studies were conducted along Hot Creek to examine the ambient concentrations and chemical speciation of arsenic. These parameters have important implications for arsenic removal efficiency in drinking water treatment and influence the mobility and toxicity of arsenic in natural waters.

039. AQUEOUS VANADIUM CHEMISTRY OF RELEVANCE TO THE ENVIRONMENT. D. C. Crans * and Anastasios D. Keramidas, Department of Chemistry, Colorado State University, Fort Collins, CO 80523-1872

Vanadium undergoes hydrolytic, protonation and redox processes in aqueous environments. Under oxidative conditions vanadium is present in oxidation state V, however, in the presence of various reducing components, such as sulfur compounds and humic acids, vanadate undergoes redox chemistry. Using NMR and EPR spectroscopies the reactions of vanadate with organic sulfur compounds are examined as a probe for the redox chemistry that occurs in reducing waters. We have chosen to study the reaction of vanadate with 2-mercaptoethanol as a model reaction and find that several products form depending on reaction stoichiometry and pH. In addition, studies of vanadate with natural organic matter will be described and evidence for vanadium(V)-humic complexes will be presented. The possibility that this type of chemistry may play a role not only reducing waters but also oxidizing waters with vanadium-rich sediments will be discussed.

040. COBALT AND MANGANESE OXIDE (MnOx) ASSOCIATION AT AN OXIC/ANOXIC INTERFACE. C-P. Lienemann[1], M. Taillefert[2], D. Perret[1], and J-F. Gaillard[2]. (1)ICMA, University of Lausanne, CH-1015 Lausanne, Switzerland, and (2)Dept. of Civil Engineering, Northwestern University, Evanston, IL, 60208-3109, USA.

We report the utilization of a multi-method approach to the study the associations of Co and Mn in a natural aquatic system: Paul Lake (MI). The chemical speciation of Co and Mn in the lake water column was established using ICP-MS and Transmission Electron Microscopic (TEM) coupled with Energy Dispersive Spectrometry (EDS). Mn-rich particles were detected in the suboxic zone. Micrographs confirmed the biological origin of the hydrous manganese oxides. Analytical Electron Microscopy clearly established that Co and Fe were scavenged by micro-organisms bearing a Mn-oxide crust. The comparison of the Co:Mn ratio in solution to the one in the particles, as inferred from the deconvolution of the EDS spectra, showed that Co was enriched in the Mn-oxides overgrowth compared to the aqueous solution. The combination of water analyses with TEM-EDS analyses is a powerful tool to unveil chemical associations in the environment.

041.

AQUEOUS PHOTOREDUCTION OF DIVALENT MERCURY WITH ORGANIC ACIDS: IMPLICATIONS OF MERCURY CHEMISTRY IN THE ATMOSPHERE. Che-Jen Lin & Simo Pehkonen, Department of Civil and Environmental Engineering, University of Cincinnati, Cincinnati, OH 45221.

The homogeneous and heterogeneous photoreduction of dissolved divalent mercury with organic acids (formate, acetate and oxalate) is investigated. Laboratory photochemistry experiments with simulated sunlight were performed to assess the role of the organic acids in changing the redox states of mercury in aqueous phase. It is observed that Hg(II) is readily reduced by the hydroperoxyl radical produced from the photolysis of oxalate. The second order rate constant was determined to be 1.1x10-4 M-1s-1 when HgCl2 was used as the salt. Enhancement of Hg(II) reduction was also observed when two iron oxides (goethite and hematite) are present in the system, indicating the iron-containing aerosols within atmospheric water could have a catalytic effect on the photoreduction. Conclusions are drawn in terms of the importance of these reactions and the implications in the chemical transformation of mercury in atmospheric water.