UC **SANTA BARBARA**

Department of Earth Science

Earth Science Colloquium

WEBB 1100 • THURSDAY October 24th. • 2:00 PM

Drinking water for the 21st Century: The role of reuse and managed aquifer recharge (MAR)

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Prior to the beginning of the 21st century, drinking water sources were typical surface water, which was commonly collected in mountain reservoirs and move to urban areas with rivers and aqueducts. Because of rising populations and a changing climate relying on surface water has become problematic. In addition to conservation water reuse is a viable option especially when it is used as a water source for managed aquifer recharge (MAR). MAR can offset some of the storage losses expected from decreases in the snow pack associate with climate change in California and elsewhere around the globe. It is also a viable low-cost, drought-resistant option to increase local water supplies. As reclaimed water becomes a larger portion of the source water supply to MAR facilities, water quality concerns are raised and it is paramount to understand the fate and transport of potential contaminants near these sites. One of the best options to understand flow and transport is to conduct geochemical tracer experiments. When conducted properly, these experiments can establish subsurface residence times and hydraulic connections between MAR facilities and downgradient production wells. There are three types of tracer: 1) intrinsic, 2) deliberate (added), and 3) environmental. They must overcome the typical recharge volumes needed to be traced. At large MAR facilities, infiltration rates from spreading basins can exceed 105 m3/day. All tracer experiments, especially deliberate (added) tracers, must be able to cope with such large infiltration rates. The three different classes of tracers will be discussed and illustrated using examples for the Orange County Water District (OCWD) MAR facilities in Southern California that include a series of large spreading basins and an 8-km reach of the Santa Ana River. Anion mapping of high-quality reclaimed water from the Groundwater Replenishment System near the large basins will be presented. Results show that the different types of tracers give complementary information about travel times and hydraulic connections to both monitoring and production wells near OCWD MAR facilities.