denver, CO, United States.

Olfenbuttel, Bob. New technologies for cleaning up contaminated soil and groundwater: Battelle Today, 65, p. 3-6, illus., 1990.

Olhoeft, Gary R.; and Lucius, Jeffrey E. Deriving length scales, correlations and statistics of soil structure from ground penetrating radar data [abstr.]: in Third international conference on Ground penetrating radar (Lucius, Jeffrey E., editor; et al.), Open-File Report (United States Geological Survey, 1978), p. 52, 1990. (Rep. No. OF 90-0414) available from: U. S. Geol. Surv., Denver, CO, United States.

Olivry, J. C.; and Hoorelbeck, J. Erosion des terres noires de la Vallee du Buech, Alpes du Sud [Erosion of the black soils of Buech Valley, Southern Alps]: in Hydrology in mountainous regions; II, Artificial reservoirs, water and slopes (Sinniger, Richard O., editor; et al.), IAHS-AISH Publication, 194, p. 259-262 (incl. English sum.), 1 table, 1990. International conference on Water resources in mountainous regions.

Omana, P. K.; and Santosh, M. Morphology of gold grains in laterite profiles of Nilambur, Kerala; implications for the genesis of supergene gold deposits: Journal of the Geological Society of India, 37(6), p. 560-568, illus., 1991.

O'Neill, Kevin; Arcone, Steven A.; and Riek, Lance. Some field, laboratory, and theoretical investigations of fresh water, ice, and soil layers using short pulse radar [abstr.]: in Third international conference on Ground penetrating radar (Lucius, Jeffrey E., editor; et al.), Open-File Report (United States Geological Survey, 1978), p. 53, 1990. (Rep. No. OF 90-0414) available from: U. S. Geol. Surv., Denver, CO, United States.

Ong, S. K.; Lindner, S. R.; and Lion, L. W. Applicability of linear partitioning relationships for sorption of organic vapors onto soil and soil minerals: in Organic substances and sediments in water; Volume 1, Humics and soils (Baker, Robert Andrew, editor), p. 275-289, illus. (incl. 2 tables), Lewis Publ., Chelsea, MI, United States, 1991. American Chemical Society meeting.

- Opdahl, Donald D.; Terry, Willie J.; and Prochnow, Norman D.** Soil survey of Barnes County, North Dakota: 203 p., illus. (incl. 18 tables, block diag., sketch map; soils maps 1:20,000; colored soils map 1:253,440; index map 1:253,440), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with N.D. Agric. Exp. Stn., N.D. Coop. Ext. Serv. and N.D. State Soil Conserv. Comm.).
- Orlov, D. S.; Min'ko, O. I.; Demin, V. V.; et al.** Involvement of metals in the molecular weight organization of humic substances: Soviet Soil Science, 22(1), p. 70-73, 1990.
- Ostrova, I. V.; Silant'yev, A. N.; Litvin, L. F.; et al.** Otseňka intensivnosti erozionno-akkumulyativnykh protsessov po soderzhaniyu v pochve tseziya-137 [Assessing the intensity of the erosion accumulation processes by the composition of Cs-137 in soils]: Vestnik Moskovskogo Universiteta, Seriya 5: Geografiya, 1990(5), p. 79-85, 3 tables, 1990.
- Ouattara, Mamadou.** A study of two toposequences of the dry valley systems of western Niger (West Africa): 314 p., Doctoral, 1990, Texas A&M University, College Station, TX. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Overby, Steven T.; and DeBano, Leonard F.** New technique for measuring volumetric shrinkage in soils: Soil Science Society of America Journal, 54(6), p. 1797-1799, 1 table, 1990.
- Owens, H. Dan; Cambell, Howard V.; Fleming, Edward L.; et al.** Soil survey of Labette County, Kansas: 128 p., illus. (incl. 20 tables, block diag., sketch map; soils maps 1:20,000; colored soils map 1:190,080; index map 1:190,080), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Kans. Agric. Exp. Stn.).
- Padilla, Francisco; and Villeneuve, Jean-Pierre.** Modeling the movement of water, heat and solutes in frost-susceptible soils: *in* Pergelisol, Canada; actes de la Cinquieme conference canadienne sur le pergelisol—Permafrost, Canada; proceedings of the Fifth Canadian permafrost conference (Universite Laval, Centre d'Etudes Nordiques), Collection Nordicana, 54, p. 43-49 (incl. French sum.), illus. (incl. sects.), 1990.
- Paepe, Roland; Mariolakos, Ilias; Van Overloop, Elfie; et al.** Last interglacial-glacial north-south geosoil traverse (from stratotypes in the North Sea basin and in the eastern Mediterranean): *in* Loess, aeolian deposits, and related Palaeosols in the Mediterranean region (Cremaschi, Mauro, editor), Quaternary International, 5, p. 57-70, illus., 1990. *INQUA Commission on Loess and INQUA Commission on Palaeogeography joint meeting.*
- Paepe, Roland; and Van Overloop, Elfie.** River and soils cyclicity interfering with sea level changes: *in* Greenhouse effect, sea level and drought (Paepe, Roland, editor; et al.), NATO Advanced Study Institutes Series. Series C; Mathematical and Physical Sciences, p. 253-280, illus. (incl. strat. cols.), 1990. *NATO advanced research workshop on Geohydrological management of sea level and mitigation of drought.*
- Paetzold, R. F.** Soil climate definitions used in soil taxonomy: *in* Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers (Kimbler, J. M., editor; et al.), Proceedings - International Soil Correlation Meeting (ISCOM), 4, p. 151-165, illus. (incl. 8 tables), 1990.
- Pakshina, S. M.** Migration and distribution of salts in soil and methods of regulating them: Soviet Soil Science, 22(5), p. 48-57, illus. (incl. 4 tables), 1990.
- Palaveyev, T. D.; and Penkov, M. D.** Properties of surface waterlogged clay soils containing exchangeable Mg: Soviet Soil Science, 22(1), p. 87-96, 6 tables, 1990.
- Panday, Sorab; and Corapcioglu, M. Yavuz.** Solute rejection in freezing soils: Water Resources Research, 27(1), p. 99-108, illus. (incl. 1 table), 1991.
- Papike, J. J.; Keith, Terry E. C.; Spilde, M. N.; et al.** Geochemistry and mineralogy of fumarolic deposits, Valley of Ten Thousand Smokes, Alaska; bulk chemical and mineralogical evolution of dacite-rich protolith: American Mineralogist, 76(9-10), p. 1662-1673, illus. (incl. 4 tables, sect., sketch map), 1991.
- Parfitt, R. L.; and Clayden, B.** Andisols; the development of a new order in soil taxonomy: Geoderma, 49(3-4), p. 181-198, 1991.
- Parissopoulos, G. A.; and Wheater, H. S.** Numerical study of the effects of layers on unsaturated-saturated two-dimensional flow: Water Resources Management, 4(2), p. 97-122, 2 tables, 1990.

- Parker-Nance, T.; Talbot, M. M. B.; and Bate, G. C.** Vegetation and geomorphic age in the Alexandria coastal dunefield, eastern Cape, South Africa: *South African Journal of Science*, 87(6), p. 252-259, illus. (incl. sketch map), 1991.
- Parker, Ronald Dean.** The effect of spatial variability on output from the Water Erosion Prediction Project soil erosion computer model: 296 p., Doctoral, 1991, University of Arizona, Tucson, AZ. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Parsons, Anthony J.; Abrahams, Athol D.; and Luk, Shiu-Hung.** Size characteristics of sediment in interrill overland flow on a semiarid hillslope, southern Arizona: *Earth Surface Processes and Landforms*, 16(2), p. 143-152, 2 tables, sketch maps, 1991.
- Parsons, R. B.; Herriman, R. C.; and Cook, T. D.** Geomorphic surfaces and soils in the lower Colorado River area, Arizona and California: *in Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers* (Kimbler, J. M., editor; *et al.*), *Proceedings - International Soil Correlation Meeting (ISCOM)*, 4, p. 201-216, illus. (incl. 3 tables, sketch map), 1990.
- Patil, D. N.; Bhosale, V. N.; and Kulkarni, A. V.** Clay mineralogy of the soils of Indrayani River basin, western Maharashtra, India: *Journal of the Geological Society of India*, 35(4), p. 421-432, illus. (incl. 1 table, geol. sketch map), 1990.
- Pauls, William R.** Soil survey of Grundy County, Missouri: 118 p., illus. (incl. block diag., sketch map; soils maps 1:24,000; colored soils map 1:190,080; index map 1:190,080), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Mo. Agric. Exp. Stn.).
- Pavich, Milan J.** Weathering process research; pedology and soil geochemistry in drainage basins: *in Proceedings of a U.S. Geological Survey workshop on Environmental geochemistry* (Doe, Bruce R., editor), U. S. Geological Survey Circular, p. 33-36, sketch map, 1990. (Rep. No. C 1033).
- Pazzaglia, F. J.; and Wells, S. G.** Quaternary stratigraphy, soils and geomorphology of the northern Rio Grande Rift: *in Tectonic development of the southern Sangre de Cristo Mountains, New Mexico* (Bauer, Paul W., editor; *et al.*), *Guidebook - New Mexico Geological Society*, 41, p. 423-430, illus. (incl. 2 tables, sects., sketch maps), 1990.
- Peacock, Thomas R.** Physical preparation of soil samples: *in Quality assurance manual for the Branch of Geochemistry, U.S. Geological Survey* (Arbogast, Belinda F., editor), *Open-File Report - U. S. Geological Survey*, p. 29-32, 1990. (Rep. No. OF 90-0668) *available from:* U. S. Geol. Surv., Denver, CO, United States.
- Pedro, G.; and Chauvel, A.** Contributions of modern pedological analysis to the history of soils and landscapes; application to the study of soils derived from the continental terminal in Casamance, Senegal: *in Sedimentary and diagenetic dynamics of continental Phanerozoic sediments in Africa* (Lang, J. L., editor), *Journal of African Earth Sciences, and the Middle East*, 12(1-2), p. 319-323 (incl. French sum.), illus. (incl. sects., geol. sketch maps), 1991.
- Pendall, Elise G.; and Amundson, Ronald.** Soil/landform relationships surrounding the Harappa archaeological site, Pakistan: *Geoarchaeology*, 5(4), p. 301-322, illus. (incl. 4 tables, sketch map), 1990.
- Pendall, Elise G.; Harden, Jennifer W.; and Trumbore, Susan E.** Pedogenic isotopic indicators of climate and carbon cycling in Fish Lake valley, Nevada: *Open-File Report - U. S. Geological Survey*, 18 p., 1 table, 1991. (Rep. No. OF 91-0296) *available from:* U. S. Geol. Surv., Denver, CO, United States.
- Pennell, Kurt Davis.** A mechanistic investigation of p-xylene and water vapor sorption on soils and clay minerals: 169 p., Doctoral, 1990, University of Florida, Gainesville, FL. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Pennock, D. J.; and de Jong, E.** Regional and catenary variations in properties of Borolls of southern Saskatchewan, Canada: *Soil Science Society of America Journal*, 54(6), p. 1697-1701, 6 tables, sketch map, 1990.
- Pentecost, Allan.** The weathering rates of some sandstone cliffs, central Weald, England: *Earth Surface Processes and Landforms*, 16(1), p. 83-91, illus. (incl. 4 tables, sketch map), 1991.
- Pereverzev, V. N.; and Koshleva, Ye. A.** Phosphorus in podzolic soils of different textures: *Soviet Soil Science*, 23(3), p. 28-35, 5 tables, 1991.
- Perez Rodriguez, J. L.; Maqueda, C.; and Justo, A.** Mineralogy of soils containing pyrophyllite from southern Spain; isolation and identification of the mineral: *Soil Science*, 150(4), p. 671-679, illus. (incl. 7 tables, sketch map), 1990.

- Perez-Rodriguez, J. L.; Maqueda, C.; and Morillo, E.** Occurrence of palygorskite in soils of Ecija (Spain): *Australian Journal of Soil Research*, 28(2), p. 117-128, illus. (incl. 4 tables), 1990.
- Perfect, E.; van Loon, W. K. P.; Kay, B. D.; et al.** Influence of ice segregation and solutes on soil structural stability: *Canadian Journal of Soil Science*, 70(4), p. 571-581 (incl. French sum.), illus. (incl. 2 tables), 1990.
- Persson, L.; and Bergstrom, L.** Drilling method for collection of undisturbed soil monoliths: *Soil Science Society of America Journal*, 55(1), p. 285-287, illus., 1991.
- Pestryakov, V. K.; Kovsh, N. V.; Popov, A. I.; et al.** Laboratory modeling of the alteration of organic matter: *Soviet Soil Science*, 22(6), p. 69-78, 6 tables, 1990.
- Peterson, F. F.; Dollarhide, W. E.; and Staidle, G. S.** Intermountain-basin landforms in the Basin and Range Province: *in Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers* (Kimble, J. M., editor; *et al.*), *Proceedings - International Soil Correlation Meeting (ISCOM)*, 4, p. 61-66, 1 table, 1990.
- Petrov, V. P.** The nature of thick zones of paleoweathering: *International Geology Review*, 33, p. 49-61, illus. (incl. 1 table), 1991.
- Peyton, R. Lee; Anderson, Stephen H.; and Gantzer, Clark J.** Measurement of soil structure, water movement and solute transport using computed tomography: 76 p., illus. (incl. 2 tables), 1991. *available from: U. S. Geol. Surv., Libr., Reston, VA, United States*.
- Philip, J. R.** Inverse solution for one-dimensional infiltration, and the ratio A/K₁: *Water Resources Research*, 26(9), p. 2023-2027, illus. (incl. 2 tables), 1990.
- Philip, J. R.** Hillslope infiltration; planar slopes: *Water Resources Research*, 27(1), p. 109-117, illus. (incl. 3 tables), 1991.
- Philip, John R.** Soils, natural science, and models: *in 75th anniversary; 1916-1991* (Douglas, Lowell A., prefacer), *Soil Science*, 151(1), p. 91-98, 1991.
- Phillips, I. R.; and Black, A. S.** Predicting exchangeable cation distributions in soil by using exchange coefficients and solution activity ratios: *Australian Journal of Soil Research*, 29(3), p. 403-414, illus. (incl. 4 tables), 1991.
- Phillips, Jonathan D.** Relative ages of wetland and upland surfaces as indicated by pedogenic development: *Physical Geography*, 11(4), p. 363-378, 3 tables, 1990.
- Phogat, V. K.; Aylmore, L. A. G.; and Schuller, R. D.** Simultaneous measurement of the spatial distribution of soil water content and bulk density: *Soil Science Society of America Journal*, 55(4), p. 908-915, illus. (incl. 3 tables), 1991.
- Pierson, F. B.; and Mulla, D. J.** Aggregate stability in the Palouse region of Washington; effect of landscape position: *Soil Science Society of America Journal*, 54(5), p. 1407-1412, illus. (incl. 3 tables), 1990.
- Pignatello, Joseph J.** Competitive effects in the sorption of nonpolar organic compounds by soils: *in Organic substances and sediments in water; Volume 1, Humics and soils* (Baker, Robert Andrew, editor), p. 291-307, illus. (incl. 2 tables), Lewis Publ., Chelsea, MI, United States, 1991. *American Chemical Society meeting*.
- Poesen, J. W. A.** Conditions for the evacuation of rock fragments from cultivated upland areas during rainstorms: *in Erosion, transport and deposition processes* (Walling, Des E., editor; *et al.*), IAHS-AISH Publication, 189, p. 145-160, illus. (incl. 1 table, sketch map), 1990.
- Poonia, S. R.; and Niederbudde, E. A.** Exchange equilibria of potassium in soils; V, Effect of natural organic matter on K-Ca exchange: *Geoderma*, 47(3-4), p. 233-242, illus. (incl. 5 anal., 3 tables), 1990.
- Porter, Donna; and Bishop, Sam.** Soil and lithostratigraphy below the Loveland/Sicily Island Silt, Crowley's Ridge, Arkansas: *in Proceedings of the Arkansas Academy of Science, Proceedings of the Arkansas Academy of Science*, 44, p. 86-90, illus. (incl. 3 tables, sketch map), 1990. *74th annual meeting of the Arkansas Academy of Science*.
- Prasad, Shyan N.; and Rokens, Mathias J. M.** Raindrop impact on elastic surfaces: *in Proceedings of the Fifth Federal interagency Sedimentation conference* (Fan, Shou-Shan, editor; *et al.*), *Proceedings - Federal Inter-Agency Sedimentation Conference*, 5, p. 3.102-3.109, illus., 1991.

