I will present examples of these types of titration curves and others, and also show how curves associated with addition of small amounts of calcite can be used to discern carbonate coprecipitates. Additionally, I will show a time series of curves which reflect a nonequilibrium weathering process.

173. NICKEL SORPTION KINETICS ON THE CLAY FRACTION OF A SOIL. D.R. Roberts and D.L. Sparks, Department of Plant and Soil Sciences, University of Delaware, Newark, Delaware, 19717-1303.

Soil mineral surfaces are capable of sorbing and retaining heavy metal ions and are therefore important in assessing the fate of heavy metal contaminants in the soil environment. Past studies of heavy metal sorption kinetics have focused on pure mineral components, with less emphasis placed on mixed systems. However, soil clay fractions in natural environments are rarely, if ever, composed of only one pure mineral component. This study examines Ni(II) sorption and desorption kinetics on the clay fraction (<0.002mm) of a Matapeake silt loam. Samples were aged (days to months) using batch techniques at a pH of 7.5 with an initial Ni(II) concentration of 3 mM. Desorption experiments were conducted at various times to assess the effect of aging on the release of Ni(II) from the clay fraction. Ascertaining the kinetics of nickel sorption on clay minerals is needed to propose possible sorption reaction mechanisms and assess the metal mobility/fate in natural environments.

174. THE EFFECTS OF RESIDENCE TIME ON THE RETENTION OF ARSENATE BY GOETHITE. S.E. O'Reilly and D.L. Sparks, Department of Plant and Soil Sciences, University of Delaware, Newark, Delaware 19717-1303

Research has shown that sorption of metals on natural materials can proceed for a long time, however the mechanisms for this slow sorption are not well understood. Accordingly, the goal of this study was to determine the effects of “aging” or residence time on the kinetics of arsenate sorption and desorption on goethite. Batch sorption and desorption studies were conducted at pH 6 for periods up to 2 months. The desorption experiments were conducted for a period up to one month on different “aged” samples using sulfate and phosphate desorptives. Initial sorption was rapid with over 90% of the arsenate sorbed within 24 hours. Arsenate sorption increased slowly with time. As residence time between arsenate and goethite increased, the amount of desorbed arsenate decreased, and desorption increased with increasing desorption equilibrium time. Phosphate was more effective in desorbing arsenate than sulfate, but, in general, As seems to be tightly bound to goethite.

175. KINETICS OF BIOGEOCHEMICAL PROCESSES IN SALT MARSH SEDIMENTS. E. Viollier, P. Van Cappellen, A. Roychoudhuri, P. Ingleitt, K. Hunter, Georgia Institute of Technology, Atlanta, GA 30332-0340.

The salt marsh developed along the Georgia coast is a dynamic ecosystem subjected to daily and seasonal stresses due to tidal cycles and river-borne organic-mineral particles. This study is an attempt to quantify early diagenetic processes and trace element immobilization/release in the first 50 centimeters of a highly reducing sediment. On one hand, kinetic experiments are performed on undisturbed sediment cores (plug-flow reactor) in order to assess reaction rates and retrieve rate expressions of individual pathways (sulfate, iron, uranium reduction, iron sulfide precipitation). On the other hand, the latter kinetic information is utilized in Steadyed (model of reactive transport in aquatic sediments). Model fitting of actual pore water distributions is carried out. Predicted vertical distributions of solids are then compared to data from selective chemical extractions.

176. SURFACE CHARGE PROPERTIES OF AND Cu(II) ADSORPTION BY SPORES OF THE MARINE BACILLUS SP. STRAIN SG-1. Lee M. He and Bradley M. Tebo, Marine Biology Research Division and Center for Marine Biotechnology and Biomedicine, Scripps Institution of Oceanography, University of California at San Diego, La Jolla, CA 92037-0202.

Dormant spores of the marine Mn(II)-oxidizing Bacillus sp. strain SG-1 are capable of binding a variety of heavy metals. The specific surface area of freeze-