



1. Title

Unique Contributions of Hydropedology to Integrated Soil and Water Sciences

2. Type

Working Groups Symposium

3. Organizer(s) & Convener

Convener: Henry Lin

Co-Convenors: Hans-Jörg Vogel, Brent Clothier, Xiaoyan Li

4. Rationale

Hydropedology is an emerging interdisciplinary science that focuses on two fundamental questions: 1) How do soil architecture and the associated distribution of soils over the landscape exert a first-order control on hydrologic processes (and related biogeochemical dynamics and ecological functions)? 2) How do hydrologic processes (and the associated transport of energy and mass) influence soil genesis, evolution, variability, and function across space and time? The first question is related to the soil's role in water quantity and quality, while the second question is linked to the water's role in soil quantity and quality.

5. Objectives

Hydropedology is in a unique position to build bridges that are important to gaining new insights into integrated soil and water sciences, including: 1) connecting fast and slow processes to soil function and soil formation, 2) bridging soil structural and landscape units to deterministic patterns and stochastic variability, and 3) linking mapping with monitoring and modeling to geographic and functional characterizations. Through addressing fundamentals and building bridges, hydropedology could unify the theories of soil formation and soil function and offer an appealing framework for coupling soil heterogeneity across spatial scales and soil change across time scales.

6. Description

In this symposium, we seek contributions from all aspects of hydropedology and invite innovative new thinking and approaches to the study of complex soil systems. A special focus of this symposium is on research leading to improvements in our understanding of subsurface heterogeneity, the diversity of soil functions dictated by soil architecture, and the processes of structure formation and degradation and its impacts on flow and transport in the real-world soils. This focus is an essential step towards an integrated predictive modeling of soil systems.