Pretorius, Johannes Rudolph. Modeling erosion hazard on a regional scale.: Doctoral, 1990, University of Pretoria, Pretoria, South Africa.

Pringle, Russell F. Soil survey of Thurston County, Washington: 283 p., illus. (incl. 18 tables, sketch map; soils maps 1:24,000; colored soils map 1:253,440; index map 1:253,440), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Wash. Dep. Nat. Resour. and Wash. State Univ., Agric. Res. Cent.).

Protopapas, Angelos L.; and Bras, Rafael L. Uncertainty propagation with numerical models for flow and transport in the unsaturated zone: *Water Resources Research*, 26(10), p. 2463-2474, illus. (incl. 2 tables), 1990.

Protopapas, Angelos L.; and Bras, Rafael L. The one-dimensional approximation for infiltration in heterogeneous soils: *Water Resources Research*, 27(6), p. 1019-1027, illus., 1991.

Puckett, William Edward. Soils, landscapes, and ground-penetrating radar analysis of the Chiefland limestone plain, in Levy County, Florida: 268 p., Doctoral, 1990, University of Florida, Gainesville, FL. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.

Puentes, Ruben. Soil structure restoration in Vertisols under pastures in Texas: 242 p., Doctoral, 1990, Texas A&M University, College Station, TX.

Purvis, K.; and Wright, V. P. Calcretes related to phreatophytic vegetation from the Middle Triassic Otter Sandstone of south west England: *Sedimentology*, 38(3), p. 539-551, illus. (incl. sketch map), 1991.

Quade, Jay. Stable isotopic composition of soil carbonate and fossil teeth in paleoecologic reconstruction: 137 p., Doctoral, 1990, University of Utah, Salt Lake City, UT. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.

Quantin, P.; Balesdent, J.; Bouleau, A.; et al. Premiers stades d'alteration de pences volcaniques en climat tropical humide (Montagne Pelee, Martinique) [First stages of volcanic pumice alteration in a humid tropical climate; Mount Pelee, Martinique]: *Geoderma*, 50(1-2), p. 125-148 (incl. English sum.), 1991.

Rabenhorst, M. C.; West, L. T.; and Wilding, L. P. Genesis of calcic and petrocalcic horizons in soils over carbonate rocks: *in Occurrence, characteristics, and genesis of carbonate, gypsum, and silica accumulations in soils* (Nettleton, W. D., editor), SSSA Special Publication, 26, p. 61-74, illus., 1991. *Division S-5 of the Soil Science Society of America symposium*.

Radcliffe, D. E.; West, L. T.; Hubbard, R. K.; et al. Surface sealing in coastal plains loamy sands: *Soil Science Society of America Journal*, 55(1), p. 223-227, illus. (incl. 3 tables), 1991.

Radcliffe, D. E.; West, L. T.; Ware, G. O.; et al. Infiltration in adjacent Cecil and Pacolet soils: *Soil Science Society of America Journal*, 54(6), p. 1739-1742, illus. (incl. 3 tables), 1990.

Radtke, Ulrich; and Bruckner, Helmut. Investigation on age and genesis of silcretes in Queensland (Australia); preliminary results: *Earth Surface Processes and Landforms*, 16(6), p. 547-554, illus. (incl. 3 tables), 1991.

Ragim-Zade, A. I.; Babayev, F. M.; Fasfutdinova, L. A.; et al. Determination of the microelement composition of soils and fodder plants on the southeastern and northeastern slopes of the Greater Caucasus: *Soviet Soil Science*, 22(8), p. 63-73, 4 tables, 1990.

Rainbird, Robert H.; Nesbitt, H. Wayne; and Donaldson, J. Allan. Formation and diagenesis of a sub-Huronian saprolith; comparison with a modern weathering profile: *Journal of Geology*, 98(6), p. 801-822, illus. (incl. 2 tables, strat. cols., geol. sketch map), 1990.

Rajaram, Govindarajan. Mechanical behavior of an agricultural soil: 204 p., Doctoral, 1991, Iowa State University of Science and Technology, Ames, IA. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.

Ranade, D. H.; and Gupta, Ram K. Prediction of water requirement for gypsum dissolution in a calcareous Clay soil and evaluation of dissolution rate constant: *Journal of the Indian Society of Soil Science*, 38(2), p. 353-354, 1 table, 1990.

Ranger, J.; Dambrine, E.; Robert, M.; et al. Study of current soil-forming processes using bags of vermiculite and resins placed within soil horizons: *Geoderma*, 48(3-4), p. 335-350, illus. (incl. 5 tables), 1991.

- Rappoldt, C.** The application of diffusion models to an aggregated soil: *Soil Science*, 150(3), p. 645-661, illus., 1990.
- Rasmussen, Anders; Gimmi, Thomas; and Fluhler, Hannes.** Modeling reactive gas uptake, transport, and transformation in aggregated soils: *Soil Science Society of America Journal*, 54(5), p. 1206-1213, illus. (incl. 3 tables), 1990.
- Rasmussen, P. E.; Schiff, S. L.; and Nesbitt, H. W.** The determination of exchangeable cations in acid soils; errors caused by weathering reactions during neutral salt extraction: *Canadian Journal of Soil Science*, 71(2), p. 155-163 (incl. French sum.), illus. (incl. 2 tables), 1991.
- Raupach, M. R.; and Leys, J. F.** Aerodynamics of a portable wind erosion tunnel for measuring soil erodibility by wind: *Australian Journal of Soil Research*, 28(2), p. 177-191, illus. (incl. 3 tables), 1990.
- Ravenholz, Halvor B.; and Lewis, Donald J.** Soil survey of Eden Valley area, Sweetwater and Sublette counties, Wyoming: 126 p., illus. (incl. 12 tables; soils maps 1:63,360), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with U. S. Dep. Inter., Bur. Reclam., and Wyo. Agric. Exp. Stn.).
- Realmuto, Vincent James.** Mapping the distribution of wet soils through the use of reflectance modeling; Dragoon Mountains, Cochise County, Arizona: 167 p., Doctoral, 1990, University of Arizona, Tucson, AZ. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Reger, Richard D.; and Combellick, Rodney A.** Directory of aggregate, rock, and soil producers in Alaska: *Information Circular - State of Alaska*, Department of Natural Resources, Division of Geological and Geophysical Surveys, 55 p., 1 table, index map, 1990. (Rep. No. 32).
- Reider, Richard G.** Late Pleistocene and Holocene pedogenic and environmental trends at archaeological sites in plains and mountain areas of Colorado and Wyoming: *in Archaeological geology of North America* (Laska, Norman P., editor; *et al.*), 4, p. 335-360, illus. (incl. 9 tables, sketch map), Geol. Soc. Am., Boulder, CO, United States, 1990.
- Reinert, Dalvan Jose.** Soil structural form and stability induced by tillage in a Typic Hapludalf: 142 p., Doctoral, 1990, Michigan State University, East Lansing, MI. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Ren Fuhong; Yang Shugen; Bai Xinli; et al.** The influence of physical and chemical properties of soil mass in aeration zone on the fluorine content in shallow ground water: *Shuiwendizi gongchendizhi = Bulletin of the Institute of Hydrogeology and Engineering Geology*, 6, p. 77-91 (Chinese, incl. English sum.), 14 tables, charts, 1990.
- Renard, Kenneth G.; Foster, George R.; Weesies, Glenn A.; et al.** RUSLE; Revised Universal Soil Loss Equation: *Journal of Soil and Water Conservation*, 46(1), p. 30-33, illus., 1991.
- Renner, Rebecca.** Does the secret lie in the soil?: *New Scientist* (1971), 128(1748-1749), p. 62-64, illus., 1990.
- Retallack, Gregory J.** Soils of the past; an introduction to paleopedology: 520 p., illus. (incl. 23 tables), Unwin Hyman, Boston, MA, United States, 1990.
- Retallack, Gregory J.** A field guide to mid-Tertiary Paleosols and paleoclimatic changes in the high desert of central Oregon; Part I: *Oregon Geology*, 53(3), p. 51-59, illus. (incl. strat. col., block diag., geol. sketch map), 1991.
- Retallack, Gregory J.** Untangling the effects of burial alteration and ancient soil formation: *Annual Review of Earth and Planetary Sciences*, 19, p. 183-206, illus., 1991.
- Retallack, Gregory J.** A field guide to mid-Tertiary Paleosols and paleoclimatic changes in the high desert of central Oregon; Part 2: *Oregon Geology*, 53(4), p. 75-80, illus. (incl. sects.), 1991.
- Reynolds, Charles B.** Influence of soil sampling and soil history in investigating soil-mediated processes: *in Proceedings of the Sixth Corps chemists meeting* (Strong, Ann B., compiler; *et al.*), Miscellaneous Paper EL, p. 15, 1990. (Rep. No. 90-14). *Sixth Corps chemists meeting*.
- Reynolds, W. D.; and Elrick, D. E.** Ponded infiltration from a single ring; I, Analysis of steady flow: *Soil Science Society of America Journal*, 54(5), p. 1233-1241, 1990.
- Rhoton, F. E.; Meyer, L. D.; and Tyler, D. D.** Effects of past erosion on the interill erodibility of a fragipan soil: *Journal of Soil and Water Conservation*, 45(6), p. 660-663, illus. (incl. 5 tables), 1990.

- Rice, James A.; and MacCarthy, Patrick.** Composition of humin in stream sediment and peat: *in* Organic substances and sediments in water; Volume 1, Humics and soils (Baker, Robert Andrew, editor), p. 35-46, illus. (incl. 2 tables), Lewis Publ., Chelsea, MI, United States, 1991. *American Chemical Society meeting.*
- Richards, Kenneth Adrian.** Soil permittivity determination using a fringe field capacitor: 125 p., Doctoral, 1990, University of Nebraska, Lincoln, NE. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Richter, G.; and Kertesz, A.** Seasonal variations of runoff rates from field plots in the Federal Republic of Germany and in Hungary during dry years: *in* Erosion, transport and deposition processes (Walling, Des E., editor; *et al.*), IAHS-AISH Publication, 189, p. 161-168, illus. (incl. 1 table), 1990.
- Righi, D.; Bravard, S.; Chauvel, A.; et al.** In situ study of soil processes in an Oxisol-Spodosol sequence of Amazonia (Brazil): *Soil Science*, 150(1), p. 438-445, illus. (incl. 2 tables), 1990.
- Righi, D.; Bravard, S.; Legros, J. P.; et al.** Changes in the particle size distribution of quartzose sands affected by lateritization; an approach by computer simulation: *Soil Science*, 149(6), p. 361-366, illus., 1990.
- Ringrose-Voase, A. J.** One-dimensional image analysis of soil structure; I, Principles: *Journal of Soil Science*, 41(3), p. 499-512, illus. (incl. 2 tables), 1990.
- Ringrose-Voase, A. J.; and Nys, C.** One-dimensional image analysis of soil structure, II, Interpretation of parameters with respect to four forest soil profiles: *Journal of Soil Science*, 41(3), p. 513-527, illus. (incl. 3 tables), 1990.
- Roberts, Dar Alexander.** Separating spectral mixtures of vegetation and soils: 198 p., Doctoral, 1991, University of Washington, Seattle, WA. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Robertson, Ian D. M.; and Eggleton, Richard A.** Weathering of granitic muscovite to kaolinite and halloysite and of plagioclase-derived kaolinite to halloysite: *Clays and Clay Minerals*, 39(2), p. 113-126, illus. (incl. 5 tables), 1991.
- Robinson, J. S.; and Syers, J. K.** A critical evaluation of the factors influencing the dissolution of Gafsa phosphate rock: *Journal of Soil Science*, 41(4), p. 597-605, illus. (incl. 2 tables), 1990.
- Rodbell, D. T.** Soil-age relationships on late Quaternary moraines, Arrowsmith Range, Southern Alps, New Zealand: *Arctic and Alpine Research*, 22(4), p. 355-365, illus. (incl. 4 tables, sketch maps), 1990.
- Rogers, Kirby L.; and Rice, Charles W.** Distribution of denitrification in soil profiles [abstr.]: *in* 7th annual water and the future of Kansas conference; Controlling water contamination (Black, Richard A., chairperson; *et al.*), Water and the Future of Kansas Conference, Proceedings, 7, p. 17-18, 1990.
- Rogers, Vergil A.** Soil survey of Savannah River Plant area, parts of Aiken, Barnwell, and Allendale counties, South Carolina: 127 p., illus. (incl. 15 tables, sketch map; soils maps 1:15,840; colored soils map 1:190,080; index map 1:190,080), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with U. S. Dep. Energy, U. S. Forest Serv., S.C. Agric. Exp. Stn. and S.C. Land Resour. Conserv. Comm.).
- Rogowski, Andrew S.; Weinrich, B. E.; and Khanbilvardi, Reza M.** A nonparametric approach to potential erosion on mined and reclaimed areas: *Journal of Soil and Water Conservation*, 45(3), p. 408-412, illus. (incl. geol. sketch maps), 1990.
- Romanovskiy, N. P.; Gurovich, V. G.; Dammer, A. E.; et al.** Plotnostnaya kharakteristika vyvetrelykh gornykh porod Dal'nego Vostoka [Density characteristics of the Far East weathered rocks]: *Tikhookeanskaya Geologiya = Pacific Geology*, 1990(1), p. 56-62, 3 tables, 1990.
- Romanovsky, V. E.; Maksimova, L. N.; and Seregina, N. V.** Reconstruction for paleotemperature conditions of freezing-thawing processes in rock soils in the late Pleistocene and Holocene [abstr.]: *in* Abstracts; International conference on the role of the Polar regions in global change (University of Alaska at Fairbanks, Geophysical Institute), p. 162, Univ. Alaska at Fairbanks, Fairbanks, AK, United States, 1990.
- Ross, Benjamin.** The diversion capacity of capillary barriers: *Water Resources Research*, 26(10), p. 2625-2629, illus., 1990.
- Ross, D. J.; and Thompson, C. H.** Soils at sites selected for eucalypt research in Toolara State Forest, Gympie, Queensland: *Division of Soils Divisional Report*, 111, 43 p., illus. (incl. 3 tables, sketch maps), 1991.

