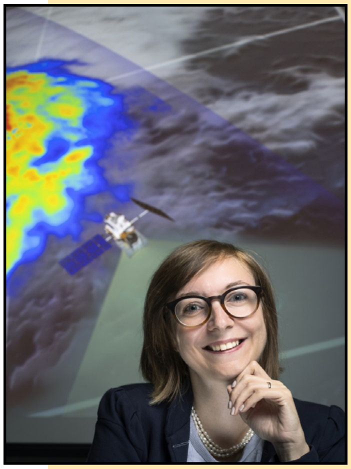
George Mason University | Institute for a Sustainable Earth

Volgenau School of Engineering



# Viviana Maggioni, PhD

Assistant Professor, Civil, Environmental, and Infrastructure Engineering

## Education

Environmental Engineering, University of Connecticut

## Key Interests

Hydrological Cycle | Global Satellite Remote Sensing | Hydroclimatic Hazards | Optimal Estimation of Precipitation | Land Data Assimilation Systems | Hyper-Resolution Modeling | Land Surface Modeling | Water Quality | Remote Sensing and Vector-Borne Diseases

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## SELECT PUBLICATIONS

- Solakian, J., *et al*. 2019. Investigating the use of satellite-based precipitation products for monitoring water quality in the Occoquan Watershed. *Journal of Hydrology: Regional Studies*, 26.
- Maggioni V., *et al*. 2014. An error model for uncertainty quantification in high-time resolution precipitation products, *Journal of Hydrometeorology*, 15(3), pp.1274–1292.
- Falck A., *et al*. 2015. Propagation of satellite precipitation uncertainties through a distributed hydrologic model: A case study in the Tocantins-Araguaia basin in Brazil. *Journal of Hydrology*, 527, pp.943–957.

## Research Focus

My research team's activities span from the local scale, by monitoring and modeling stormwater quantity and quality at the Mason main campus with state-of-the-art sensor networks, to the global scale, combining water resources engineering with hydrometeorology and remote sensing using satellite data to evaluate conditions in remote regions, where ground truthing is impossible, but where environmental and health consequences can be devastating.

## Current Projects

- We study surface flux, snow/ice storage, and water balance changes in High Mountain Asia (HMA) and investigate the causality of these changes at the regional to local scale. We are developing a high-resolution Land Data Assimilation System, forced by physically downscaled surface meteorology, parameterized by remotely sensed topography and vegetation, and constrained by remotely sensed snow, temperature, and glacier observations.
- We develop innovative terrestrial phenology data assimilation techniques to integrate satellite-based vegetation observations into a modeling framework to improve our estimation of hydrological variables globally. A better characterization of terrestrial water, energy, and carbon cycles through the integration of observations into models at spatial and temporal scales conducive to decision making and adaptation responses are essential to socio-ecosystem sustainability.
- As water in various components of the landscape freezes, its movement is largely curtailed with impacts on climate, hydrology, ecology, and biogeochemical processes. We are exploring the potential of developing a global, high resolution fractional Freeze/Thaw product that moves beyond current binary methods by representing intermediate phases between frozen and thawed states. This includes identifying responses of various types of frozen or thawed ground that can vary temporally, with depth, and widely over varying landscape properties.