Eawag
Überlandstrasse 133
8600 Dübendorf
Switzerland
Phone +41 (0)58 765 53 61
Fax +41 (0)58 765 53 75
info@eawag.ch
www.eawag.ch

eawag
aquatic research

Eawag Seminar Invitation

# Beneath the Surface of Climate Change: Managing Natural Climate Variability toward Sustainable Groundwater

Speaker ***Dr. Jason Gurdak,***
*Associate Professor Department of Earth & Climate Sciences, San Francisco State University, San Francisco, California USA*

When **March 10, 11.00 – 12.00 a.m.**

Where **Forum Chriesbach C20, Eawag Dübendorf**

Abstract Many aquifers in semi-arid and arid regions are experiencing unsustainable groundwater depletion. Future climate variability and change may intensify depletion, which will have profound socioeconomic consequences and exacerbate the so-called 'global groundwater crisis'. This presentation explores new findings from the UNESCO groundwater and climate change (GRAPHIC) project to help manage our way through this crisis. Particular focus will be on quantifying teleconnections in groundwater with climate variability on interannual to multidecadal timescales because of the tangible implications for water-resource management. Climate variability on these timescales partially controls patterns of precipitation, drought, snowmelt, streamflow, and other processes that affect surface-water resources. Yet, the effects of interannual to multidecadal climate variability on recharge and other subsurface hydrologic processes that affect groundwater are largely unknown. Here, singular spectrum, wavelet coherence, and lag correlation analyses are used to quantify the effects of the El Niño/Southern Oscillation (2–7 year cycle), Pacific Decadal Oscillation (10–25 year cycle), and Atlantic Multidecadal Oscillation (50–70 year cycle) on precipitation, groundwater levels, groundwater pumping, and recharge rates in the Central Valley, Basin and Range, High Plains, and North Atlantic Coastal Plain aquifer systems of the U.S. New process-level insight will be presented about climate variability controls on transient recharge rates. This insight can be used to design distributed managed aquifer recharge (MAR) systems that capture stormwater, enhance recharge, and provide a promising conjunctive-use and adaptation strategy for projected hydroclimatologic variability. The presentation will conclude with the importance of framing the global groundwater crisis within the Water-Energy-Food Nexus. Sustainable solutions will come from a Nexus approach of interdisciplinary teams of researchers that span the biophysical and social sciences, while also engaging a diverse set of stakeholders.