- Ross, G. John (prefacer).** Poorly crystalline and X-ray amorphous inorganic components in soils and clays: Oct. 16-17, 1989. *Soil Science Society of America Journal*, 55(4), p. 1161-1187, 1991.
- Ross, P. J.; Williams, J.; and Bristow, K. L.** Equation for extending water-retention curves to dryness: *Soil Science Society of America Journal*, 55(4), p. 923-927, illus., 1991.
- Ross, Peter J.; and Bristow, Keith L.** Simulating water movement in layered and gradational soils using the Kirchhoff transform: *Soil Science Society of America Journal*, 54(6), p. 1519-1524, illus. (incl. 2 tables), 1990.
- Ross, S. M.; Thorne, J. B.; and Nortcliff, S. II;** Soil hydrology, nutrient and erosional response to the clearance of terra firme forest, Maraca Island, Roraima, northern Brazil: *in The Maraca Rainforest Project* (Hemming, John H., leader), *Geographical Journal*, 156, Part 3, p. 267-282, illus. (incl. 5 tables), 1990.
- Roth, C. H.; and Pavan, M. A.** Effects of lime and gypsum on clay dispersion and infiltration in samples of a Brazilian Oxisol: *Geoderma*, 48(3-4), p. 351-361, illus. (incl. 4 tables), 1991.
- Ruan Tianjian; and Cheng Jianping.** Hydrogen stripping of absorbed hydrocarbons in soil sample; a new method in geochemical exploration for oil and gas: *in Proceedings of the Second conference on petroleum geochemistry and exploration in the Afro-Asian region* (Fan Pu, editor; *et al.*), *Journal of Southeast Asian Earth Sciences*, 5(1-4), p. 5-7, illus. (incl. sketch maps), 1991.
- Ruprecht, J. K.; and Schofield, N. J.** Seasonal soil water dynamics in the Jarrah Forest, Western Australia; II, Results from a site with fine-textured soil profiles: *Hydrological Processes*, 4(3), p. 259-267, illus. (incl. geol. sketch map), 1990.
- Russo, David.** Stochastic analysis of simulated vadose zone solute transport in a vertical cross section of heterogeneous soil during nonsteady water flow: *Water Resources Research*, 27(3), p. 267-283, illus., 1991.
- Russo, David; Bresler, Eshel; Shani, Uri; et al.** Analyses of infiltration events in relation to determining soil hydraulic properties by inverse problem methodology: *Water Resources Research*, 27(6), p. 1361-1373, illus. (incl. 3 tables), 1991.
- Russo, David; and Dagan, Gedeon.** On solute transport in a heterogeneous porous formation under saturated and unsaturated water flows: *Water Resources Research*, 27(3), p. 285-292, illus., 1991.
- Rutter, Nat; Ding Zhongli; Evans, M. E.; et al.** Baoji-type pedostratigraphic section, Loess Plateau, north-central China: *Quaternary Science Reviews*, 10(1), p. 1-22, illus. (incl. 2 tables, geol. sketch map), 1991.
- Rutter, Nat; Ding Zhongli; and Liu Tungsheng.** Comparison of isotope stages 1-61 with the Baoji-type pedostratigraphic section of north-central China: *Canadian Journal of Earth Sciences = Journal Canadien des Sciences de la Terre*, 28(7), p. 985-990 (incl. French sum.), 2 tables, strat. cols., sketch maps, 1991.
- Rybakova, N. O.** Changes in the vegetation cover and climate in the Kolyma Lowlands in late Quaternary time: *Polar Geography and Geology*, 14(4), p. 279-286, illus., 1990.
- Sadusky, M. C.; and Sparks, D. L.** Anionic effects on potassium reactions in variable-charge Atlantic Coastal Plain soils: *Soil Science Society of America Journal*, 55(2), p. 371-375, illus. (incl. 3 tables), 1991.
- Saha, J. K.; Mondal, A. K.; Hazra, G. C.; et al.** Depthwise distribution of copper fractions in some Ultisols: *Soil Science*, 151(6), p. 452-458, illus. (incl. 5 tables), 1991.
- Sahu, G. C.; Patnaik, S. N.; and Das, P. K.** Morphology, genesis, mineralogy and classification of soils of northern plateau zone of Orissa: *Journal of the Indian Society of Soil Science*, 38(1), p. 116-121, 5 tables, 1990.
- Salehzadeh, Amir.** The temperature dependence of soil moisture characteristics of agricultural soils: 208 p., Doctoral, 1990, University of Wisconsin, Madison, WI. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Salem, M. Z.; and Abo El-Ennan, S. M.** A comparative micromorphological study of the most important diagnostic horizons of the soils of Egypt: *Egyptian Journal of Soil Science*, 30(4), p. 587-605, illus. (incl. 2 tables, sketch map), 1990.

- Samson, Scott A.; and Lewis, David T.** Numerical taxonomy of soils using spectral information of overlying range vegetation: *Geoderma*, 50(1-2), p. 1-11, 1991.
- Sanhueza, Eugenio; and Andreae, Meinrat O.** Emission of formic and acetic acids from tropical savanna soils: *Geophysical Research Letters*, 18(9), p. 1707-1710, illus., 1991.
- Sanhueza, Eugenio; Hao, Wei Min; Scharffe, Dieter; et al.** N₂O and NO emissions from soils of the northern part of the Guayana Shield, Venezuela: *Journal of Geophysical Research, D, Atmospheres*, 95(13), p. 22,481-22,488, illus. (incl. 5 tables), 1990.
- Sannigrahi, A. K.; Godse, N. G.; and Sharanappa.** Characteristics and classification of dominant hill soils of Nilgiri: *Journal of the Indian Society of Soil Science*, 38(2), p. 345-348, 2 tables, 1990.
- Santosh, M.; and Omana, P. K.** Very high purity gold from lateritic weathering profiles of Nilambur, southern India: *Geology (Boulder)*, 19(7), p. 746-749, illus. (incl. 1 table), 1991.
- Sass, R. L.; Fisher, F. M.; Harcombe, P. A.; et al.** Methane production and emission in a Texas rice field: *Global Biogeochemical Cycles*, 4(1), p. 47-68, illus. (incl. 2 tables), 1990.
- Savage, Kevin M.; and Potter, Paul E.** Petrology of modern sands of the rios Guaviare and Inirida, southern Colombia; tropical climate and sand composition: *Journal of Geology*, 99(2), p. 289-298, illus. (incl. 3 tables, geol. sketch map), 1991.
- Sayin, M.; Mermut, A. R.; and Tiessen, H.** Phosphate sorption-desorption characteristics by magnetically separated soil fractions: *Soil Science Society of America Journal*, 54(5), p. 1298-1304, illus. (incl. 4 tables), 1990.
- Scanlon, Bridget R.** Evaluation of moisture flux from chloride data in Desert soils: *Journal of Hydrology*, 128(1-4), p. 137-156, illus. (incl. 1 table, sketch map), 1991.
- Schaetzl, Randall J.** A lithosequence of soils in extremely gravelly, dolomitic parent materials, Bois Blanc Island, Lake Huron: *Geoderma*, 48(3-4), p. 305-320, illus. (incl. 4 tables, sketch map), 1991.
- Scharffe, Dieter; Hao, Wei Min; Donoso, Loreto; et al.** Soil fluxes and atmospheric concentration of CO and CH₄ in the northern part of the Guayana Shield, Venezuela: *Journal of Geophysical Research, D, Atmospheres*, 95(13), p. 22,475-22,480, illus. (incl. 3 tables), 1990.
- Schchepilov, V. G.** Vliyanie geomorfologicheskikh usloviy na eroziyu i urozhay sel'skokhozyaystvennykh kul'tur [Impact of geomorphologic conditions on soil erosion and crop yield]: *Geomorfologiya*, 1990(2), p. 54-57 (incl. English sum.), illus. (incl. 6 tables, sketch map), 1990.
- Schlesinger, William H.** Evidence from chronosequence studies for a low carbon-storage potential of soils: *Nature (London)*, 348(6298), p. 232-234, illus. (incl. 1 table), 1990.
- Schnabel, R. R.; and Potter, R. M.** Kinetics of sulfate retention on soil as affected by solution pH and concentration: *Soil Science Society of America Journal*, 55(3), p. 693-698, illus. (incl. 5 tables), 1991.
- Schnitzer, M.; Schulten, H. R.; Schuppli, P.; et al.** Organic matter extraction from soils with water of high pressure and temperature: *Soil Science Society of America Journal*, 55(1), p. 102-108, illus. (incl. 6 tables), 1991.
- Schnitzer, Morris.** Soil organic matter; the next 75 years: *in* 75th anniversary; 1916-1991 (Douglas, Lowell A., prefacer), *Soil Science*, 151(1), p. 41-58, illus. (incl. 6 tables), 1991.
- Schnoor, Jerald L.** Kinetics of chemical weathering; a comparison of laboratory and field weathering rates: *in* Aquatic chemical kinetics; reaction rates of processes in natural waters (Stumm, Werner, editor), p. 475-504, illus. (incl. 3 tables, sketch map), John Wiley & Sons, New York, NY, United States, 1990. (A Wiley-Intersci. Publ.).
- Schoeneberger, Philip James.** Physical properties and water movement through a soil and saprolite at different geomorphic positions: 120 p., Doctoral, 1990, North Carolina State University, Raleigh, NC. available from: Univ. Microfilms, Ann Arbor, MI, United States.
- Schuh, W. M.; and Cline, R. L.** Effect of soil properties on unsaturated hydraulic conductivity pore-interaction factors: *Soil Science Society of America Journal*, 54(6), p. 1509-1519, illus. (incl. 3 tables), 1990.
- Schulin, R.; Papritz, A.; Fluhler, H.; et al.** Parameter estimation for simulating binary homovalent cation transport in aggregated soils at variable ionic strength: *in* Validation of flow and transport models for the unsaturated zone (Wierenga, Peter J., editor), *Journal of Contaminant Hydrology*, 7(1-2), p. 1-19, illus. (incl. 7 tables), 1991.

- Schumacher, Brian A.; Shines, K. C.; Burton, J. V.; et al.** Comparison of three methods for soil homogenization: *Soil Science Society of America Journal*, 54(4), p. 1187-1190, 4 tables, 1990.
- Schwertmann, U.** Some properties of soil and synthetic iron oxides: *in Soil colloids and their associations in aggregates* (De Bocht, Marcel F., editor; *et al.*), NATO ASI Series, Series B: Physics, 215, p. 57-84, illus. (incl. 7 tables), 1990. *NATO Advanced Research Workshop*.
- Scott, D. F.; and Van Wyk, D. B.** The effects of wildfire on soil wettability and hydrological behaviour of an afforested catchment: *Journal of Hydrology*, 121(1-4), p. 239-256, illus. (incl. 4 tables), 1990.
- Scotter, D. R.; and Tillman, R. W.** Movement of solutes associated with intermittent soil water flow; I, Tritium and bromide: *Australian Journal of Soil Research*, 29(2), p. 175-183, illus., 1991.
- Sedov, S. N.; Malinin, O. I.; and Shoba, S. A.** Autonomous taiga soil formation on the southwest coast of the Sea of Okhotsk: *Soviet Soil Science*, 22(3), p. 24-35, illus. (incl. 2 tables), 1990.
- Seelig, B. D.; Richardson, J. E.; and Kington, R. E.** Comparison of statistical and standard techniques to classify and delineate sodic soils: *Soil Science Society of America Journal*, 55(4), p. 1042-1048, illus. (incl. 4 tables, sketch maps), 1991.
- Seelig, B. D.; Richardson, J. L.; and Baker, W. T.** Characteristics and taxonomy of sodic soils as a function of landform position: *Soil Science Society of America Journal*, 54(6), p. 1690-1697, illus. (incl. 3 tables, sketch maps), 1990.
- Segeren, Antonius Gerardus.** The hydraulic conductivity of a soil surface skin formed by furrow flow: 193 p., Doctoral, 1990, Utah State University, Logan, UT. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Selker, J. S.; Parlange, J. Y.; Steenhuis, T. S.; et al.** Laboratory tests of a theory of fingering during infiltration into layered soils: *Soil Science Society of America Journal*, 55(3), p. 896-897, 1991.
- Selker, John Steven.** Unstable wetting in homogeneous soils under continuous infiltration: 252 p., Doctoral, 1991, Cornell University, Ithaca, NY. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Semeniuk, V.** The geomorphology and soils of the Yoongarillup Plain in the Mandurah-Bunbury coastal zone, south-western Australia; a critical appraisal: *Journal of the Royal Society of Western Australia*, 73(1), p. 1-7, 1 table, sketch maps, 1990.
- Sequi, Paolo; Ciavatta, Claudio; and Antisari, Livia Vittori.** Organic fertilizers and humification in soil: *in Organic substances and sediments in water*; Volume 1, Humics and soils (Baker, Robert Andrew, editor), p. 351-367, illus. (incl. 1 table), Lewis Publ., Chelsea, MI, United States, 1991. *American Chemical Society meeting*.
- Sgibnev, V. V.; and Dodonov, A. E.** Pleistocene paleosols in Middle Asia; genetic and stratigraphic separation [abstr.]: *in* 13th international sedimentological congress; abstracts, posters, International Sedimentological Congress, 13, p. 201, 1990.
- Shao Zongchen.** Chemical distinction of hydrous oxide-type surfaces in soils; I, Surface charge: *Acta Pedologica Sinica = T'u Jang Hsueh Pao*, 27(2), p. 159-165 (Chinese, incl. English sum.), 2 tables, charts, 1990.
- Sharma, M. L.; and Taniguchi, M.** Movement of a non-reactive solute tracer during steady and intermittent leaching: *Journal of Hydrology*, 128(1-4), p. 323-334, illus. (incl. 1 table), 1991.
- Sharma, P. P.; Gupta, S. C.; and Rawls, W. J.** Soil detachment by single raindrops of varying kinetic energy: *Soil Science Society of America Journal*, 55(2), p. 301-307, illus. (incl. 2 tables), 1991.
- Sharma, S. P.; Sharma, P. K.; and Tripathi, B. R.** Forms of acidity in some acid soils of India: *Journal of the Indian Society of Soil Science*, 38(2), p. 189-195, 3 tables, 1990.
- Sharpley, Andrew N.** Kinetics of sulfate desorption from soil: *Soil Science Society of America Journal*, 54(6), p. 1571-1575, illus. (incl. 4 tables), 1990.
- Shaviv, A.; and Shachar, N.** A model of phosphorus diffusion from a slightly soluble source and its transformations in Calcareous soils: *Geoderma*, 47(3-4), p. 361-379, illus., 1990.
- Shen Siyuan; and Xi Chengfan.** Soil water-retention and its relationship with particle size distribution in northern Anhui: *Acta Pedologica Sinica = T'u Jang Hsueh Pao*, 27(1), p. 34-42 (Chinese), 6 tables, 1990.

