Nathaniel W. Chaney

8 Lawrence Dr. Apt 306; Princeton, NJ 08540
email: nchaney@princeton.edu

Research Interests

Land surface and hydrologic modeling, high performance computing, environmental data delivery, digital soil mapping, machine learning, data assimilation, network design, and geostatistics.

Education

Princeton University

Ph.D., Civil and Environmental Engineering 6/2015

Land Surface Models in Hydrologic Monitoring Systems: Addressing the Sources of Uncertainty

M.A., Civil and Environmental Engineering 6/2012

UC Berkeley

B.A., Applied Mathematics 5/2010

B.A., *cum laude*, Earth and Planetary Sciences: Atmospheric Sciences 5/2010

Experience

Postdoctoral Research Associate, Princeton University 7/2015 – Present

Visiting Research Scientist, Geophysical Fluid Dynamics Laboratory 7/2015 – Present

Developing a field-scale resolving land model for seasonal and climate modeling.
Supervisor Elena Shevliakova.

Research Assistant, Princeton University 9/2010 – 6/2015

Developed and implemented the African Flood and Drought Monitor.
Analyzed the drivers of the spatial heterogeneity of soil moisture.
Developed HydroBloks, a hyper-resolution land surface model.
Advisor Eric F. Wood.

Assistant Instructor, Princeton University Fall 2014

Fundamentals of Environmental Studies: Population, Land Use, Biodiversity, and Energy (ENV 201).

Visiting Scholar, University of Sydney 4/2014

Developed the 30 meter POLARIS soil product over the contiguous United States.

Research Assistant, UC Berkeley 2008 – 2010

Analysis of the coupling between the diurnal cycle of streamflow and evapotranspiration.
Supervisor Inez Fung.

Awards

Wu Prize for Excellence, Princeton University 2014

Awarded to engineering graduate students who perform at the highest level as scholars and researchers.

Technical Skills

Graduate certificate in computational science, Princeton University 2015

Python, FORTRAN, C, C++, Matlab, R, HTML, Javascript, Perl, ArcGIS, QGIS

Released Software

African Flood and Drought Monitor http://stream.princeton.edu

HydroBlocks https://github.com/chaneyn/HydroBloks

Publications

Refereed Journal Articles

Chaney, N. W., P. Metcalfe, E. F. Wood, 2016: HydroBlocks: A Field-scale Resolving Land Surface Model for Application Over Continental Extents. *Hydrological Processes*, In press.

Chaney, N. W., E. F. Wood, J. W. Hempel, A. McBratney, T. Nauman, C. Brungard, N. Odgers, 2016: POLARIS: A 30-meter probabilistic soil series map of the contiguous United States. *Geoderma*, **274**, 54-67.

Chaney, N. W., J. D. Herman, P. M. Reed, E. F. Wood, 2015: Flood and Drought Hydrologic Monitoring: The Role of Model Parameter Uncertainty. *Hydrology and Earth System Sciences*, **19**, 3239-3251.

Chaney, N. W., J. K. Roundy, Julio E. Herrera Estrada, E. F. Wood, 2014: High-Resolution Modeling of the Spatial Heterogeneity of Soil Moisture: Applications in Network Design. *Water Resources Research*, **51** (1), 619-638.

Chaney, N. W., J. Sheffield, G. Villarini, E. F. Wood, 2014: Development of a High-Resolution Gridded Daily Meteorological Dataset over Sub-Saharan Africa: Spatial Analysis of Trends in Climate Extremes. *Journal of Climate*, **27**, 5815-5835.

Pan, M., Fisher, C. K., **Chaney, N. W.**, Zhan, W., Crow, W. T., Aires, F., Entekhabi, D., Wood, E. F, 2015: Triple collocation: Beyond three estimates and separation of structural/non-structural errors. *Remote Sensing of Environment.* **171**, 299-310.

