Sign In My Time ?

H55O-0902 - Microbial community response to changing groundwater chemistry in the San Joaquin Valley

Friday, 17 December 2021

16:00 - 18:00

Convention Center - Poster Hall, D-F

Abstract

The Central Valley of California is one of the most agriculturally productive regions of the world, relying on groundwater to support its domestic, municipal, and agricultural water needs. Groundwater contamination is a pervasive concern in the San Joaquin Valley as a result of anthropogenic, abiotic, and biotic processes. Elevated concentrations of trace elements in groundwater such as As, U, and Cr are likely related to anthropogenic forcing, but are naturally occurring within Central Valley sediments. Here we study the microbiological processes underpinning contaminant release and how they inform approaches to improving water quality and reducing municipal water treatment costs. This research explores how microbial communities shift and are altered by geogenic and anthropogenic contaminants, as well as the use of indicator microbes to diagnose and mitigate fouled wells. We sampled both monitoring and production wells in the City of Fresno with documented contamination by H2S, As, Mn, Fe, and/or NO3-. We hypothesize that contaminant release is linked to the microbial community as well as aquifer chemistry. To assess microbial community composition, 16s rDNA was extracted from groundwater samples and sequenced to document community composition. Community structure was measured alongside water chemistry, and groundwater level. Microbiological community and water chemistry comparisons between production and monitoring wells suggest that there is a disconnect between sites presumed to access the same aquifer, highlighting the complexity of subsurface environments. Redox chemistry and pH also varied across the wells tested concomitant with microbial community structure. Evaluating microbial community change in response to agricultural and anthropogenic water demand supports prediction and mitigation of contaminated wells. We propose microbial community structure and biogeochemical mechanisms directly impact groundwater quality via mobilization and manipulation of natural and anthropogenic contaminants. The ability to more accurately and immediately connect the microbiological community of the aquifer to water chemistry has potential to improve human and ecological health and reduce municipal water treatment costs.

Help / FAQ
Home
Sign In
Search
Browse by Day
Browse by Sections
Keynote and Plenary
Named Lectures
Innovations
Union
eLightning Sessions
Online eLightning Sessions
Poster Sessions
Online Only Sessions
Town Halls
Scientific Workshops
AGU Events
Pod Reservation System
Online Summary Sessions
Suggested

P

Tia Peterson
Colorado College

Authors

K Emily Kron California State University, Fresno	O Lauren O'Rourke Whitman College
G John Goodman Union College	C Amalia Culpepper-Wehr Williams College
S Richard Steiner-Otoo Montclair State University	K Jackson Kohn Colorado College
G Mia Goudy California State University Fresno	N Mark Nickels Trinity University
M Aric Howard Mine California State University Fresno	Z Brady Ziegler Trinity University

View Related

Lauren Lowman, Wake Forest University, Engineering, Winston-Salem, United States, **Amy Hansen**, University of Kansas, Civil, Environmental, and Architectural Engineering, Lawrence, United States, **Khandker S. Ishtiaq**, Florida International University, Miami, FL, United States, **John T Van Stan II**, Georgia Southern University, Statesboro, GA, United States and **Salli Dymond**, Northern Arizona University, School of Forestry, Flagstaff, United States

○ Friday, 17 December 2021

16:00 - 18:00

Convention Center - Poster Hall, D-F

Hydrology

Similar

Geospatial and Statistical Analyses of Groundwater Contaminants in the San Joaquin River Valley During Drought and Non-Drought Periods

***Mark Nickels**[1], Mia Goudy[2], John Goodman[3], Jackson Kohn[4], Lauren O'Rourke[5], Tia Peterson[4], Richard Steiner-Otoo[6], Amalia Culpepper-Wehr[7], Brady Ziegler[1] and Aric Howard Mine[8], (1)Trinity University, San Antonio, TX, United States, (2)California State University Fresno, Fresno, United States, (3)Union College, Schenectady, NY, United States, (4)Colorado College, Colorado Springs, CO, United States, (5)Whitman College, Walla Walla, WA, United States, (6)Montclair State University, Montclair, NJ, United States, (7)Williams College, Williamstown, MA, United States, (8)California State University Fresno, Earth & Environmental Sciences Dept., Fresno, CA, United States*

Assessment of GPS-enhanced InSAR and *in-situ* data for groundwater and aquifer structure characterization in California’s San Joaquin Valley

***Wesley Neely**, Scripps Institution of Oceanography, La Jolla, CA, United States; Stanford University, Geophysics, Stanford, United States and Adrian A Borsa, Scripps Institution of Oceanography, University of California San Diego, La Jolla, United States*

Using Random Forest to Predict 1,2,3-Trichloropropane Contamination from Legacy Non-Point Source Pollution of Groundwater in California’s San Joaquin Valley

***Hope Hauptman**, University of California Merced, Environmental Systems, Merced, CA, United States and Colleen Naughton, University of California Merced, Environmental Engineering, Merced, CA, United States*

Investigating Aquifer Recharge with InSAR and Groundwater Modeling in the Central Valley

***Zel Hurewitz**, Scripps Institution of Oceanography, La Jolla, CA, United States and Adrian A Borsa, Scripps Institution of Oceanography, University of California San Diego, La Jolla, United States*

Characterizing Temporal Dynamics of Isotope and Ion Chemistry in Groundwater Across a Barrier Island as Influenced by Rainfall and Tidal Cycles.

REGISTER HOUSING ATTEND

COVID-19 PROTOCOLS