Geochanical dynamics of a spring-fed stream in an arid climate

Tracy J. Lund*, Everett Shock*, Panjai Prapaipong*
*School of Earth and Space Exploration, Arizona State University, Tempe, AZ 85287
**Department of Chemistry and Biochemistry, Arizona State University, Tempe, AZ 85287

Studying this site is important because:
- Several cold springs provide water that ultimately flows via the Verde River into the greater Phoenix metro area and is used for drinking water.
- While studies have analyzed major ion composition in streams at different time scales (Farkas et al., 2007; Miller & Dower, 1977) and nutrient loads in rural and urban streams (Martin et al., 1997; Jones et al., 1999) over different time scales and in response to weather events, little is known about longer term, seasonal trends of trace elements in perennial, normally-manned, semi-streams.

Rainfall through time

Rainfall totals throughout the study site as shown in Figure 1. Winter precipitation is largely over by March 1. Summer months show the highest rainfall density and closest relationship with ground flows as indicated by the green arrow. The rainfall event is modeled to start on April 20 and last until May 10, as indicated by the red box. This data set was produced by a digital elevation model (DEM) of the catchment.

In-situ Conditions

Measurements from the YS-300 sondes are presented in Figures 2 and 3. Specific conductivity, a measurement relating to the concentration of all ions in solution, is shown in Figure 1. Conductivity increases by 2.5 times between April 20 and August 1. A measurement of hydrogen ions in solution, increases slightly from March 1 to July 1 (Figure 4). The seeming downward trend in pH values during the summer is due to a buildup of sediment on the pH electrode and does not reflect actual soil conditions. Figure 5 shows similar trends of specific conductivity and water temperature. Variations of water temperature reflect the time of day and ambient air temperature. Greater data density reflects increased sampling frequency and ambient air temperature. Greater data density reflects increased sampling frequency and ambient air temperature.