Reed, P. M., **N. W. Chaney**, J. D. Herman, M. P. Ferringer, E. F. Wood, 2015: Internationally Coordinated Multi-Mission Planning is Critical for Space-based Rainfall Observations to Aid Flood Risk Adaptation. *Environmental Research Letters*, **10** (10).

Bierkens, M., V. A. Bell, P. Burek, **N. W. Chaney**, L. Condon, C. H. David, A. Roo, P. Dll, N. Drost, J. S. Famiglietti, M. Flrke, D. J. Gochis, P. House, R. Hut, J. Keune, S. Kollet, R. Maxwell, J. T. Reager, L. Samaniego, E. Sudicky ,E. H. Sutanudjaja, N. Gielsen, H. Winsemius, E. F. Wood., 2014: Hyper-resolution global hydrological modelling: what's next?. *Hydrological Processes*, **29** (2), 310-320.

Estes, L. D., **N. W. Chaney**, J. Herrera-Estrada, K. K. Caylor, J. Sheffield, E. F. Wood, 2014: Changing Water Availability during the African maize-growing season, 1979-2010. *Environmental Research Letters*, **9** (7).

Xia, Y., J. Sheffield, M. B. Ek, J. Dong, **N. W. Chaney**, H. Wei, J. Meng, E. F. Wood, 2014: Evaluation of multi-model simulated soil moisture in NLDAS-2. *Journal of Hydrology*, **512**, 107-125.

Enenkel, M., L. See, R. Bonifacio, V. Boken, **N. W. Chaney**, P. Vinck, L. You, E. Dutra, M. Anderson, 2014: Drought and food security-Improving decision-support via new technologies and innovative collaboration. *Global Food Security*, **4**, 51-55.

Yuan, X., E. F. Wood, **N. W. Chaney**, J. Sheffield, J. Kam, M. Liang, and K. Guan, 2013: Probabilistic Seasonal Forecasting of African Drought by Dynamical Models. *Journal of Hydrometeorolgy.*, **14** (6), 1706-1720.

Sheffield, J., E. F. Wood, **N. W. Chaney**, K. Guan, S. Sadri, X. Yuan, L. Olang, A. Amani, A. Ali, S. Demuth, and L. Ogallo, 2013: A Drought Monitoring and Forecasting System for Sub-Sahara African Water Resources and Food Security. *Bulletin of the American Meteorological Society*, **95**, 861-882.

Ershadi, A., M.F. McCabe, J. P. Evans, **N. W. Chaney**, E. F. Wood, 2013: Multi-site evaluation of terrestrial evapotranspiration models using FLUXNET data. *Agricultural and Forest Meteorology*, **187**, 46-61.

Articles in review

Chaney, N. W., M. Ek, E. F. Wood : Deriving Global Parameter Estimates for the Noah Land Surface Model using FLUXNET and Machine Learning, In review. *Journal of Geophysical Research - Atmosphere.*

Estes, L. D., Searchinger, T., Spiegel, M., Tian, D., Sichinga, S., Mwale, M., Kehoe, L., Kuemmerle, T., Berven A., **Chaney, N.**, Sheffield, J., Wood, E. F., Caylor, K. K.: Reconciling agriculture, carbon, and biodiversity in a savanna transformation frontier, In review. *Philosophical Transactions B.*

Oral Presentations and Workshops

UNESCO, Santiago, Chile 5/2016
Training of the Latin American and Caribbean Flood and Drought Monitor

ISMC, Austin, Texas 3/2016
A 30-meter soil properties map of the contiguous United States for use in environmental models (Contributed talk and poster)

NCSS national conference, Duluth, Minnesota 6/2015
Completion of a soils layer (Not SSURGO) for all unmapped western lands (Contributed talk)

EGU, Vienna, Austria 4/2015
dSSURGO: Development and validation of a 30 meter digital soil class product over the 8-million square kilometer contiguous United States (Contributed talk)

AGU, San Francisco, CA 12/2014
Development and Implementation of the DTOPLATS-MP land surface model over the Continental US at 30 meters (Contributed talk)

