

13.3.2010

Scientific publications of Kumpula Space Centre 2009

Ph.D. Theses

- Juusola, Liisa, 2009: Observations of the solar wind - magnetosphere - ionosphere coupling. *Finnish Meteorological Institute Contributions*, 78, 167 p.
- Keskitalo, Reijo, Measuring the Cosmic Microwave Background - Topics along the analysis pipeline, Report Series in Physics HU-P-D165, University of Helsinki 2009, ISBN 978-952-10-4241-6, ISSN 0356-0961, [ISBN 978-952-10-4242-3 \(pdf\)](#)
- Kohout, Tomas, 2009: Physical properties of meteorites and their role in planetology, Report Series in Geophysics 60, Helsinki 2009, ISBN 978-952-10-5444-0, ISSN 0355-8630, [ISBN 978-952-10-5445-7 \(pdf\)](#)
- Luojus, Kari, 2009: Remote sensing of snow-cover for the boreal forest zone using microwave radar. *Finnish Meteorological Institute Contributions*, 77, 170 p.

Peer-reviewed scientific publications

2009 (94)

- Ahoranta, J., et al. with, Vainio, R., 2009: Radiation hardness studies of CdTe and HgI₂ for the SIXS particle detector on-board the BepiColombo spacecraft, *Nucl. Instr. Meth. Phys. Res. A* 605, 344-349.
- Agueda, N., et al. with Vainio, R., Kilpua, E., 2009: Modeling Solar Near-Relativistic Electron Events: Insights into Solar Injection and Interplanetary Transport Conditions, *Astron. Astrophys.*, 507, 981-993.
- Agueda, N., R. Vainio, D. Lario, and B. Sanahuja, 2009: The influence of in-situ pitch-angle cosine coverage on the derivation of solar energetic particle injection and interplanetary transport conditions, *Adv. Space Res.* 44, 794-.
- Arola, A., et al. with Kujanpää J., Tamminen, J., 2009: A new approach to correct for absorbing aerosols in OMI UV. *Geophys. Res. Lett.*, 36, L22805.
- Ashdown, M. A. J., et al. with Keihänen, E., Keskitalo, R., Kurki-Suonio, H., Poutanen, T., 2009: Making maps from Planck LFI 30 GHz data with asymmetric beams and cooler noise, *Astron. Astrophys.*, 493, 753-783.
- Bennouna, Y. S., de Leeuw, G., et al., 2009: Aerosol remote sensing over the ocean using MSG-SEVIRI visible image, *J. Geophys. Res.*, 114, D23203, DOI: 10.1029/2008JD011615
- Cllilverd, M. A., A. Seppälä, et al., 2009: Additional stratospheric NO_x production by relativistic electron precipitation during the 2004 spring NO_x descent event. *J. Geophys. Res.*, 114, No. A4, A04305.
- Cllilverd, M.A., et al. with Seppälä, A., Verronen, P.T., 2009: Remote sensing space weather events: Antarctic-Arctic Radiation-belt (Dynamic) Deposition-VLF

Atmospheric Research Konsortium network. *Space Weather*, 7, S04001.

[doi:10.1029/2008SW000412](https://doi.org/10.1029/2008SW000412)

