Nathaniel W. Chaney

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Research Interests

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

Education

Princeton University

Ph.D., Civil and Environmental Engineering — 6/2015
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 Scientist, Geophysical Fluid Dynamics Laboratory — 7/2015 – Present
Developing a field-scale resolving land model for 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
Collaborated with Alex McBratney to develop the 30 meter POLARIS soil product.

Research Assistant, UC Berkeley — 2008 – 2010
Analyzed the impact of the riparian zone on 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

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

Released Software

African Flood and Drought Monitor	http://stream.princeton.edu
HydroBloks	https://github.com/chaneyn/HydroBloks http://www.hydrobloks.com
State Space Estimation (SSE)	https://github.com/chaneyn/SSE

Publications

Refereed Journal Articles

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.

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).

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.

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.

Articles in review

Chaney, N. W., P. Metcalfe, E. F. Wood: HydroBloks: Towards field-scale land surface modeling over continental extents, In review. *Hydrological Processes.*

Articles in preparation

Chaney, N. W., M. Ek, E. F. Wood : Improving Parameter Estimates in the Noah land surface model using FLUXNET,. *Agricultural and Forest Meteorology.*

Chaney, N. W., C. Fisher, J. D. Herman : African Flood and Drought Monitor: Web-based delivery and visualization of hydrologic data. *Environmental Modeling and Software.*

Oral Presentations and Workshops

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

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*, *Scientific Reports*, *Hydrology and Earth System Sciences*, *Remote Sensing of Environment*.

Member, American Geophysical Union 2009 – Present

Member, Soil Science Society of America 2014 – Present