- Shen Zhenrong; Li Yuanyuan; Wang Lin; et al.** Research of the model of surface, soil and groundwater transformation for the plains of North China: *in* The hydrological basis for water resources management (Shamir, Uri, editor; *et al.*), IAHS-AISH Publication, 197, p. 93-102 (incl. French sum.), illus. (incl. 2 tables), 1990. *International symposium*.
- Sheppard, Marsha I.; and Schwartz, W. J.** A unique soil-carbonate liberation technique for use with carbon-14-labelled carbonate: Soil Science Society of America Journal, 55(1), p. 279-282, illus. (incl. 1 table), 1991.
- Sheptukhov, V. N.; Galkina, M. M.; and Skvortsova, Ye. B.** Change of structure of a subsoil horizon of Sod-Podzolic soils on deep loosening: Soviet Soil Science, 22(1), p. 97-108, illus. (incl. 4 tables), 1990.
- Shestakov, Ye. I.; Karpukhin, A. I.; Kaurichev, I. S.; et al.** Migration and transformation of manganese compounds in Podzolic soils: Soviet Soil Science, 22(3), p. 62-75, illus. (incl. 5 tables), 1990.
- Shiozwa, Sho; and Campbell, Gaylon S.** Soil thermal conductivity: *in* Instrumentation for studying vegetation canopies for remote sensing in optical and thermal infrared regions (Goel, Narendra S., editor; *et al.*), Remote Sensing Reviews, 5(1), p. 301-310, illus. (incl. 1 table), 1990.
- Shkaruba, A. M.** Devices for measuring the electrokinetic potential of soils and their surface conductivity: Soviet Soil Science, 23(3), p. 96-98, illus., 1991.
- Shoemaker, Leslie Lessing.** GLEAMS plus the vadose zone: 289 p., Doctoral, 1990, University of Maryland, College Park, MD. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Shoji, S.; and Ito, T.** Classification of tephra-derived Spodosols: Soil Science, 150(5), p. 799-815, illus. (incl. 3 tables), 1990.
- Shukla, L. M.; and Lyngdoh, Joplin C.** Zinc status of soils of Meghalaya in relation to their characteristics: Journal of the Indian Society of Soil Science, 38(2), p. 315-316, 2 tables, 1990.
- Shurtliff, Daniel R.; Seavers, Vernon C.; and Belohlavy, Francis V.** Soil survey of Loup County, Nebraska: 190 p., illus. (incl. 20 tables; colored soils map 1:190,080; soils maps 1:20,000), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Univ. Nebr., Conserv. and Surv. Div.).
- Simmons, Melvin; and Moos, Dean K.** Soil survey of Cavalier County, North Dakota: 192 p., illus. (incl. 18 tables, block diagrs., sketch map; soils maps 1:20,000; colored soils map 1:253,440; index map 1:253,440), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with N.D. Agric. Exp. Stn., N.D. Coop. Ext. Serv. and N.D. State Soil Conserv. Comm.).
- Simon, Andrew; Larsen, Matthew C.; and Hupp, Cliff R.** The role of soil processes in determining mechanisms of slope failure and hillslope development in a humid-tropical forest, eastern Puerto Rico: *in* Soils and landscape evolution; proceedings of the 21st annual Binghamton symposium in geomorphology (Kneupfer, Peter L. K., editor; *et al.*), Geomorphology, 3(3-4), p. 263-286, illus. (incl. 9 tables, sketch map), 1990.
- Simonov, G. A.** Composition of layered silicates in a series of Sod-Podzolic soils: Soviet Soil Science, 22(3), p. 89-97, illus. (incl. 1 table), 1990.
- Simonson, Roy W.** Soil science; goals for the next 75 years: *in* 75th anniversary; 1916-1991 (Douglas, Lowell A., prefacer), Soil Science, 151(1), p. 7-18, 1991.
- Simonson, Roy W.** The U.S. soil survey; contributions to soil science and its application: Geoderma, 48(1-2), p. 1-16, 1991.
- Singh, Balwant; and Gilkes, R. J.** A potassium-rich beidellite from a laterite pallid zone in Western Australia: Clay Minerals, 26(2), p. 233-244, 3 tables, charts, 1991.
- Singh, M.; Ramola, R. C.; Singh, S.; et al.** Influence of moisture content on radon diffusion in soil: Nuclear Geophysics, 4(4), p. 479-482, illus., 1990.
- Singh, Piyush; and Kanwar, Rameshwar S.** Preferential solute transport through macropores in large undisturbed saturated soil columns: Journal of Environmental Quality, 20(1), p. 295-300, illus. (incl. 2 tables), 1991.
- Singh, R. P.; Ram, Hanuman; and Singh, Sant.** Comparative study of some morphological characteristics of concretions of some sodic soils: Journal of the Indian Society of Soil Science, 38(2), p. 349-352, 2 tables, 1990.

- Singh, R. R.; and Choudhary, S. N.** Soil copper status of the calcareous belt of Bihar: *Journal of the Indian Society of Soil Science*, 38(2), p. 317-318, 2 tables, 1990.
- Sisson, James B.; and van Genuchten, Martinus T.** An improved analysis of gravity drainage experiments for estimating the unsaturated soil hydraulic functions: *Water Resources Research*, 27(4), p. 569-575, illus. (incl. 2 tables), 1991.
- Sivakumar, M. V. K.; Lascano, R. J.; and Upchurch, D. R.** Hydraulic properties of four soils in Niger and implications for water balance studies: *in Proceedings of the Sahel forum on The state-of-the-art of hydrology and hydrogeology in the arid and semi-arid areas of Africa* (Stout, Glenn E., editor; *et al.*), p. 502-512 (incl. French sum.), illus. (incl. sketch map), Int. Water Resour. Assoc., Urbana, IL, United States, 1990.
- Sivakumar, M. V. K.; Wallace, J. S.; Renard, C. (editors); et al.** Soil water balance in the Sudano-Saharan zone; proceedings of an international workshop: Feb. 18-23, 1991, Niger. IAHS-AISH Publication, 199, 628 p., illus., 1991.
- Sjoberg, R.; and Broadbent, N.** Measurement and calibration of weathering, using the Schmidt hammer, on wave washed moraines on the upper Norrland coast, Sweden: *Earth Surface Processes and Landforms*, 16(1), p. 57-64, illus. (incl. 1 table, sketch map), 1991.
- Skjemstad, J. O.; Bushby, H. V. A.; and Hansen, R. W.** Extractable Fe and Al in the surface horizons of a range of soils from Queensland: *Australian Journal of Soil Research*, 28(2), p. 259-266, illus. (incl. 3 tables), 1990.
- Slate, Janet L.; Bull, William B.; Ku, Teh-Lung; et al.** Soil-carbonate genesis in the Pinacate volcanic field, northwestern Sonora, Mexico: *Quaternary Research* (New York), 35(3, Part 1), p. 400-416, 4 tables, charts, 1991.
- Smalley, Ian.** The first great loess bibliography; Stuntz and Free republished, 1911-1991: *Occasional Paper - Leicester University Geography Department*, 19, p. 174-263, 1991.
- Smettem, K. R. J.; Chittleborough, D. J.; Richards, B. G.; et al.** The influence of macropores on runoff generation from a hillslope soil with a contrasting textural class: *Journal of Hydrology*, 122(1-4), p. 235-252, illus. (incl. 6 tables), 1991.
- Smith, C. A. S.; Fox, C. A.; and Hargrave, A. E.** Development of soil structure in some turbic Cryosols in the Canadian low Arctic: *Canadian Journal of Soil Science*, 71(1), p. 11-29 (incl. French sum.), illus. (incl. 3 tables, sects.), 1991.
- Smith, James A.; Tuck, David M.; Jaffe, Peter R.; et al.** Effects of surfactants on the mobility of nonpolar organic contaminants in porous media: *in Organic substances and sediments in water; Volume 1, Humics and soils* (Baker, Robert Andrew, editor), p. 201-238, illus. (incl. 3 tables), Lewis Publ., Chelsea, MI, United States, 1991. *American Chemical Society meeting*.
- Smith, Matt C.; Vellidis, George; Thomas, D. L.; et al.** Calibration of water table location in a sandy soil using ground penetrating radar [abstr.]: *in Third international conference on Ground penetrating radar* (Lucius, Jeffrey E., editor; *et al.*), Open-File Report (United States Geological Survey, 1978), p. 63, 1990. (Rep. No. OF 90-0414) available from: U. S. Geol. Surv., Denver, CO, United States.
- Smith, R. E.** Analysis of infiltration through a two-layer soil profile: *Soil Science Society of America Journal*, 54(5), p. 1219-1227, illus., 1990.
- Smithson, Paul Chace.** Aluminum chemistry of forested soils subjected to acidic inputs: 308 p., Doctoral, 1990, North Carolina State Univ., Raleigh, NC. available from: Univ. Microfilms, Ann Arbor, MI, United States.
- Sohn, Mary L.; and Rajski, Scott.** The adsorption of Cd(II) from seawater by humic acids of various sources of origin: *Organic Geochemistry*, 15(4), p. 439-447, illus. (incl. 3 tables), 1990.
- Soileau, J. M.; Hajek, B. F.; and Touchton, J. T.** Soil erosion and deposition evidence in a small watershed using fallout cesium-137: *Soil Science Society of America Journal*, 54(6), p. 1712-1719, illus. (incl. 6 tables, sketch map), 1990.
- Sokolov, I. S.; and Gradusov, B. P.** Podzolic soils of central Siberia and some current problems in podzolization: *Soviet Soil Science*, 22(5), p. 7-18, 6 tables, 1990.
- Sokolov, V. N.; and O'Brien, Neal R.** A fabric classification of argillaceous rocks, sediments, soils: *Applied Clay Science*, 5(4), p. 353-360, illus., 1990.

Sombroek, W. G. Aridisols of the world, occurrence and potential: *in* Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers (Kimble, J. M., editor; *et al.*), Proceedings - International Soil Correlation Meeting (ISCOM), 4, p. 121-128, 1990.

Sombroek, W. G. Geographic quantification of soils and changes in their properties: *in* Proceedings of the International conference, Soils and the greenhouse effect (Bouwman, A. F., editor), p. 225-244, 1 table, John Wiley & Sons, Chichester, United Kingdom, 1990.

Sophocleous, Marios A. Combining the soilwater balance and water-level fluctuation methods to estimate natural ground-water recharge; practical aspects: *Journal of Hydrology*, 124(3-4), p. 229-241, illus. (incl. sketch map), 1991.

Sorensen, Jan; and Thorling, Laerke. Stimulation by lepidocrocite (Y-FeOOH) of Fe(II)-dependent nitrite reduction: *Geochimica et Cosmochimica Acta*, 55(5), p. 1289-1294, illus., 1991.

Southard, R. J.; Boettinger, J. L.; and Chadwick, O. A. Identification, genesis, and classification of duripans: *in* Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers (Kimble, J. M., editor; *et al.*), Proceedings - International Soil Correlation Meeting (ISCOM), 4, p. 45-60, illus. (incl. 2 tables), 1990.

Spain, Alister V. Influence of environmental conditions and some soil chemical properties on the carbon and nitrogen contents of some tropical Australian rainforest soils: *Australian Journal of Soil Research*, 28(6), p. 825-839, illus. (incl. 3 tables), 1990.

Spiers, Graeme Allington. Mineral translocation and authigenesis in selected Alberta soils: Doctoral, 1990, University of Alberta, Edmonton, AB, Canada. *available from:* Natl. Libr. Can., Ottawa, ON, Canada.

Sposito, Garrison. Lie group invariance of the Richards equation: *in* Dynamics of fluids in hierarchical porous media (Cushman, John H., editor), p. 327-347, illus. (incl. 1 table), Acad. Press, San Diego, CA, United States, 1990.

Spruill, Willie E. Soil survey of Columbus County, North Carolina: 138 p., illus. (incl. 16 tables, sketch map; soils maps 1:24,000; colored soils map 1:253,440; index map 1:253,440), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with N.C. Dep. Nat. Resour. and Commun. Dev., N.C. Agric. Res. Serv., N.C. Agric. Ext. Serv., and Columbus Cty. Board Comm.).

Srivastava, A. K.; and Kumar, Rajesh. Textural structural relationships of some Indian soils: *Journal of the Indian Society of Soil Science*, 38(2), p. 293-296, 3 tables, 1990.