- Combi, M.R., Mäkinen, J.T.T., Bertaux, J.-L., Lee, Y. and Quémérais, E., 2009: Water Production in Comets 2001 Q4 (NEAT) and 2002 T7 (LINEAR) Determined from SOHO/SWAN Observations. *Astronomical Journal*, 137, 4734-4743.
- Galvin, A. B., et al. with Kilpua, E. K. J., Solar wind ion trends and signatures: STEREO PLASTIC observations approaching solar minimum, *Ann. Geophysicae*, 27, 3909-3922.
- Daglis, I. A., G. Balasis, N. Ganushkina, F.-A. Metallinou, M. Palmroth, R. Pirjola, and I. Tsagouri, 2009: Investigating dynamic coupling in geospace through the combined use of modeling, simulations and data analysis. *Acta Geophysica*, 57, no. 1, pp. 141-157 DOI: 10.2478/s11600-008-0055-5.
- de la Torre Juarez, M., et al. with Kivi, R., 2009: Detection of temperatures conducive to Arctic polar stratospheric clouds using CHAMP and SAC-C radio occultation data. *J. Geophys. Res.*, 114, D07112, doi:10.1029/2008JD011261.
- Dupuy, E., et al. with E. Kyrölä, 2009: Validation of ozone measurements from the Atmospheric Chemistry Experiment (ACE). *Atm. Chem. Phys.*, 9, 287-343.
- Fowler, D., et al., with de Leeuw, G., 2009: Atmospheric composition change: Ecosystems-Atmosphere interactions, *Atmospheric Environment*, 43, 5193-5267.
- Haapala, I., and Pulkkinen, T.I., 2009: Maan ytimeistä avaruuteen. *Bidrag till kannedom av Finlands Natur och Folk*, Publications of the Finnish Society of Sciences and Letters, vol. 180, pp.5-9.
- Haider, S.A., et al. with Kallio, E., 2009: D, E, and F layers in the Daytime at High Latitude Terminator Ionosphere of Mars: Comparison with Earth's Ionosphere using COSMIC data. *J. Geophys. Res.*, 114, doi:10.1029/2008JA013709.
- Haider, S.A., et al. with Kallio, E., 2009: On the Responses to Solar X-ray Flare and Coronal Mass Ejection in the Ionospheres of Mars and Earth. *Geophys. Res. Lett.*, 36, doi:10.1029/2009GL038694.
- Hietala, H., Laitinen, T. V., Andréevá, K., Vainio, R., Vaivads, E., André, M., Palmroth, M., Pulkkinen, T. I., Koskinen, H. E. J., Lucek, E. A., and Reme, H., 2009: Supermagnetosonic Jets behind a Collisionless Quasi-parallel Shock. *Phys. Rev. Lett.*, 103, 245001, doi:10.1103/PhysRevLett.103.245001.
- Huovelin, J., et al. with Vainio, R., Alha, L., Koskinen, H., Muinonen, K., Schmidt, W., Syrjäsoo, M., 2009: Solar Intensity X-ray and particle Spectrometer (SIXS), Planet. Space Sci., doi:10.1016/j.pss.2008.11.007.
- Hyvärinen O., Eerola K., Siljamo N., and Koskinen J., 2009: Comparison of snow products by satellite instruments and numerical weather prediction analyses. *Journal of Applied Meteorology and Climatology*, 48, No. 6. pp. 1199--1216.
- Janhunen, P., 2009: On the feasibility of a negative polarity electric sail. *Ann. Geophys.*, 27, 1439-1447.
- Janhunen, P., 2009: Increased electric sail thrust through removal of trapped shielding electrons by orbit chaotisation due to spacecraft body. *Ann. Geophys.*, 27, 3089-3100.
- Järvinen, R., et al. with Kallio, E., Sillanpää, I., 2009: Oxygen ion escape from Venus in a global hybrid simulation: role of the ionospheric O⁺ ions. *Ann. Geophys.*, 27, 4333-4348.

