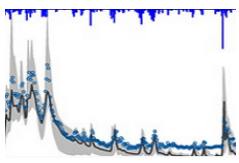
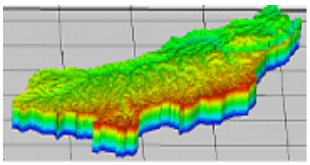
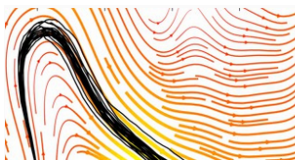
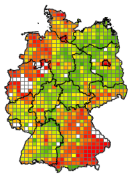
ModMon Integration Platform

Robust Pictures of the Future for Sustainable Development Paths in Landscapes under Climate Change



First Announcement

UFZ Environmental Modeling & Monitoring Colloquium

Wednesday, 08 June 2022, 3:00 - 4:30 pm

ONLINE

Towards locally relevant global soil moisture monitoring for water resources and climate applications

Dr. Noemi Vergopolan

Princeton University and NOAA Geophysical Fluid Dynamics Laboratory

Soil moisture spatiotemporal variability critically influences freshwater availability, agriculture and irrigation water demands, ecosystem dynamics, natural geohazards (e.g., wildfires and landslides), hydroclimate extremes (e.g., droughts and floods), land-atmosphere interactions, biogeochemistry, and ecosystems dynamics. In-situ hydrologic observations can provide detailed information, but their representativeness is limited, and networks of sensors are often not widely available. Hyperspectral satellite observations provide global coverage, but measurements can be infrequent or too coarse to capture the local spatial variability. This observation data gap limits the use of hydrologic information for scientific and water resources applications. To address these challenges, my research develops novel and scalable satellite land data assimilation approaches that use high-resolution land surface modeling, machine learning, and in-situ observations to obtain hydrologic information at the local spatial scales. In this presentation, I will introduce SMAP-HydroBlocks – the first 30-m resolution satellite-based surface soil moisture dataset for the United States. This unique dataset reveals the high degree of soil moisture spatial variability at the local scale and its complex interplay with the diverse landscape and hydroclimate. This spatial variability, however, does not persist across large spatial scales – up to 80% of the spatial information is lost at 1-km resolution, with complete loss expected at the scale of current state-of-the-art hydrologic and drought monitoring systems (5–25-km). I will conclude by discussing pathways forward to further understand the impact of local-scale hydrology on hydroclimate extremes, natural geohazards, ecological, and biogeochemical processes across scales.

All interested colleagues are kindly invited.

Dr. Noemi Vergopolan

is a research scientist and engineer at the Atmospheric and Ocean Science Program at Princeton University working on Earth System Modeling at the NOAA Geophysical Fluid Dynamics Laboratory. Her research aims to aid water resource decision-making by improving monitoring and forecasting of hydrological hazards and their impacts from global to local spatial scales. To this aim, Dr. Vergopolan develops scalable solutions for high-resolution hydrological predictions by leveraging satellite remote sensing, land surface modeling, machine learning, data fusion, and high-performance computing. **For more details see:** https://waterai.earth