Srivastava, Rajeev; Bhattacharya, Tapas; Prasad, Jagdish; et al. The Leptovertic sub-group; a proposed amendment to Soil Taxonomy: *Journal of the Indian Society of Soil Science*, 38(1), p. 177-179, 2 tables, 1990.

Stadtmauer, T. Soil erosion in East Kalimantan, Indonesia: *in* Research needs and applications to reduce erosion and sedimentation in tropical steeplands; proceedings of an international symposium (Ziemer, R. R., editor; *et al.*), IAHS-AISH Publication, 192, p. 221-230, illus. (incl. 3 tables), 1990.

Stahl, Randal S. Zinc sorption by iron oxides, manganese oxides, and soils; influence of pH: 122 p., Doctoral, 1990, University of Maryland, College Park, MD. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.

Stallings, Lisa Rose. The effects of agricultural acidification on a vineyard soil's chemical and mineralogical properties: 106 p., Doctoral, 1991, University of California, Davis, Davis, CA. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.

Starr, J. L.; and Glotfelty, D. E. Atrazine and bromide movement through a silt loam soil: *Journal of Environmental Quality*, 19(3), p. 552-558, illus. (incl. 2 tables), 1990.

Stauffer, Robert E.; and Wittichen, Bruce D. Effects of silicate weathering on water chemistry in forested, upland, felsic terrane of the USA: *Geochimica et Cosmochimica Acta*, 55(11), p. 3253-3271, illus. (incl. 11 tables), 1991.

Staunton, S. A comparison of the surface impedance factors of Ca, Na, Rb and Cs derived from their self-diffusion coefficients in various soils: *in* Transport processes in the soil, *Journal of Soil Science*, 41(4), p. 643-653, illus. (incl. 5 tables), 1990. *British-Israeli symposium.*

- Steenhuis, Tammo S.; King, K. J. Samuel; Parlange, J. Yves; et al.** Flow regime in sandy soils with inclined layers: in Proceedings of Tenth annual American Geophysical Union hydrology days (Morel-Seytoux, Hubert J., editor), Annual Rocky Mountains Groundwater Conference, 14, p. 78-94, illus., 1990.
- Stern, Ran.** Effects of soil properties and chemical ameliorants on seal formation, runoff and erosion: Doctoral, 1991, University of Pretoria, Pretoria, South Africa.
- Stevens, K. F.** The cover bed sequence on the Pahiatua Terrace, NW Wairarapa; physical and chemical properties: Geology Board of Studies Publication, 7, 50 p., 8 tables, sects., sketch map, 1990.
- Stewart, K. C.** Determination of water extractable boron in soil and stream-sediment samples by inductively coupled plasma-atomic emission spectroscopy: in Quality assurance manual for the Branch of Geochemistry, U.S. Geological Survey (Arbogast, Belinda F., editor), Open-File Report - U. S. Geological Survey, p. 97-99, 1990. (Rep. No. OF 90-0668) available from: U. S. Geol. Surv., Denver, CO, United States.
- Stolpe, N. B.; and Lewis, D. T.** Mineralogical implications of high ratios of 1500 kPa water content to percent measured clay for two soils of western Nebraska: Geoderma, 47(1-2), p. 1-16, illus. (incl. 10 tables, block diag.), 1990.
- Stolt, M. H.; Baker, J. C.; and Simpson, T. W.** Micromorphology of the soil-saprolite transition zone in Hapludults of Virginia: Soil Science Society of America Journal, 55(4), p. 1067-1075, illus. (incl. 4 tables), 1991.
- Stolt, M. H.; and Rabenhorst, M. C.** Micromorphology of argillic horizons in an upland/tidal marsh catena: Soil Science Society of America Journal, 55(2), p. 443-450, illus. (incl. 6 tables, sketch map), 1991.
- Stolt, Mark Hjalmer.** An approach to studying soil-landscape relationships in Virginia: 263 p., Doctoral, 1990, Virginia Polytechnic Institute and State University, Blacksburg, VA.
- Strigutskiy, V. P.; Navosha, Yu. Yu.; Bambalov, N. N.; et al.** Paramagnetism of humic substances and use of the EPR method in soil science: Soviet Soil Science, 22(1), p. 115-126, illus. (incl. 3 tables), 1990.
- Struempler, Arthur W.** Radon in soil, water, and outside air and buildings in northwestern Nebraska [abstr.]: in Proceedings of the South Dakota Academy of Science; Seventy-fifth annual meeting of the South Dakota Academy of Science (Hanten, Carroll J., editor), Proceedings of the South Dakota Academy of Science, 69, p. 195, 1990.
- Stumm, Werner; and Wieland, Erich.** Dissolution of oxide and silicate minerals; rates depend on surface speciation: in Aquatic chemical kinetics; reaction rates of processes in natural waters (Stumm, Werner, editor), p. 367-400, illus. (incl. 3 tables), John Wiley & Sons, New York, NY, United States, 1990. (A Wiley-Intersci. Publ.).
- Su, Haiping; Kanemasu, Edward T.; Ransom, Michel D.; et al.** Separability of soils in a tallgrass prairie using SPOT and DEM data: Remote Sensing of Environment, 33(3), p. 157-163, illus. (incl. 7 tables), 1990.
- Subba Rao, A.; and Sekhon, G. S.** Variability in potassium status of the soils developed on different parent materials: Journal of the Indian Society of Soil Science, 38(2), p. 206-212, 4 tables, 1990.
- Sukhoverkhova, M. V.; Gladkov, N. A.; Matukhin, R. G.; et al.** Phosphate weathered crust of the Aldan Shield: Soviet Geology and Geophysics, 31(8), p. 50, illus. (incl. 3 tables, sect.), 1990.
- Sutherland, R. A.; and de Jong, E.** Estimation of sediment within agricultural fields using cesium-137, Crystal Springs, Saskatchewan, Canada: Applied Geography (Sevenoaks), 10(3), p. 205-221, illus. (incl. 5 tables, sketch maps), 1990.
- Swenson, Hal K.; and Bayer, James.** Soil survey of Panguitch area, Utah, parts of Garfield, Iron, Kane, and Piute counties: 354 p., 14 tables, sketch map, soils maps 1:24,000, soils map 1:380,160, index map 1:380,160, 1990. available from: U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with U. S. Forest Serv., U. S. Bur. Land Manage., Natl. Park Serv. and Utah Agric. Exp. Stn.).
- Tandarich, John P.; Bicki, Thomas J.; McKenna, D. P.; et al.** The pedo-weathering profile and its implications for ground water protection: Ground Water Management, 1, p. 893-900, 1990.
- Tang Changyuan.** Research on the hysteretic characteristics of soil water: Shuiwendizhi Gongchengdizhi = Hydrogeology and Engineering Geology, 18(2), p. 11-13 (Chinese, incl. English sum.), charts, 1991.

Tant, Phillip L.; Ranson, Robert H.; Gagnon, John A.; et al. Soil survey of Bertie County, North Carolina: 115 p., illus. (incl. 17 tables, block diagrs., sketch map; soils maps 1:24,000; colored soils map 1:253,440; index map 1:253,440), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with N.C. Dep. Nat. Resour. and Commun. Dev., N.C. Agric. Res. Serv., N.C. Agric. Ext. Serv. and Bertie Cty. Board Comm.).

Tao Ping. Views on geochemical features of elements in rocks and the process of weathering rocks into soil: Guizhou Dizhi = Geology of Guizhou, 8(2), p. 119-130 (Chinese, incl. English sum.), illus. (incl. 5 tables), 1991.

Tardy, Y.; Kobilsek, B.; and Paquet, H. Mineralogical composition and geographical distribution of African and Brazilian periallantic laterites; the influence of continental drift and tropical paleoclimates during the past 150 million years and implications for India and Australia: *in* Sedimentary and diagenetic dynamics of continental Phanerozoic sediments in Africa (Lang, J. L., editor), Journal of African Earth Sciences, and the Middle East, 12(1-2), p. 283-295 (incl. French sum.), illus. (incl. 1 table, sketch maps), 1991.

Tarnocai, C.; and Schweger, C. E. Late Tertiary and early Pleistocene Paleosols in northwestern Canada: Arctic, 44(1), p. 1-11 (incl. French, Russian sum.), illus. (incl. 7 chart, sects., strat. cols., sketch map), 1991.

Tarnocai, Charles. Paleosols of the interglacial climates in Canada: *in* The last? interglaciation in Canada (Mott, Robert J., editor; *et al.*), Geographie Physique et Quaternaire, 44(3), p. 363-374, illus. (incl. sketch maps), 1990.

Tawfic, Tarik Abdeirahman. Chemical equilibria of copper and lead in soil environments: 128 p., Doctoral, 1990, Colorado State University, Fort Collins, CO. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.

Taylor, Kelly; Graham, Robert C.; and Ervin, Jarel O. Laumontite in soils of the San Gabriel Mountains, California: Soil Science Society of America Journal, 54(5), p. 1483-1489, illus. (incl. 4 tables, sketch map), 1990.

Taylor, R. M. Some observations on the formation and transformation of iron oxides: *in* Soil colloids and their associations in aggregates (De Bocht, Marcel F., editor; *et al.*), NATO ASI Series, Series B: Physics, 215, p. 85-103, illus., 1990. *NATO Advanced Research Workshop.*

Taylor, R. M.; Raupach, M. R.; and Chartres, C. J. Simulation of soil reactions; aluminium-iron(III) hydroxy species react with silica to give deposits on particle surfaces: Clay Minerals, 25(3), p. 375-389, illus. (incl. 3 tables, 4 plates), 1990.

Teh, G. H. Rare earth elements distribution in some in situ Malaysian granitic soils [abstr.]: Warta Geologi = Newsletter of the Geological Society of Malaysia, 16(1), p. 12, portr., 1990.

Tejan-Kella, M. S.; Chittleborough, D. J.; and Fitzpatrick, R. W. Weathering assessment of heavy minerals in age sequences of Australian sandy soils: Soil Science Society of America Journal, 55(2), p. 427-438, illus. (incl. 7 tables, sketch map), 1991.

Tereshina, T. V.; Balabko, P. N.; Vostokova, L. B.; et al. Genesis of floodplain soils with a light-colored horizon: Soviet Soil Science, 22(5), p. 19-29, illus. (incl. 1 table), 1990.

Terhune, C. L.; and Harden, Jennifer W. Seasonal variations of carbon dioxide concentrations in stony, coarse-textured desert soils of southern Nevada, USA: Soil Science, 151(6), p. 417-429, illus. (incl. 3 tables, sketch map), 1991.

Terwilliger, Valery J. Effects of vegetation on soil slippage by pore pressure modification: Earth Surface Processes and Landforms, 15(6), p. 553-570, illus. (incl. 6 tables, sketch map), 1990.

Tessier, D. Behaviour and microstructure of clay minerals: *in* Soil colloids and their associations in aggregates (De Bocht, Marcel F., editor; *et al.*), NATO ASI Series, Series B: Physics, 215, p. 387-415, illus. (incl. 4 tables), 1990. *NATO Advanced Research Workshop.*

Teveldal, S.; Jorgensen, P.; and Stuanes, A. O. Long-term weathering of silicates in a sandy soil at Nordmoen, Southern Norway: Clay Minerals, 25(4), p. 447-465, illus. (incl. 2 tables), 1990.

Thien, Steve J.; and Myers, R. Separating ion-exchange resin from soil: Soil Science Society of America Journal, 55(3), p. 890-892, illus. (incl. 2 tables), 1991.

- Thoen, Gregory F.** Soil survey of Barry County, Michigan: 187 p., illus. (incl. 19 tables, block diagrs., sketch map; soils maps 1:15,840; colored soils map 1:190,080; index map 1:190,080), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Mich. Agric. Exp. Stn., Mich. Dep. Agric. and Mich. Technol. Univ.).
- Thompson, T. L.; Hossner, L. R.; and Wilding, L. P.** Micromorphology of calcium carbonate in bauxite processing waste: *Geoderma*, 48(1-2), p. 31-42, illus. (incl. 3 tables), 1991.
- Thorburn, Peter J.; Cowie, Bruce A.; and Lawrence, Paul A.** Effect of land development on groundwater recharge determined from non-steady chloride profiles: *Journal of Hydrology*, 124(1-2), p. 43-58, illus. (incl. 3 tables, sketch map), 1991.
- Thornes, John Barrie (editor).** Vegetation and erosion; processes and environments: *in the collection* British Geomorphological Research Group Symposia Series, 1988, United Kingdom. 517 p., illus., John Wiley and Sons, Chichester, United Kingdom, 1990.
- Thornes, John Barrie.** The interaction of erosional and vegetational dynamics in land degradation; spatial outcomes: *in* Vegetation and erosion; processes and environments (Thornes, John Barrie, editor), p. 41-53, illus., John Wiley and Sons, Chichester, United Kingdom, 1990.
- Tidball, Ronald R.** Soil studies in the Northern Great Plains: *in* Proceedings of a U.S. Geological Survey workshop on Environmental geochemistry (Doe, Bruce R., editor), U. S. Geological Survey Circular, p. 27-32, illus. (incl. 1 table, sketch maps), 1990. (Rep. No. C 1033).
- Tiessen, H.; Frossard, E.; Mermut, A. R.; et al.** Phosphorus sorption and properties of ferruginous nodules from semiarid soils from Ghana and Brazil: *Geoderma*, 48(3-4), p. 373-389, illus. (incl. 4 tables), 1991.
- Tiessen, H.; Hauffe, H. K.; and Mermut, A. R.** Deposition of Harmattan dust and its influence on base saturation of soils in northern Ghana: *Geoderma*, 49(3-4), p. 285-299, 1991.
- Tillman, R. W.; and Scotter, D. R.** Movement of solutes associated with intermittent soil water flow; II, Nitrogen and cations: *Australian Journal of Soil Research*, 29(2), p. 185-196, illus., 1991.
- Tipping, E.; and Woof, C.** Humic substances in acid organic soil; modelling their release to the soil solution in terms of humic charge: *Journal of Soil Science*, 41(4), p. 573-586, illus. (incl. 7 tables), 1990.
- Tisue, T.; Alberts, J. J.; and Price, M.** Cd-113M as a biogeochemical tracer in southeastern coastal saltmarshes [abstr.]: *in* Sixty-third annual meeting of the South Carolina Academy of Science, Bulletin of the South Carolina Academy of Science, 52, p. 95, 1990.
- Tonkin, P. J.; and Basher, L. R.** Soil-stratigraphic techniques in the study of soil and landform evolution across the Southern Alps, New Zealand: *in* Soils and landscape evolution; proceedings of the 21st annual Binghamton symposium in geomorphology (Kneupper, Peter L. K., editor; et al.), *Geomorphology*, 3(3-4), p. 547-575, illus. (incl. 8 tables, sketch map), 1990.
- Tonkonogov, V. D.; and Shishov, L. L.** Classification of anthropogenically transformed soils: *Soviet Soil Science*, 22(6), p. 52-59, 3 tables, 1990.
- Toorman, Alexander Frederik.** Use of inverse methods for estimating unsaturated flow parameters: 394 p., Doctoral, 1990, University of Arizona, Tucson, AZ. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Torres Sanchez, R. M.; Rouxhet, P. G.; Stone, W. E. E.; et al.** Interaction of stable and metastable monomeric iron(III) species with a kaolinitic soil clay: *in* Soil colloids and their associations in aggregates (De Boedt, Marcel F., editor; et al.), NATO ASI Series, Series B: Physics, 215, p. 105-117, illus. (incl. 1 table), 1990. *NATO Advanced Research Workshop*.
- Totev, N. G.; and Bhowmik, A. K.** Sand mineralogy of soils of Mohgaon teak forests, Mandla, Madhya Pradesh: *Journal of the Indian Society of Soil Science*, 38(2), p. 361-362, 1 table, 1990.
- Townsend, Margaret A.; and Marks, Edward T.** Occurrence of nitrate in soil and ground water in sandy soils in south-central Kansas: *in* Agricultural impacts on ground water quality, *Ground Water Management*, 1, p. 145-157, illus. (incl. 3 tables), 1990.
- Trasar-Cepeda, M. C.; Gil-Sotres, F.; and Guitian-Ojea, F.** Relation between phosphorous fractions and development of soils from Galicia (NW Spain): *Geoderma*, 47(1-2), p. 139-150, illus. (incl. 64 anal., 6 tables), 1990.