- Juusola, L., Kauristie, K., Amm, O., and Ritter, P., 2009: Statistical dependence of auroral ionospheric currents on solar wind and geomagnetic parameters from 5 years of CHAMP satellite data. *Ann. Geophys.*, 27, 1005-1017.
- Juusola, L., Nakamura, R., Amm, O., and Kauristie, K., 2009: Conjugate ionospheric equivalent currents during bursty bulk flows. *J. Geophys. Res.*, 114, A04313, doi:10.1029/2008JA013908.
- Kainulainen, J., Lemmetyinen, J., Rautiainen, K., Colliander, A., Uusitalo, J., Lahtinen J., 2009: Error Propagation in Calibration Networks of Synthetic Aperture Radiometers. *IEEE Transactions of Geoscience and Remote Sensing*, 47(9): 3140-3150.
- Keiling, A., et al. with Amm, O., 2009: Substorm current wedge driven by plasma flow vortices: THEMIS observations. *J. Geophys. Res.*, 114, A00C22, doi:10.1029/2009JA014114, 2009.
- Kilpua, E. K. J., et al. with Pomoell, J., Vainio, R., 2009: STEREO Observations of interplanetary coronal mass ejections and prominence deflection during solar minimum period, *Ann. Geophysicae*, 27, 4491-4503.
- Kilpua, E. K. J., et al., 2009: Small solar wind transients and their connection to the large-scale coronal structure, *Solar Phys.*, 256, 327-344.
- Kilpua, E. K. J., et al., 2009: Multispacecraft observations of magnetic clouds and their solar origins between 19 and 23 May 2007, *Solar Phys.*, 254, 325-344.
- Kokhanovsky, A. A., et al. with de Leeuw, G., 2009: The inter-comparison of AATSR dual-view aerosol optical thickness retrievals with results from various algorithms and instruments, *Int. J. Remote Sensing*, 30, 4525-4537.
- Kokhanovsky, A. A., and de Leeuw, G., 2009: Determination of atmospheric aerosol properties over land using satellite measurements, *Bull. Am. Met. Soc.*, 90, 235-237.
- Koskinen, H., 2009: Avaruussää: Auringon myrskyistä avaruusajan teknologisiin haasteisiin. *Bidrag till kännedom av Finlands natur och folk*, 180, 179-209.
- Kurihara, J., et al. with Kauristie, K., 2009: Temperature enhancements and vertical winds in the lower thermosphere associated with auroral heating during the DELTA campaign. *J. Geophys. Res.*, 114, A12306, doi:10.1029/2009JA014392.
- Kurki-Suonio, H., Keihänen, E., Keskitalo, R. Poutanen T., Sirviö, A.-S., et al., Destriping CMB temperature and polarization maps, *Astron. Astrophys.*, 506, 1511-1539.
- Lemmetyinen, J., Derksen, C., Pulliainen, J., et al., 2009: A Comparison of Airborne Microwave Brightness Temperatures and Snowpack Properties Across the Boreal Forests of Finland and Western Canada. *IEEE Transactions of Geoscience and Remote Sensing*, 47, pp 965-978.
- Lindfors, A., Heikkilä, A., Kaurola, J., Koskela, T. and Lakkala, K., 2009: Reconstruction of solar spectral surface UV irradiances using radiative transfer simulations. *Photochemistry and Photobiology*, 85, 1233-1239.
- Lindfors, A., et al. with Tanskanen, A., Arola, A., Koskela, T., Lakkala, K., 2009: The PROMOTE UV Record: Toward a Global Satellite-Based Climatology of Surface Ultraviolet Irradiance. *Selected Topics in Applied Earth Observations and Remote Sensing, IEEE Journal of*, 2,(3),pp. 207-212,10.1109/JSTARS.2009.2030876.
- Liu, C., et al. with Kyrölä, E., 2009: A Madden-Julian Oscillation-triggered record ozone minimum over the Tibetan Plateau in December 2003 and its association with stratospheric "low-ozone pockets". *Geophys. Res. Lett.*, 36, Issue 15, CiteID L15830.

