Water Insights Gained from the Susquehanna-Shale Hills Critical Zone Observatory

**Abstract:**
Earth’s Critical Zone (CZ) spans from the bedrock to the atmospheric boundary layer. Since 2007 the Susquehanna-Shale Hills Critical Zone Observatory has been hosting interdisciplinary studies of water, energy and solute fluxes in the Shaver’s Creek watershed. In this talk, I will describe our local Observatory, the CZ approach, and how the interdisciplinary CZ lens is leading to water insights. One key contribution is describing how CZ architecture entrains water flowpaths with distinct chemistry. We are using this information to better predict concentration-discharge relationships in streams by developing a suite of models that couple PIHM (the Penn State Integrated Hydrologic Model) with reactive transport, geomorphology, ecosystem, and biogeochemical models. We have used one set of coupled models to “earthcast” changes in the CZ due to climate change. Most research at the Susquehanna-Shale Hills Critical Zone Observatory has focused on small forested catchments, but we recently expanded to an agricultural catchment, and a new proposal will include work in agricultural riparian zones. In general, compared to other water research frameworks, the CZ approach extends deeper in time and deeper into regolith with an array of disciplines making co-located measurements. The CZ lens should complement other approaches to understanding and managing water quality.

*A link to the seminar recording can be made available upon request after the event for those who cannot tune into the seminars on the actual day of the event.*