- Tribis, V. P.** Determination of the rate of mineralization of organic matter in peat soils: Soviet Soil Science, 22(4), p. 118-123, 1 table, 1990.
- Truman, C. C.; Bradford, Joe M.; and Ferris, J. E.** Antecedent water content and rainfall energy influence on soil aggregate breakdown: Soil Science Society of America Journal, 54(5), p. 1385-1392, illus. (incl. 10 tables), 1990.
- Truman, Clinton C.** Effect of antecedent moisture content, rainfall intensity, aggregate stability, and plot configuration on interrill erosion processes: 273 p., Doctoral, 1990, Purdue University, West Lafayette, IN. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Truman, Clinton C.; and Bradford, Joe M.** Effect of antecedent soil moisture on splash detachment under simulated rainfall: Soil Science, 150(5), p. 787-798, illus. (incl. 8 tables), 1990.
- Trumbore, Susan E.; Keller, Michael; Wofsy, Steven C.; et al.** Measurements of soil and canopy exchange rates in the Amazon rain forest using ^{222}Rn : in Special section on the Amazon Boundary Layer Experiment 2B, Journal of Geophysical Research, D, Atmospheres, 95(10), p. 16,865-16,873, illus. (incl. 2 tables), 1990.
- Tuck, Jonathan J.; and Hayes, Michael H. B.** Structure and dynamics of water at clay surfaces, inferences from neutron scattering studies: in Soil colloids and their associations in aggregates (De Boodt, Marcel F., editor; et al.), NATO ASI Series, Series B: Physics, 215, p. 365-386, illus., 1990. *NATO Advanced Research Workshop*.
- Twidale, C. R.** Weathering, soil development, and landforms: in Groundwater geomorphology; the role of subsurface water in earth-surface processes and landforms (Higgins, Charles G., editor; et al.), Special Paper - Geological Society of America, 252, p. 29-50, illus. (incl. 1 table, sects., sketch maps), 1990.
- Twomlow, Stephen J.; Parkinson, Robert J.; and Reid, Ian.** Soil loosening and drainage of structurally unstable silty soils: Journal of Hydrology, 121(1-4), p. 63-83, illus. (incl. 3 tables, sketch map), 1990.
- Tyler, Scott Woodman.** Fractal applications to soil hydraulic properties: 76 p., Doctoral, 1990, University of Nevada, Reno, NV. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Udupa, S. G.; Vasuki, N.; and Channal, H. T.** Comparative studies on spectral properties and chemical behaviour of humic acids [abstr.]: Journal of the Indian Society of Soil Science, 38(1), p. 152-153, 1 table, 1990.
- Ugolini, F. C.; and Dahlgren, R. A.** Weathering environments and occurrence of imogolite/allophane in selected Andisols and Spodosols: in Poorly crystalline and X-ray amorphous inorganic components in soils and clays (Ross, G. John, prefacer), Soil Science Society of America Journal, 55(4), p. 1166-1171, 3 tables, 1991. *American Society of Agronomy symposium*.
- Ugolini, Fiorenzo C.; and Sletten, Ronald S.** The role of proton donors in pedogenesis as revealed by soil solution studies: in 75th anniversary, 1916-1991 (Douglas, Lowell A., prefacer), Soil Science, 151(1), p. 59-75, illus. (incl. 1 table), 1991.
- Ulmer, Michael G.; and Whited, P. Michael.** Soil survey of Hettinger County, North Dakota: 221 p., illus. (incl. 18 tables; colored soils map 1:253,440; soils maps 1:20,000), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with N.D. Agric. Exp. Stn., N.D. Coop. Ext. Serv., and N.D. State Soil Conserv. Comm.).
- Unger, Paul W.; Fulton, Larry J.; and Jones, Ordie R.** Land-leveling effects on soil texture, organic matter content, and aggregate stability: Journal of Soil and Water Conservation, 45(3), p. 412-415, 1 table, 1990.
- United Nations, Food and Agriculture Organization.** FAO-ISRIC soil database (SDB): World Soil Resources Reports, 89 p., 1990. (Rep. No. 64).
- Unlu, K.; Nielsen, D. R.; Biggar, J. W.; et al.** Statistical parameters characterizing the spatial variability of selected soil hydraulic properties: Soil Science Society of America Journal, 54(6), p. 1537-1547, illus. (incl. 11 tables), 1990.
- Utsunomiya, Yojiro; Zhao, Huachang; Hua, Runkuei; et al.** Soil moisture mapping based on thermal inertia from NOAA-11 satellite AVHRR measurements: Chigaku Zasshi = Journal of Geography, 99(5)(906)), p. 483-489 (Japanese, incl. English sum.), illus. (incl. 1 table, charts), 1990.
- Valat, Beatrice; Jouany, Claire; and Riviere, Louis M.** Characterization of the wetting properties of air-dried peats and composts: Soil Science, 152(2), p. 100-107, illus. (incl. 3 tables), 1991.

- Valentin, C.** Surface crusting in two Alluvial soils of northern Niger: *Geoderma*, 48(3-4), p. 201-222, illus. (incl. 4 tables), 1991.
- Valentine, David William.** Influence of topography on soil acidity and hydrogen ion budgets in an Arctic landscape: 146 p., Doctoral, 1990, Duke University, Durham, NC. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Valeton, I.** Bauxites and associated terrestrial sediments in Nigeria and their position in the bauxite belts of Africa: *in* Sedimentary and diagenetic dynamics of continental Phanerozoic sediments in Africa (Lang, J. L., editor), *Journal of African Earth Sciences*, and the Middle East, 12(1-2), p. 297-310 (incl. French sum.), illus. (incl. 2 tables, charts, geol. sketch maps), 1991.
- Valiantzas, J.; and Thirriot, C.** Transport in heterogeneous porous formations; 1, Time-dependent convective dispersion: *Journal of Hydrology*, 118(1-4), p. 311-327, illus., 1990.
- Valiantzas, J.; and Thirriot, C.** Transport in heterogeneous porous formations; 2, Time-dependent double dispersion: *Journal of Hydrology*, 118(1-4), p. 329-342, illus., 1990.
- Valiantzas, J. D.; and Sassalou, A.** Laboratory determination of unsaturated hydraulic conductivity using a generalized-form hydraulic model: *Journal of Hydrology*, 128(1-4), p. 293-304, illus., 1991.
- Valverde, Mario A.; and Vinson, Eric N.** Aridic intergrades to the Xerorthents, Xerochrepts, and Xeralfs of Southern California, United States of America: *in* Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers (Kimbler, J. M., editor; *et al.*), *Proceedings - International Soil Correlation Meeting (ISCOM)*, 4, p. 21-36, illus. (incl. 6 tables, sketch maps), 1990.
- van Dal sen, Wim.** Mapping vadose zones in groundwater recharge areas with ground penetrating radar [abstr.]: *in* Third international conference on Ground penetrating radar (Lucius, Jeffrey E., editor; *et al.*), Open-File Report (United States Geological Survey, 1978), p. 69, 1990. (Rep. No. OF 90-0414) *available from:* U. S. Geol. Surv., Denver, CO, United States.
- van Dam, J. C.; Hendrickx, J. M. H.; van Ommen, H. C.; et al.** Water and solute movement in a coarse-textured water-repellent field soil: *Journal of Hydrology*, 120(1-4), p. 359-379, illus. (incl. 6 tables), 1990.
- van der Watt, H. v. H.; Barnard, R. D.; Cronje, I. J.; et al.** Amelioration of subsoil acidity by application of a coal-derived calcium fulvate to the soil surface: *Nature (London)*, 350(6314), p. 146-148, illus. (incl. 3 tables), 1991.
- van der Zee, S. E. A. T. M.** Experimental study of non-uniform flow in granular porous media: *Journal of Contaminant Hydrology*, 6(3), p. 227-240, illus., 1990.
- Van Meirvenne, M.; Hofman, G.; Van Hove, J.; et al.** A continuous spatial characterization of textural fractions and CaCO₃ content of the topsoil of the Polder region of Northwest East-Flanders, Belgium: *Soil Science*, 150(4), p. 710-716, illus. (incl. 2 tables, sketch maps), 1990.
- Van Rees, K. C. J.; Comerford, N. B.; and Rao, P. S. C.** Defining soil buffer power; implications for ion diffusion and nutrient uptake modeling: *Soil Science Society of America Journal*, 54(5), p. 1505-1507, illus., 1990.
- van Stempvoort, D. R.; Reardon, E. J.; and Fritz, P.** Fractionation of sulfur and oxygen isotopes in sulfate by soil sorption: *Geochimica et Cosmochimica Acta*, 54(10), p. 2817-2826, illus. (incl. 5 tables, sketch map), 1990.
- Van Vliet-Lanoë, Brigitte.** The genesis and age of the argillic horizon in Weichselian loess of northwestern Europe: *in* Loess, aeolian deposits, and related Palaeosols in the Mediterranean region (Cremaschi, Mauro, editor), *Quaternary International*, 5, p. 49-56, illus. (incl. strat. cols., sketch map), 1990. *INQUA Commission on Loess and INQUA Commission on Palaeogeography joint meeting*.
- Van Wesenbeeck, I. J.; and Kachanoski, R. G.** Spatial scale dependence of in situ solute transport: *Soil Science Society of America Journal*, 55(1), p. 3-7, illus. (incl. 1 table), 1991.
- Vance, George F.; and David, Mark B.** Spodosol cation release and buffering of acidic inputs: *Soil Science*, 151(5), p. 362-368, illus. (incl. 1 table), 1991.
- Vance, George F.; and David, Mark B.** Forest soil response to acid and salt additions of sulfate; III, Solubilization and composition of dissolved organic carbon: *Soil Science*, 151(4), p. 297-305, illus. (incl. 1 table), 1991.

- Vance, George Floyd.** Proton binding and aluminum complexation by soil humic and fulvic acids: 216 p., Doctoral, 1990, Univ. of Illinois, Urbana, IL. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Vanstone, Simon D.** Early Carboniferous (Mississippian) Paleosols from Southwest Britain; influence of climatic change on soil development: *Journal of Sedimentary Petrology*, 61(4), p. 445-457, illus. (incl. strat. col., sketch map), 1991.
- Varshney, S. K.; Tandon, S. K.; and Shukla, A.** Lithofacies, carbonate accumulation, and pedogenic modification of the overbank intervals in the Lower Siwalik Subgroup of the Kathgodam-Ranibaug-Amritpur sector of Kumauna Himalaya [abstr.]: *in* Group discussion on Suture zones, young and old; Seminar on Himalayan geology; abstracts (Bagati, T. N., editor; *et al.*), p. 66-67, Wadia Inst. Himalayan Geol., Dehra Dun, India, 1990.
- Veldkamp, E.; Huising, E. J.; Stein, A.; et al.** Variation of measured banana yields in a Costa Rican plantation as explained by soil survey and thematic mapper data: *Geoderma*, 47(3-4), p. 337-348, illus. (incl. 3 tables, sketch map), 1990.
- Vellidis, George; Smith, Matt C.; Thomas, D. L.; et al.** Detecting soil water movement in a sandy soil with ground penetrating radar [abstr.]: *in* Third international conference on Ground penetrating radar (Lucius, Jeffrey E., editor; *et al.*), Open-File Report (United States Geological Survey, 1978), p. 70, 1990. (Rep. No. OF 90-0414) *available from:* U. S. Geol. Surv., Denver, CO, United States.
- Vennum, Walter R.; and Nejedly, Jeffrey W.** Clay mineralogy of soils developed on weathered igneous rocks, West Antarctica: *New Zealand Journal of Geology and Geophysics*, 33(4), p. 579-584, 2 tables, sketch map, 1990.
- Verba, M. P.** Change in the composition and properties of coarse fraction minerals of Sod-podzolic soils on gleying: *Soviet Soil Science*, 22(5), p. 92-102, 5 tables, 1990.
- Verma, K. S.; Shyampura, R. L.; and Jain, S. P.** Characterization of soils under forest of Kashmir Valley: *Journal of the Indian Society of Soil Science*, 38(1), p. 107-115, illus. (incl. 4 tables), 1990.
- Verma, S. K.; and Gupta, Ram K.** Redistribution of surface applied chloride in a montmorillonitic Clay soil: *Journal of the Indian Society of Soil Science*, 38(1), p. 6-14, illus. (incl. 2 tables), 1990.
- Vicente, M. A.; Molina, E.; and Espejo, R.** Clays in paleoweathering processes; study of a typical weathering profile in the Hercynian basement in the Montes de Toledo (Spain): *Clay Minerals*, 26(1), p. 81-90, 1 table, charts, 1991.
- Viles, H. A.** The agency of organic beings; a selective review of recent work in biogeomorphology: *in* Vegetation and erosion; processes and environments (Thornes, John Barrie, editor), p. 5-24, illus. (incl. 6 tables), John Wiley and Sons, Chichester, United Kingdom, 1990.
- Villamayor, F. P.; and Huddleston, J. H.** New method for characterizing soil contrast: *Soil Science Society of America Journal*, 55(3), p. 767-772, illus. (incl. 16 tables), 1991.
- Violante, A.; Colombo, C.; and Buondonno, A.** Competitive adsorption of phosphate and oxalate by aluminum oxides: *Soil Science Society of America Journal*, 55(1), p. 65-70, illus., 1991.
- Virginia Polytechnic Institute and State University, Crop and Environmental Sciences Department.** Keys to soil taxonomy: SMSS Technical Monograph, 19, 422 p., 1990.
- Vodyanitskiy, Yu. N.; Trukhin, V. I.; Bagina, O. L.; et al.** Lepidocrocite in Brown forest soil of Lithuania: *Soviet Soil Science*, 22(5), p. 87-91, illus. (incl. 2 tables), 1990.
- Voltz, M.; and Webster, R.** A comparison of kriging, cubic splines and classification for predicting soil properties from sample information: *Journal of Soil Science*, 41(3), p. 473-490, illus. (incl. 10 tables), 1990.
- Vreeken, Willem J.** Pre-late Wisconsin soil-geomorphology of the S.W. prairies [abstr.]: *in* Canadian Quaternary Association-American Quaternary Association; first joint meeting (Morgan, Alan V., chairperson), p. 33, Univ. Waterloo, Quat. Sci. Inst., Waterloo, ON, Canada, 1990.
- Wagenet, R. J.** Quantitative prediction of the leaching of organic and inorganic solutes in soil: *in* Quantitative theory in soil productivity and environmental pollution (Greenwood, D. J., editor; *et al.*), Philosophical Transactions of the Royal Society of London, Series B: Biological Sciences, 329(1255), p. 321-330, illus., 1990.