UNESCO, Santiago, Chile 11/2014
Installation and Training of the Latin American and Caribbean Flood and Drought Monitor

ASA, CSSA, and SSSA meeting, Long Beach, CA 11/2014
Spatial Disaggregation and Harmonization of gSSURGO (Invited Talk)

EGU, Vienna, Austria 4/2014
Development of an Improved Surface Conductance Scheme for Penman-Monteith using FLUXNET (Contributed talk)

HyperHydro Workshop, Utrecht, Netherlands 2/2014
Macroscale Land Surface Models: Improving Spatial Heterogeneity

ASA, CSSA, and SSSA meeting, Tampa, FL 11/2013
Soil Heterogeneity in Macroscale Land Surface Models: Unresolved Challenges (Invited Talk)

AGRHYMET, Niamey, Niger 10/2013
Installation and Training of the African Flood and Drought Monitor: AGRHYMET

Model Complexity vs. Model Uncertainty of Catchment models, Berlin, Germany 6/2013
Hydrologic Modeling: VIC, TOPLATS, and beyond

EGU, Vienna, Austria 4/2013
Assimilation of In-Situ Measurements into Gridded Data Products through State-Space Estimation: Application over Sub-Saharan Africa (Contributed talk)

NGEE-Arctic, Oak Ridge, TN 4/2013
High-Resolution Land Surface Modeling: Potential and Challenges

SWALIM, Nairobi, Kenya 11/2012
Princeton African Drought Monitor: Greater Horn of Africa (Invited Talk)

ICPAC, Nairobi, Kenya 6/2012
Development and Implementation of the African Drought Monitor: ICPAC

AGRHYMET, Niamey, Niger 1/2012
Development and Implementation of the African Drought Monitor: AGRHYMET

Other Presentations

EGU, Vienna, Austria 4/2016
Poster: How to represent 100 meter spatial heterogeneity in Earth system models.

AGU Fall Meeting, San Fransisco, CA 12/2015
Poster: Assessing deficiencies of soil moisture networks using a field-scale land surface model.

AGU Fall Meeting, San Fransisco, CA 12/2014
Talk as co-author: Evolution of Global-Scale Hydrology over the Last 25 Years.

Satellite Soil Moisture Validation and Application Workshop, Frascati, Italy 7/2013
Talk as co-author: High-Resolution Land Surface Modeling: Improved Validation and Downscaling of Soil Moisture Retrievals.

Ezio Todini 70th Symposium, Bologna 6/2013
Talk as co-author: Continental Scale Hyper-Resolution Land Surface Modeling: Challenges and Initial Results.

EGU, Vienna, Austria 4/2013
Talk as co-author: Global products of evapotranspiration: the GEWEX LandFLUX Initiative.

AGU Fall Meeting, San Fransisco, CA 12/2012
Poster: Validation of a suite of process-based models of evapotranspiration using FLUXNET.
Talk as co-author: Development of an Experimental African Drought Monitoring and Seasonal Forecasting System: A First Step Towards a Global Drought Information System.

AGU Fall Meeting, San Fransisco, CA 12/2011
Talk as co-author: Assessment of large scale and regional scale models for application to a high resolution global land surface model.
Poster: Development of an operational African Drought Monitor prototype.

AGU Fall Meeting, San Fransisco, CA 12/2009
Poster: Relationship between Fracture Mechanics and Heat Transfer in Moulin Formation.

Professional Activities

Reviewer for *Water Resources Research*, *Journal of Hydrometeorology*, *Remote Sensing*, *Journal of Hydrology*, *Hydrological Processes*, *Scientific Reports*, *International Journal of Climatology*, *Water*, *Hydrology and Earth System Sciences*, *Remote Sensing of Environment*, *Ambio*, and *Global Environmental Change*.

Member, American Geophysical Union 2009 – Present

Member, Soil Science Society of America 2014 – Present

NASA Grant Review Panel 2016

Recent Volunteering

Youth leader at local community church 2014 – Present

Mentor for Princeton University's chapter of Engineers Without Borders 2015