

# Nathaniel W. Chaney

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300 Forrestal Rd, Princeton, NJ 08544  
**email:** nchaney@princeton.edu

<b>Research Interests</b>	Earth system science, hydrology, numerical modeling, high performance computing, machine learning, environmental data delivery, and data assimilation.
<b>Education</b>	<b>Princeton University</b> Ph.D., Civil and Environmental Engineering 6/2015 <i>Land Surface Models in Hydrologic Monitoring Systems: Addressing the Sources of Uncertainty</i> M.A., Civil and Environmental Engineering 6/2012  <b>UC Berkeley</b> B.A., Applied Mathematics 5/2010 B.A., <i>cum laude</i> , Earth and Planetary Sciences: Atmospheric Sciences 5/2010
<b>Experience</b>	<b>Postdoctoral Research Associate</b> , Princeton University 7/2015 – Present <b>Visiting Research Scientist</b> , Geophysical Fluid Dynamics Laboratory 7/2015 – Present Developing a landscape resolving land model for Earth system models. Supervisor Elena Shevliakova.  <b>Research Assistant</b> , 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 HydroBlocks, a hyper-resolution land surface model. Advisor Eric F. Wood.  <b>Assistant Instructor</b> , Princeton University Fall 2014 Fundamentals of Environmental Studies: Population, Land Use, Biodiversity, and Energy (ENV 201).  <b>Visiting Scholar</b> , University of Sydney 4/2014 Developed the 30 meter POLARIS soil product over the contiguous United States.  <b>Research Assistant</b> , UC Berkeley 2008 – 2010 Analysis of the coupling between the diurnal cycle of streamflow and evapotranspiration. Supervisor Inez Fung.
<b>Awards</b>	<b>Wu Prize for Excellence</b> , Princeton University 2014 Awarded to engineering graduate students who perform at the highest level as scholars and researchers.
<b>Technical Skills</b>	<b>Graduate certificate in computational science</b> , Princeton University 2015 Python, FORTRAN, C, C++, Matlab, R, HTML, Javascript, Perl, ArcGIS, QGIS
<b>Released Software</b>	African Flood and Drought Monitor <a href="http://stream.princeton.edu">http://stream.princeton.edu</a> HydroBlocks <a href="https://github.com/chaneyn/HydroBlocks">https://github.com/chaneyn/HydroBlocks</a> Geospatialtools <a href="https://github.com/chaneyn/geospatialtools">https://github.com/chaneyn/geospatialtools</a>

## Publications

### *Refereed Journal Articles*

- Chaney, N. W.**, J. D. Herman, M. Ek, E. F. Wood, 2016: Deriving Global Parameter Estimates for the Noah Land Surface Model using FLUXNET and Machine Learning. *Journal of Geophysical Research - Atmospheres.*, In press.
- Chaney, N. W.**, P. Metcalfe, E. F. Wood, 2016: HydroBlocks: A Field-scale Resolving Land Surface Model for Application Over Continental Extents. *Hydrological Processes*, **30**, 3543-3559.
- 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.
- He, X., **N. W. Chaney**, M. Schleiss, J. Sheffield, 2016: Spatial Downscaling of Precipitation using Adaptable Random Forests. *Water Resources Research*, In press.
- Pan, M., X. Cai, **N. W. Chaney**, D. Entekhabi, E. F. Wood, 2016: An Initial Assessment of SMAP Soil Moisture Retrievals Using High Resolution Model Simulations and In-situ Observations. *Geophysical Research Letters*, In press.
- Estes, L. D., Searchinger, T., Spiegel, M., Tian, D., Sickinga, S., Mwale, M., Kehoe, L., Kuemmerle, T., Berven A., **Chaney, N.**, Sheffield, J., Wood, E. F., Caylor, K. K., 2016: Reconciling agriculture, carbon, and biodiversity in a savanna transformation frontier. *Philosophical Transactions B.*, **371**, 1703.
- 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 Hydrometeorology*, **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-Saharan 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.

**Oral Presentations and Workshops**

- ASA, CSSA, and SSSA meeting**, Phoenix, AZ 11/2016  
Polaris: Towards an Improved Representation of Spatial Heterogeneity in Land Surface Models (Invited Talk)
- Lawrence Berkeley National Laboratory**, Berkeley, CA 9/2016  
Harnessing Big Data to Rethink Heterogeneity in Global Hydrology (Invited Talk)
- U.C. Davis**, Davis, CA 9/2016  
Harnessing Big Data to Rethink Heterogeneity in Global Hydrology (Invited Talk)
- CUAHSI Biennial Colloquium**, Shepherdstown, WV 7/2016  
The role of Big Data in building and applying the next generation of hydrologic models and soil databases over the globe (Invited Talk)
- 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

	<b>ASA, CSSA, and SSSA meeting</b> , Tampa, FL	11/2013
	Soil Heterogeneity in Macroscale Land Surface Models: Unresolved Challenges (Invited Talk)	
	<b>AGRHYMET</b> , Niamey, Niger	10/2013
	Installation and Training of the African Flood and Drought Monitor: AGRHYMET	
	<b>Model Complexity vs. Model Uncertainty of Catchment models</b> , Berlin, Germany	6/2013
	Hydrologic Modeling: VIC, TOPLATS, and beyond	
	<b>EGU</b> , Vienna, Austria	4/2013
	Assimilation of In-Situ Measurements into Gridded Data Products through State-Space Estimation: Application over Sub-Saharan Africa (Contributed talk)	
	<b>NGEE-Arctic</b> , Oak Ridge, TN	4/2013
	High-Resolution Land Surface Modeling: Potential and Challenges	
	<b>SWALIM</b> , Nairobi, Kenya	11/2012
	Princeton African Drought Monitor: Greater Horn of Africa (Invited Talk)	
	<b>ICPAC</b> , Nairobi, Kenya	6/2012
	Development and Implementation of the African Drought Monitor: ICPAC	
	<b>AGRHYMET</b> , Niamey, Niger	1/2012
	Development and Implementation of the African Drought Monitor: AGRHYMET	
<b>Other Presentations</b>	<b>EGU</b> , Vienna, Austria	4/2016
	Poster: How to represent 100 meter spatial heterogeneity in Earth system models.	
	<b>AGU Fall Meeting</b> , San Fransisco, CA	12/2015
	Poster: Assessing deficiencies of soil moisture networks using a field-scale land surface model.	
	<b>AGU Fall Meeting</b> , San Fransisco, CA	12/2014
	Talk as co-author: Evolution of Global-Scale Hydrology over the Last 25 Years.	
	<b>Satellite Soil Moisture Validation and Application Workshop</b> , Frascati, Italy	7/2013
	Talk as co-author: High-Resolution Land Surface Modeling: Improved Validation and Down-scaling of Soil Moisture Retrievals.	
	<b>Ezio Todini 70th Symposium</b> , Bologna	6/2013
	Talk as co-author: Continental Scale Hyper-Resolution Land Surface Modeling: Challenges and Initial Results.	
	<b>EGU</b> , Vienna, Austria	4/2013
	Talk as co-author: Global products of evapotranspiration: the GEWEX LandFLUX Initiative.	
	<b>AGU Fall Meeting</b> , 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.	
	<b>AGU Fall Meeting</b> , 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.	
	<b>AGU Fall Meeting</b> , 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*, *Journal of Geophysical Research - Atmospheres*, *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