- Wahl, Frank E.; Ragon, Larry G.; Young, Phillip D.; et al.** Soil survey of Sherman County, Nebraska: 163 p., illus. (incl. 20 tables, block diagrs., sketch map; soils maps 1:20,000; colored soils map 1:190,080; index map 1:190,080), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Univ. Nebr., Conserv. and Surv. Div.).
- Walia, C. S.; and Chamuah, G. S.** Characteristics, classification and suitability for land use planning of foot-hill soils: *Journal of the Indian Society of Soil Science*, 38(2), p. 286-292, illus. (incl. 3 tables), 1990.
- Wallach, Rony.** Soilwater distribution in a nonuniformly irrigated field with root extraction: *Journal of Hydrology*, 119(1-4), p. 137-150, illus., 1990.
- Wallach, Rony; and van Genuchten, Martinus T.** A physically based model for predicting solute transfer from soil solution to rainfall-induced runoff water: *Water Resources Research*, 26(9), p. 2119-2126, illus. (incl. 2 tables), 1990.
- Wang Bingke.** Slumping erosion in the loess area of Haidong Prefecture: *Soil and Water Conservation in China* = Chung-Kuo Shui T'u Pao Ch'ih, 1990(5(98)), p. 25-26 (Chinese), 1990.
- Wang, C.; Ross, G. J.; Torrance, J. K.; et al.** The formation of podzolic B horizons and pedogenic imogolite as influenced by microrelief within a pedon: *Geoderma*, 50(1-2), p. 63-77, 1991.
- Wang, H. D.; Harris, W. G.; and Yuan, T. L.** Relation between phosphorus and iron in Florida phosphatic soils: *Soil Science Society of America Journal*, 55(2), p. 554-560, illus. (incl. 7 tables), 1991.
- Wang, H. D.; Harris, W. G.; and Yuan, T. L.** Noncrystalline phosphates in Florida phosphatic soils: *Soil Science Society of America Journal*, 55(3), p. 665-669, illus. (incl. 5 tables), 1991.
- Wang, Handi.** Mineralogical and chemical characteristics of phosphates in some Florida phosphatic soils: 1990 p., Doctoral, 1990, University of Florida, Gainesville, FL. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Wang Mingzhu; and He Yuanqiu.** On classification of allitic soils in China: *Acta Pedologica Sinica* = T'u Jang Hsueh Pao, 27(2), p. 219-227 (Chinese, incl. English sum.), 3 tables, chart, 1990.
- Wang Wenyang; and Zhang Jianfeng.** Study on measuring water movement parameters in unsaturated soil by horizontal column infiltration method: *Shuili Xuebao* = *Journal of Hydraulic Engineering*, 1990(7), p. 26-30 (Chinese), illus. (incl. charts), 1990.
- Warburton, Jeff.** Use of magnetic susceptibility anisotropy in the study of the matrix fabric of frost-disturbed soils: *New Zealand Journal of Geology and Geophysics*, 33(3), p. 507-510, illus. (incl. 2 tables), 1990.
- Warner, Barry G.; Kubiw, Helen J.; and Karrow, Paul F.** Origin of a postglacial kettle-fill sequence near Georgetown, Ontario: *Canadian Journal of Earth Sciences* = *Journal Canadien des Sciences de la Terre*, 28(12), p. 1965-1974 (incl. French sum.), illus. (incl. 1 table, charts, sketch map), 1991.
- Warner, Barry G.; Tolonen, Kimmo; and Tolonen, Mirjam.** A postglacial history of vegetation and bog formation at Point Escuminac, New Brunswick: *Canadian Journal of Earth Sciences* = *Journal Canadien des Sciences de la Terre*, 28(10), p. 1572-1582 (incl. French sum.), illus. (incl. 2 tables, charts, sketch map), 1991.
- Warner, Glenn Stanley.** Characterization of soil macropores by computed tomography: 204 p., Doctoral, 1990, University of Minnesota, Minneapolis, MN. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Warren, C. J.; Xing, B.; and Dudas, M. J.** Simple microwave digestion technique for elemental analysis of mineral soil samples: *Canadian Journal of Soil Science*, 70(4), p. 617-620, 1 table, 1990.
- Warrick, A. W.** Traveling front approximations for infiltration into stratified soils: *Journal of Hydrology*, 128(1-4), p. 213-222, illus. (incl. 1 table), 1991.
- Warrick, A. W.** Numerical approximations of Darcian flow through unsaturated soil: *Water Resources Research*, 27(6), p. 1215-1222, illus. (incl. 6 tables), 1991.
- Warrick, A. W.; and Jim Yeh, T. C.** One-dimensional, steady vertical flow in a layered soil profile: *Advances in Water Resources*, 13(4), p. 207-210, illus. (incl. 1 table), 1990.
- Washington, John William.** Radon generation and transport in soils: 225 p., Doctoral, 1991, Pennsylvania State University, University Park, University Park, PA. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.

- Watanabe, Mitsuhsisa.** Chronology of the fluvial terrace surfaces in the Kitakami Lowland, northeastern Japan, and fluctuations of debris supply during the late Pleistocene: *Daiyonki-Kenkyu = Quaternary Research*, 30(1), p. 19-42 (Japanese, incl. English sum.), illus. (incl. 1 table, charts, geol. sketch maps), 1991.
- Waters, Dwain D.; and Roth, Linn E.** Soil survey of Noble County, Ohio: 206 p., illus. (incl. 20 tables, block diag., sketch map; soils maps 1:15,840; colored soils map 1:190,080; index map 1:190,080), 1990. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Ohio Dep. Nat. Resour., Div. Soil and Water Conserv., and Ohio Agric. Res. and Dev. Cent.).
- Watts, Frank C.** Soil survey of Nassau County, Florida: 219 p., illus. (incl. 19 tables; colored soils map 1:253,440; soils maps 1:15,840), 1991. *available from:* U. S. Dep. Agric., Soil Conserv. Serv., United States (Prep. in coop. with Univ. Fla., Inst. Food and Agric. Sci., Agric. Exp. Stn., and Soil Sci. Dep.; and Fla. Dep. Agric. and Consum. Serv.).
- Weaver, Alex van Breda.** The distribution of soil erosion as a function of slope aspect and parent material in Ciskei, Southern Africa: *in Soil erosion and host materials in Africa* (Dardis, George, editor), *GeoJournal*, 23(1), p. 29-34, 8 tables, sketch map, 1991.
- Webb, A. A.; and Dowling, A. J.** Characterization of basaltic clay soils (Vertisols) from the Oxford Land System in central Queensland: *Australian Journal of Soil Research*, 28(6), p. 841-856, illus. (incl. 5 tables, sketch map), 1990.
- Webster, R.; and Oliver, Margaret A.** Statistical methods in soil and land resource survey: *in the collection Spatial information system*, 316 p., illus. (incl. 35 tables), Oxford Univ. Press, New York, NY, United States, 1990.
- Weddle, Thomas Kirk.** Stratigraphy of late Wisconsinan deposits in the lower Sandy River valley, New Sharon and Mercer, Maine, and relations with till stratigraphy in adjacent areas: 422 p., Doctoral, 1991, Boston University, Boston, MA. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Wells, Stephen G.; McFadden, Leslie D.; and Schultz, J. D.** Eolian landscape evolution and soil formation in the Chaco dune field, southern Colorado Plateau, New Mexico: *in Soils and landscape evolution; proceedings of the 21st annual Binghamton symposium in geomorphology* (Kneupper, Peter L. K., editor; *et al.*), *Geomorphology*, 3(3-4), p. 517-546, illus. (incl. 6 tables, sketch maps), 1990.
- Wessman, Carol A.** Remote sensing of soil processes: *in Modern techniques in soil ecology; proceedings of the international workshop on Modern techniques in soil ecology relevant to organic matter breakdown, nutrient cycling and soil biological processes* (Crossley, D. A., Jr., editor; *et al.*), p. 479-493, illus., Elsevier, Amsterdam, Netherlands, 1991.
- White, G. Norman; Feldman, Steven B.; and Zelazny, Lucian W.** Rates of nutrient release by mineral weathering: *in Mechanisms of forest response to acidic deposition* (Lucier, Alan A., editor; *et al.*), p. 108-162, illus. (incl. 5 tables), Springer-Verlag, New York, NY, United States, 1990.
- Whitehead, Neil E.; Barrie, John; and Rankin, Peter.** Anomalous Hg contents in soils of Niue Island, South Pacific: *Geochemical Journal*, 24(6), p. 371-378, charts, 1990.
- Whiteman, C. A.; and Kemp, R. A.** Pleistocene sediments, soils and landscape evolution at Stebbing, Essex: *JQS. Journal of Quaternary Science*, 5(2), p. 145-161, illus. (incl. 5 tables, sects., sketch maps), 1990.
- Whitmore, A. P.** A method for assessing the goodness of computer simulation of soil processes: *Journal of Soil Science*, 42(2), p. 289-299, illus. (incl. 1 table), 1991.
- Whitney, C. Gene; Abbas, Syed Qamar; and Esposito, Kenneth J.** Mineralogy and thermal properties of clay deposits in the Salt Range and Kala Chitta Range, Punjab Province, Pakistan: *Open-File Report - U. S. Geological Survey*, 114 p., illus. (incl. 3 tables, sketch maps), 1990. (Rep. No. OF 90-0657) *available from:* U. S. Geol. Surv., Denver, CO, United States (Prepared jointly by the Geological Survey of Pakistan and the U.S. Geological Survey, under the auspices of the U.S. Agency for International Development).
- Wieder, M.** Micromorphological aspects of pedogenic gypsum in soils [abstr.]: *in Israel Geological Society annual meeting*, 1990, Annual Meeting - Israel Geological Survey, 1990, p. 85, 1990.
- Wilding, L. P.; West, L. T.; and Drees, L. R.** Field and laboratory identification of calcic and petrocalcic horizons: *in Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers* (Kimble, J. M., editor; *et al.*), *Proceedings - International Soil Correlation Meeting (ISCOM)*, 4, p. 79-92, illus. (incl. 4 tables, sketch map), 1990.