- Liu, C. M., et al. with Pirjola, R., 2009: Calculation of geomagnetically induced currents in mid- to low-latitude power grids based on the plane wave method: A preliminary case study. *Space Weather*, 7, S04005, doi:10.1029/2008SW000439, 9 pp.
- Liu, C.-M., Liu, L.-G. and Pirjola, R., 2009: Geomagnetically Induced Currents in the High-Voltage Power Grid in China. *IEEE T. Power Deliver.*, 24, pp. 2368-2374.
- Liu, K., et al. with Kallio, E., Järvinen, R., Janhunen, P., 2009: Hybrid simulations of the O⁺ ion escape from Venus: Influence of the solar wind density and the IMF x component. *Adv. Space Res.*, Issue 9, pp 1436-1441, doi:10.1016/j.asr.2009.01.005.
- Luojus, K., Pulliainen, J., et al., 2009: Comparison of SAR-based Snow-Covered Area Estimation Methods for the Boreal Forest Zone. *IEEE Geoscience and Remote Sensing Letters*, 6 no. 3, pp. 403-407.
- Luojus, K., Pulliainen, J., et al., 2009: Enhanced SAR-Based Snow-Covered Area Estimation Method for Boreal Forest Zone. *IEEE Transactions on Geoscience and Remote Sensing*, 47, no. 3, pp. 922-935.
- Määttänen, A., et al. with Savijärvi, H., 2009: A study of the properties of a local dust storm with Mars Express OMEGA and PFS data, *Icarus*, 201, 504-516.
- Manninen, T. and Stenberg, P., 2009: Simulation of the effect of snow covered forest floor on the total forest albedo. *Agricultural and Forest Meteorology*, 149, 303-319.
- McPherron, R. L., et al. with Pulkkinen, T. I., 2009: Changes in the response of the AL Index with solar cycle and epoch within a corotating interaction region. *Ann. Geophys.*, 27, 3165-3178.
- Mielonen T., Arola A., Komppula M., Kukkonen J., Koskinen J. De Leeuw G. and Lehtinen K, 2009: Comparison of CALIOP level 2 aerosol subtypes to aerosol types derived from AERONET inversion data. *Geophys. Res. Lett.*, 36. L18804.
- Milillo, A., et al. with Kallio, E., 2009: Statistical analysis of the observations of the MEX/ASPERA-3 NPI in the shadow. *Planet. Space Sci.*, 57, doi:10.1016/j.pss.2008.09.016, pp. 1000-1007.
- Mostl, C. et al. with Kilpua, E. K. J., 2009: Optimized Grad-Shafranov reconstruction of a magnetic cloud using STEREO-Wind observations, *Solar Phys.*, 256, 427-441.
- Mostl, C. et al. with Kilpua, E. K. J., 2009: Multispacecraft recovery of a magnetic cloud and its origin from magnetic reconnection on the Sun, *J. Geophys. Res.*, 114, A04102, DOI: 10.1029/2008JA013657.
- Nagai, T., et al. with Amm, O., 2009: Plasmoid formation for multiple onset substorms: Observations of the Japanese Lunar Mission Kaguya. *Ann. Geophys.*, 27, 59-64.
- Ngwira, C. M., et al. with Viljanen, A. and Pirjola, R., 2009: Limitations of the modelling of geomagnetically induced currents in the South African power network. *Space Weather*, 7, No. 10, S10002, doi: 10.1029/2009SW000478, 5 pp.
- Palmroth, M., Pulkkinen, T. I., Polvi, J., Viljanen, A., and Janhunen, P., 2009: On the response of ionospheric electrojets to solar wind discontinuities. *Ann. Geophys.*, 27, 3791-3803.
- Partamies, N., et al. with Pulkkinen, T. I., Tanskanen, E., 2009: Statistical survey on sawtooth events, SMCs and isolated substorms. *Adv. Space Res.*, 44, 376-384, doi 10.1016/j.asr.2009.03.013.
- Pirjola, R., 2009: Properties of matrices included in the calculation of geomagnetically induced currents (GICs) in power systems and introduction of a test model for GIC computation algorithms. *Earth, Planets and Space*, Vol. 61, No. 2, pp. 263-272.

