

Eawag Seminar Invitation

Multi-scale problems in subsurface environments: what we can learn from each scale

Speaker Dr. Joaquin Jimenez-Martinez, Department Water Resources and Drinking Water, Eawag, Dübendorf, Switzerland

When April 21, 2022, 16:00 – 17:00, CEST

Where Online via Zoom, contact seminars@eawag.ch for access details.

Abstract Soil and aquifers provide a number of functions in Earth's critical zone and sustain other ecosystems. The subsurface is a porous and topologically complex environment. This complexity creates a heterogeneous mosaic of high and low fluid flow velocities controlling the mixing of chemicals, transport of contaminants, or the cycling of nutrients. Taking the adsorption process of a pollutant as a common thread, we show i) at the field scale, the uncertainty associated with the transport and mass balance, ii) at the meter scale, the differences in the parameterization (e.g., sorption coefficient) inferred under realistic conditions versus ideal conditions (i.e., batch experiments), and iii) at micro-scale, the control that the mixing with the resident water exerts on the reaction. We disentangle the mechanisms at each scale and demonstrate that the conventional continuum-scale theories and models oversimplify and/or ignore important processes at smaller scales.