- Williams, B. G.; Richardson, D. P.; and Walker, J.** Spatial variability of apparent electrical conductivity: Technical Memorandum - CSIRO Institute of Natural Resources and Environment, 90/6, 7 p., illus., 1990.
- Williams, J. R.** The erosion-productivity impact calculated model; a case history: *in Quantitative theory in soil productivity and environmental pollution* (Greenwood, D. J., editor; *et al.*), Philosophical Transactions of the Royal Society of London, Series B: Biological Sciences, 329(1255), p. 421-428, 1990.
- Williams, Robert D.; and Cooper, J. R.** Locating soil boundaries using magnetic susceptibility: *Soil Science*, 150(6), p. 889-895, illus. (incl. 1 table), 1990.
- Wilson, Michael C.** Dating late Quaternary humid paleoclimatic episodes in the Sahel of West Africa from Paleosol carbonate nodules [abstr.]: *in Canadian Quaternary Association-American Quaternary Association; first joint meeting* (Morgan, Alan V., chairperson), p. 34, Univ. Waterloo, Quat. Sci. Inst., Waterloo, ON, Canada, 1990.
- Witty, John E.** The Orthids past, present and future classification: *in Proceedings of the Fourth international soil correlation meeting (ISCOM IV); Characterization, classification, and utilization of Aridisols; Part A, Papers* (Kimbler, J. M., editor; *et al.*), Proceedings - International Soil Correlation Meeting (ISCOM), 4, p. 93-98, 5 tables, 1990.
- Wolt, Jeffrey D.** Effects of acidic deposition on the chemical form and bioavailability of soil aluminum and manganese: *in Mechanisms of forest response to acidic deposition* (Lucier, Alan A., editor; *et al.*), p. 62-107, 2 tables, Springer-Verlag, New York, NY, United States, 1990.
- Wright, A. C.; and Webster, R.** A stochastic distributed model of soil erosion by overland flow: *Earth Surface Processes and Landforms*, 16(3), p. 207-226, illus., 1991.
- Wright, V. P.; Marriott, S. B.; and Vanstone, S. D.** A "reg" Palaeosol from the Lower Triassic of South Devon; stratigraphic and palaeoclimatic implications: *Geological Magazine*, 128(5), p. 517-523, illus. (incl. sect., strat. col., sketch map), 1991.
- Wright, V. P.; Vanstone, S. D.; and Robinson, D.** Ferrolysis in Arundian alluvial Palaeosols, evidence of a shift in the Early Carboniferous monsoonal system: *Journal of the Geological Society of London*, 148, Part 1, p. 9-12, strat. cols., 1991.
- Wu Jianming; Gao Xianbiao; and Gao Bimo.** Content and distribution of trace elements in the soils of Shandong: *Acta Pedologica Sinica = T'u Jang Hsueh Pao*, 27(1), p. 87-93 (Chinese, incl. English sum.), illus. (incl. 2 tables, charts), 1990.
- Wu, L.; Vomocil, J. A.; and Childs, S. W.** Pore size, particle size, aggregate size, and water retention: *Soil Science Society of America Journal*, 54(4), p. 952-956, illus. (incl. 3 tables), 1990.
- Xie, R. J.; and MacKenzie, A. F.** Molybdate sorption-desorption in soils treated with phosphate: *Geoderma*, 48(3-4), p. 321-333, illus. (incl. 3 tables), 1991.
- Xu Fenglin; Li Xueyuan; Huang Qiaoyun; et al.** Studies on the clay minerals of mountain soils in Hubei and Hunan provinces; I, The clay minerals of soils on the south slope of the Dabie Mountains: *Acta Pedologica Sinica = T'u Jang Hsueh Pao*, 27(3), p. 293-300 (Chinese, incl. English sum.), 4 tables, charts, 1990.
- Xu, Shihe; and Harsh, James B.** Hard and soft acid-base model verified for monovalent cation selectivity: *Soil Science Society of America Journal*, 54(6), p. 1596-1601, illus. (incl. 2 tables), 1990.
- Xue Dongsen; and Harrison, Robert B.** Sulfate, aluminum, iron, and pH relationships in four Pacific-Northwest forest subsoil horizons: *Soil Science Society of America Journal*, 55(3), p. 837-840, illus. (incl. 5 tables), 1991.
- Yalon, Dan H.** Soil pedon is not a suitable term: *Soil Science*, 150(2), p. 561, 1990.
- Yair, Aaron.** Runoff generation in a sandy area; the Nizzana Sands, western Negev, Israel: *Earth Surface Processes and Landforms*, 15(7), p. 597-609, illus. (incl. 3 tables, sketch map), 1990.
- Yair, Aaron.** The role of topography and surface cover upon soil formation along hillslopes in arid climates: *in Soils and landscape evolution; proceedings of the 21st annual Binghamton symposium in geomorphology* (Kneupper, Peter L. K., editor; *et al.*), *Geomorphology*, 3(3-4), p. 287-299, illus. (incl. 2 tables, sketch map), 1990.
- Yang Guozhi.** Study on rare alkali metals in soils in China: *Acta Pedologica Sinica = T'u Jang Hsueh Pao*, 27(1), p. 116-119 (Chinese, incl. English sum.), 5 tables, 1990.

- Yang Yansheng.** A preliminary study on the regional prediction equation of soil losses in Southern China: *Acta Pedologica Sinica* = T'u Jang Hsueh Pao, 27(1), p. 73-79 (Chinese, incl. English sum.), 3 tables, 1990.
- Yasuhsara, Masaya; Yasuike, Shinji; Marui, Atsunao; et al.** Electromagnetic detector for water content in soils: *Chishitsu News*, 1990(6(430)), p. 17-27 (Japanese), illus. (incl. 2 tables, charts), 1990.
- Yasuike, Shinji; Yasuhara, Masaya; Marui, Atsunao; et al.** Measurement of soil water content in Kanto Loam based on time-domain reflectometry (TDR): *Haidororji* = *Hydrology*, 20(3), p. 133-139 (Japanese, incl. English sum.), 1 table, charts, 1990.
- Yavitt, Y. B.; Lang, G. E.; and Sexstone, A. J.** Methane fluxes in wetland and forest soils, beaver ponds, and low-order streams of a temperate forest ecosystem: *Journal of Geophysical Research, D, Atmospheres*, 95(13), p. 22,463-22,474, illus. (incl. 3 tables), 1990.
- Ye Liangmiao; and Qiu Yinan.** Fluvial Paleosols and their application to the correlation of fluvial deposits: *Acta Sedimentologica Sinica*, 9(2), p. 63-70 (Chinese), illus. (incl. 2 tables, strat. cols.), 1991.
- Ye Zitong.** The utilization of salt transfer function model to study water-salt movements in soil layers under infiltration: *Shuili Xuebao* = *Journal of Hydraulic Engineering*, 1990(2), p. 1-9 (Chinese, incl. English sum.), illus. (incl. charts), 1990.
- Yelpat'yevskiy, P. V.; and Lutsenko, T. N.** The role of water-soluble organic matter in the transport of technogenic metals through the profile of a mountain Burozem: *Soviet Soil Science*, 22(8), p. 34-47, illus. (incl. 1 table), 1990.
- Yonebayashi, K.; and Hattori, T.** A new fractionation of soil humic acids by adsorption chromatography: *Geoderma*, 47(3-4), p. 327-336, illus. (incl. 3 tables), 1990.
- Young, I. M.; and Crawford, J. W.** The fractal structure of soil aggregates; its measurement and interpretation: *Journal of Soil Science*, 42(2), p. 187-192, illus., 1991.
- Youngs, E. G.; and Leeds-Harrison, P. B.** Aspects of transport processes in aggregated soils: *in Transport processes in the soil*, *Journal of Soil Science*, 41(4), p. 665-675, illus., 1990. *British-Israeli symposium*.
- Yuan Guodong; and Gong Zitong.** Soil genesis of Quaternary red earth and its paleogeographic implication: *Acta Pedologica Sinica* = T'u Jang Hsueh Pao, 27(1), p. 54-62 (Chinese, incl. English sum.), illus. (incl. 6 tables, charts), 1990.
- Zakharova, O. Yu.; Koryakin, A. S.; Khramtsov, I. N.; et al.** Izmeneniye morfologii kristallov tsirkona pri vyvetrivanii [Changes in the morphology of zircon crystals due to weathering]: *Mineralogicheskiy Zhurnal*, 12(5), p. 89-91 (incl. English sum.), 1990.
- Zayani, K.; Tarhouni, J.; Vachaud, G.; et al.** An inverse method for estimating soil core water characteristics: *Journal of Hydrology*, 122(1-4), p. 1-13, illus. (incl. 3 tables), 1991.
- Zech, W.; Hempfling, R.; Haumaier, L.; et al.** Humification in subalpine Rendzinas; chemical analyses, IR and ^{13}C NMR spectroscopy and pyrolysis-field ionization mass spectrometry: *Geoderma*, 47(1-2), p. 123-138, illus. (incl. 3 tables), 1990.
- Zeese, R.** Paleosols of different age in central and Northeast Nigeria: *in Sedimentary and diagenetic dynamics of continental Phanerozoic sediments in Africa* (Lang, J. L., editor), *Journal of African Earth Sciences, and the Middle East*, 12(1-2), p. 311-318 (incl. French sum.), illus. (incl. 2 tables, charts, geol. sketch maps), 1991.
- Zhang, F. S.; Li, G. L.; and Yu, T. R.** Reactions of hydrogen ions with variable charge soils; II, Kinetics of reaction: *Soil Science*, 152(1), p. 25-32, illus. (incl. 1 table), 1991.
- Zhang, F. S.; Zhang, X. N.; and Yu, T. R.** Reactions of hydrogen ions with variable charge soils; I, Mechanisms of reaction: *Soil Science*, 151(6), p. 436-443, illus. (incl. 2 tables), 1991.
- Zhang, Hailin.** Factors determining the rate and stoichiometry of hornblende dissolution: 146 p., Doctoral, 1990, University of Minnesota, Minneapolis, MN. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Zhang Jianhui; and Li Zhongming.** Moisture retention characteristics of purple soils derived from the parent rock of Suining Group in Szechwan Basin: *Acta Pedologica Sinica* = T'u Jang Hsueh Pao, 27(3), p. 345-347 (Chinese), 1 table, chart, 1990.

- Zhang Jing; Huang Wei Wen; Liu Min Guang; et al.** Element concentration and partitioning of loess in the Huanghe (Yellow River) drainage basin, North China: *Chemical Geology*, 89(1-2), p. 189-199, illus. (incl. 2 tables, sketch map), 1990.
- Zhang, Jinhui.** Dynamic simulation of water movement and uptake in unsaturated soil zones: 177 p., Doctoral, 1990, Oklahoma State University, Stillwater, OK. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Zhang, Peng Chu; and Sparks, Donald L.** Kinetics and mechanisms of sulfate adsorption/desorption on goethite using pressure-jump relaxation: *Soil Science Society of America Journal*, 54(5), p. 1266-1273, illus., 1990.
- Zhang, Pengchu.** Kinetics and mechanisms of anion adsorption and desorption at the goethite-water interface using pressure-jump relaxation: 112 p., Doctoral, 1990, University of Delaware, Newark, DE. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Zhang, Renduo.** Soil variability and geostatistical applications: 281 p., Doctoral, 1990, University of Arizona, Tucson, AZ. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Zhang Taolin; and Zhao Qiguo.** The genetic properties of soils in arid tropical and subtropical regions of China: *Acta Pedologica Sinica* = *T'u Jang Hsueh Pao*, 27(2), p. 207-218 (Chinese, incl. English sum.), 5 tables, 2 plates, charts, 1990.
- Zhang Tongwei; and Wang Xianbin.** Geochemical characteristics of mercury in near surface soil and its relation to the accumulation of oil and gas in Shensi-Gansu-Ningxia Basin: *Acta Sedimentologica Sinica*, 9(1), p. 115-121 (Chinese, incl. English sum.), 1 table, charts, 1991.
- Zhang Xiaonian; Zhao Anzhen; Zhang Gangya; et al.** Exchangeable alkalinity and exchangeable acidity of Red soils in Southern China: *Acta Pedologica Sinica* = *T'u Jang Hsueh Pao*, 27(3), p. 270-279 (Chinese, incl. English sum.), 2 tables, charts, 1990.
- Zhang Xuedong; and Wan Hongxiang.** SWIP-I soil permeameter and its utilization: *Shuiwen* = *Hydrology*, 1990(1(55)), p. 44-47 (Chinese), illus. (incl. charts), 1990.
- Zhang Zhigan; Liu Fanzen; Zhang Hongping; et al.** Study of soil water movement and recharge rate of rainfall infiltration in aeration zone of loess by measuring natural tritium: *Shuiwendizhi Gongchengdizhi* = *Hydrogeology and Engineering Geology*, 1990(3), p. 5-7 (Chinese, incl. English sum.), illus. (incl. 2 tables, charts), 1990.
- Zhang Zonghu.** Soil erosion processes in the Loess Plateau of Northwestern China: *in Proceedings, 13th Congress of the International Union for Quaternary Research; Distribution and chronological problems of loess* (Pecsi, Marton, editor), *GeoJournal*, 24(2), p. 195-200, 2 tables, 1991.
- Zhao Junlin; Liu Peitong; and Li Tianjie.** Correlation between chemical compositions of both primitive soil and parent rocks in King George Island region: *Antarctic Research*, 2(1), p. 53-65 (Chinese, incl. English sum.), 8 tables, 1990.
- Zhao Qiguo.** Podzolic soils in China: *Acta Pedologica Sinica* = *T'u Jang Hsueh Pao*, 27(3), p. 318-324 (Chinese, incl. English sum.), 6 tables, charts, 1990.
- Zhao Zaofan; Pei Jianhong; Zhang Xiujing; et al.** Adsorption stripping voltammetry determination of molybdenum (VI) in water and soil: *Talanta* (Oxford), 37(10), p. 1007-1010, illus. (incl.), 1990.
- Zheng Hongbo; Oldfield Frank; Yu Lizhong; et al.** The magnetic properties of particle-sized samples from the Luo Chuan loess section; evidence for pedogenesis: *Physics of the Earth and Planetary Interiors*, 68(3-4), p. 250-258, illus., 1991.
- Zhikhovich, V. V.** Preserving the moisture of Clay soils in pre-experiment and experiment periods: *Soviet Engineering Geology*, 1990(3), p. 107-109, illus., 1990.
- Zhou Guoping.** Weathering crust kaolin deposit in Guangdong: *Mineral Deposits* = *K'uang Ch'uang Ti Chih / Kuangchuang Dizhi*, 9(2), p. 167-175 (Chinese, incl. English sum.), illus. (incl. 5 tables, charts), 1990.
- Zhou Guoping; and Lin Yuchuan.** Weathering-residual type kaolin deposits in the coastal area of Guangdong Province: *Dizhixue Bao* = *Acta Geologica Sinica*, 65(1), p. 58-72 (Chinese, incl. English sum.), illus. (incl. 10 tables, charts, sketch map), 1991.
- Zhou Guoping; and Lin Yuchuan.** Sedimentary-weathering type kaolin deposits and their characteristics: *Mineral Deposits* = *K'uang Ch'uang Ti Chih / Kuangchuang Dizhi*, 10(3), p. 272-282 (Chinese, incl. English sum.), 6 tables, charts, 1991.

- Zhou, H. Z.; MacDonald, K. B.; and Moore, A.** Some cautions on the use of geographic information system (GIS) technology to integrate soil site and area data: *Canadian Journal of Soil Science*, 71(3), p. 389-394 (incl. French sum.), illus. (incl. 4 tables), 1991.
- Zhou, Li-Ping.** Studies of non-directional magnetic properties of Chinese loess and Palaeosols: *Quaternary Newsletter*, 62, p. 18, 1990.
- Zhu, Junlin L.** Effective properties for flow in heterogeneous porous media: 108 p., Doctoral, 1990, Virginia Polytechnic Inst. and State University, Blacksburg, VA. *available from:* Univ. Microfilms, Ann Arbor, MI, United States.
- Zhukov, V. V.; Bogatyrev, B. A.; Demina, V. N.; et al.** Vliyaniye litodinamicheskogo faktora na sostav produktov vyvetrivanija [Effect of lithodynamic factor on the composition of weathering products]: Geokhimiya, 1991(3), p. 398-409 (incl. English sum.), 1991.
- Zobeck, T. M.** Abrasion of crustal soils; influence of abraded flux and soil properties: *Soil Science Society of America Journal*, 55(4), p. 1091-1097, illus. (incl. 5 tables), 1991.
- Zobeck, Ted M.** Soil properties affecting wind erosion: *Journal of Soil and Water Conservation*, 46(2), p. 112-118, illus., 1991.