- Pirjola, R., et al., 2009: Ground effects of space weather investigated by the surface impedance. *Earth, Planets and Space*, Vol. 61, No. 2, pp. 249-261.
- Pitkänen, T., et al. with Amm, O., 2009: Reconnection electric field estimates of high-latitude boundaries during a substorm. *Ann. Geophys.*, 27, 2157-2171, 2009.
- Praks, J., Sarvas, J., Hallikainen, M., and Pulliainen, J., 2009: Using multilook averaging for coherently modeled scattering from a pine tree at L-band. *IEEE Transactions of Geoscience and Remote Sensing*, 6, 162-166.
- Pulkkinen, A., Viljanen, A. and Pirjola, R., 2009: Harnessing the celestial batteries. *American Journal of Physics*, 77(7), 610-613.
- Pulkkinen, A., Viljanen, A., Pirjola, R. and Häkkinen, L., 2009: Electromagnetic source equivalence and extension of the complex image method for geophysical applications. *Progress In Electromagnetics Research B*, Vol. 16, pp. 57-84.
- Riihelä, A. and Manninen, T., 2009: Measuring the Vertical Albedo of a Subarctic Boreal Forest Canopy. *Silva Fennica*, 42 (5), 807-815.
- Rinne, J., Aurela, M., and Manninen, T., 2009: A Simple Method to Determine the Timing of Snow Melt by Remote Sensing with Application to the CO₂ Balances of Northern Mire and Heath Ecosystems. *Remote Sens. 2009*, 1(4), 1097-1107.
- Rochette, P., et al. with Kohout, T., Pesonen, L., 2009: Magnetic classification of stony meteorites: 3. Achondrites, *Meteoritics & Planet. Sci.*, 44, 405-427.
- Salminen, M., Pulliainen, J., et al., 2009: The behaviour of snow and snow-free surface reflectance in boreal forests: Implications to the performance of snow covered area monitoring. *Remote Sensing of Environment*, 113, pp. 907-918.
- Sandroos, A., Vainio, R., 2009: Reacceleration of flare ions in coronal and interplanetary shock waves. *The Astrophysical Journal Supplement Series*, 180.
- Sandroos, A., Vainio, R., 2009: Diffusive shock acceleration to relativistic energies in the solar corona. *Astron. Astrophys.*, 507, L21-24.
- Schaap et al., with de Leeuw, G., Exploring the relation between aerosol optical depth and PM_{2.5} at Cabauw, the Netherlands, *Atm. Chem. Phys.*, 9, 909-925.
- Schulz, J., et al., with, Manninen, T., Riihelä, A., 2009: Operational climate monitoring from space: the EUMETSAT satellite application facility on climate monitoring (CM-SAF). *Atmos. Chem. Phys.*, 9, 1-23, 2009.
- Seppälä, A., C. E. Randall, M. A. Clilverd, E. Rozanov, and C. J. Rodger, 2009: Geomagnetic activity and polar surface air temperature variability. *J. Geophys. Res.*, 114, A10312, doi:10.1029/2008JA014029.
- Seran, E., et al. with Kauristie, 2009: What can we learn from HF signal scattered from a discrete arc?. *Ann. Geophys.*, 27, 1887-1896.
- Snekvik, K., Juusola, L., Østgaard, N., and Amm, O., 2009: Reconnection Hall current system observed in the magnetotail and in the ionosphere. *Geophys. Res. Lett.*, 36, L08104, doi:10.1029/2009GL037239.
- Sofiev M., Vankevich R., Lötjönen, M., Prank M., Petukhov V., Ermakova T., Koskinen J. and Kukkonen J., 2009: An operational system for the assimilation of the satellite information on wild-land fires for the needs of air quality modelling and forecasting. *Atmos. Chem. Phys.*, 9, 6833-6847
- Sofiev, M., V. Sofieva, T. Elperin, N. Kleorin, I. Rogachevskii, and S. S. Zilitinkevich, 2009: Turbulent diffusion and turbulent thermal diffusion of aerosols in stratified atmospheric flows. *J. Geophys. Res.*, 114, D18209, doi:10.1029/2009JD011765.

