Abstract title: Elemental Cycling Recorded in Fracture Zone Minerals in Earth's Metal-rich Bedrock

Presenter: Cardace, Dawn.
Affiliation: University of Rhode Island, Department of Geosciences, Kingston, RI, United States.

cardace@uri.edu

ORCiD 0000-0001-6095-6715

Some of Earth's naturally metal-rich bedrock units, tectonically upheaved from the subseafloor and stranded on continents, are essentially mantle samples, characterized by high Fe and Mg rock compositions and sometimes mobile Cr, Ni, and other metals in advecting groundwater systems. Reactions with water drive pervasive alteration of primary materials to serpentine clay mineral assemblages. These rock units are of high interest to research in atmospheric carbon drawdown strategies and evaluations of mineral controls on microbial activity in/beyond the critical zone. Core samples of serpentinites from the Coast Range Ophiolite were obtained at the UC-Davis administered McLaughlin Natural Reserve in Lower Lake, CA. Shallow samples were collected from Coast Range Ophiolite Microbial Observatory (CROMO) cores, deeper samples were from Homestake Mining Co. archives. Questions asked were: (1) do bulk core samples reflect changing redox status with depth below ground surface? (2) how do Fe-containing vein fill minerals exhibit redox differentiation with distance from vein centers to edges, and (3) do different fracture sets (relatively dated based on cross-cutting relationships) exhibit the same or different redox characteristics? Implications for metal release and trapping within the mineral assemblages are considered as the system trends towards equilibrium.