- Sofieva V. F. , et al., 2009: Technical Note: Scintillations of the double star α Cru observed by GOMOS/Envisat. *Atmos. Chem. Phys.*, 9, 8967-8973.
- Sofieva, V. F., A. S. Gurvich, and F. Dalaudier, 2009: Gravity wave spectra parameters in 2003 retrieved from stellar scintillation measurements by GOMOS. *Geophys. Res. Lett.*, L05811, doi:10.1029/2008GL036726.
- Sofieva, V. F., et al. with Kyrölä, E., Tamminen, J., 2009: Influence of scintillation on quality of ozone monitoring by GOMOS. *Atmos. Chem. Phys.*, 9, 9197-9207.
- Sofieva, V.F., Kyrölä, E., Verronen, P. T., Seppälä, A., Tamminen, et al., 2009: Spatio-temporal observations of the tertiary ozone maximum. *Atmospheric Chemistry and Physics*, 9, 4439-4445. <http://www.atmos-chem-phys.net/9/4439/2009/>
- Spanier, F., Vainio, R., 2009: Three-wave interactions of dispersive plasma waves propagating parallel to the magnetic field, *Adv. Sci. Lett.*, 2, 337-.
- Takala, M., Pulliainen, J., Metsämäki, S. J., Koskinen, J. T., 2009: Detection of Snowmelt Using Spaceborne Microwave Radiometer Data in Eurasia From 1979 to 2007. *IEEE Trans. on Geoscience and Remote Sensing*, Vol 47, pp. 2996 - 3007.
- Tètard, C., et al. with Kyrölä, E., Tamminen, J., 2009: Simultaneous measurements of OCIO, NO₂ and O₃ in the Arctic polar vortex by the GOMOS instrument. *Atmospheric Chemistry and Physics*, 9, pp 7857-7866.
- Thomson, A.W.P., McKay, A.J. and Viljanen, A., 2009: A Review of Progress in Modelling of Induced Geoelectric and Geomagnetic Fields with Special Regard to Induced Currents. *Acta Geophysica*, 57, 209-219, doi: 10.2478/s11600-008-0061-7.
- Toivanen, P.K. and Janhunen, P., 2009: Electric Sailing under Observed Solar Wind Conditions. *Astrophys. Space Sci. Transactions*, 5, 61-69.
- Turunen, E, et al. with Verronen, P.T., Seppälä, A., Tamminen, J., 2009: Impact of different precipitation energies on NO_x generation during geomagnetic storms. *J. Atmos. Sol.-Terr. Phys.*, 71, 1176-1189. doi:10.1016/j.jastp.2008.07.005
- Usoskin, I. G., et al. with Vainio, R., 2009: History of cosmic ray research in Finland, *Adv. Space Res.* 44, 1232.
- Vainio, R., et al., 2009: Dynamics of the Earth's Particle Radiation Environment, *Space Sci. Rev.* 147, 187.
- Vanhamäki, H., Kauristie, K., Amm, O., et al., 2009: Electrodynamics of an omega-band as deduced from optical and magnetometer data. *Ann. Geophysicae*, 27, 3367-3385.
- Valtonen, E., et al. with Huovelin, J., Vainio, R., 2009: Radiation tolerance tests of small-sized CsI(Tl) scintillators coupled to photodiodes, *IEEE Trans. Nucl. Sci.* 56, 2149.
- Varis, J. et al. with Poutanen, T., Kurki-Suonio, H., 2009: Design, development, and verification of the Planck Low Frequency Instrument 70 GHz Front-End and Back-End Modules, *J. Instrumentation*, 4, T12001, DOI: 10.1088/1748-0221/4/12/T12001.
- Verronen, P.T., Ceccherini, S., Cortesi, U., Kyrölä, E. and Tamminen J., 2009: Statistical comparison of night-time NO₂ observations in 2003-2006 from GOMOS and MIPAS instruments. *Adv. Space Res.*, 43, 1918-1925. doi:10.1016/j.asr.2009.01.027
- Watermann, J., Vainio, R. et al., 2009: The State of Space Weather Scientific Modeling – An Introduction, *Space Sci. Rev.* 147, 111.
- Watermann, J., et al. with Palmroth, M., Ganushkina, N. Yu., 2009: Models of Solar-Wind Structures and Their Interaction with the Earth's Space Environment. *Space Sci. Rev.*, DOI 10.1007/s11214-009-9494-9.

- Wik, M., et al. with Pirjola, R., Viljanen, A., 2009: Space weather events in July 1982 and October 2003 and the effects of geomagnetically induced currents on Swedish technical systems. *Ann. Geophys.*, 27, No. 4, pp. 1775-1787.
- Wimmer-Schweingruber, R.F., et al. with Janhunen, P., 2009: Interstellar heliospheric probe/heliospheric boundary explorer mission - a mission to the outermost boundaries of the solar system. *Experimental Astronomy*, 24, 9-46, 2009.