

determined for adsorption of Cu, Cr, Pb and Zn to natural suspended material, under conditions mimicking those of the lake (pH = 10.0). A chemical equilibrium program (MINEQL) was used to model inorganic metal speciation. Taking Pb as an example at a total concentration of 0.25 μM , the model predicted 98% of Pb to be adsorbed to particulates, 0.005 μM as $\text{Pb}(\text{CO}_3)_2^{2-}$, and 7×10^{-7} μM as aquo Pb^{2+} . Model results are used to examine potential exposure pathways of toxic metals to the filter-feeding flamingos at the lake.

235.

GEOCHEMISTRY OF TRACE METALS IN THE GIRONDE ESTUARY. A.M.L. Kraepiel, J.-F. Chiffolleau, J.-M. Martin, and F.M.M. Morel, Department of Geosciences, Princeton University, Princeton, New Jersey 08544

Using clean techniques, we measured the dissolved, particulate and (by cross-flow filtration) colloidal fractions of Cd, Ni, Zn, Cu, Pb, Mn and Fe in the Gironde in Southwest France. The fractions of the particulate riverine metals that eventually dissolved in the estuary vary from >90% for Cd to ~0% for Pb. Observed mid-salinity maxima for Cd, Ni, Zn, and Cu are well reproduced by a simple conservation model which accounts for the inorganic complexation of the metals by seawater anions. The colloidal fraction contains both amorphous iron oxide particles that separate from the rest by coagulation and organic macromolecules which, along with their bound colloidal fraction of the other metals, behave conservatively in the estuary.

236.

ANALYTICAL SPECIATION OF LEAD IN THE WATER COLUMN OF PAUL LAKE (MI). M.Taillefert¹, C-P. Lienemann², J-F. Gaillard¹ and D. Perret², ¹ Department of Civil Engineering, Northwestern University, Evanston, IL 60208-3109; ² Institut de Chimie Analytique et Minerale (ICMA), Universite de Lausanne, Lausanne, CH-1015

In the water column of Paul Lake (MI), the profile of dissolved Pb shows a significant concentration gradient below the chemocline, i.e. from around 20 pM to 3 nM. Good correlations between particulate organic matter (POM), hydrous iron oxides, and Pb were found in the water column, suggesting that Pb is scavenged by particles formed at the oxic-anoxic transition. The investigation of the micro-particles, using Transmission Electron Microscopy coupled with Energy Dispersive Spectrometry (TEM-EDS), shows that: (i) hydrous iron oxides and POM form intimate aggregates below the oxycline, and (ii) these organo-mineral moieties contain Pb. The distribution of Pb among the dissolved and particulate phases, as well as the analytical speciation of dissolved Pb determined by voltammetry and ionic exchange chromatography, are presented.

237.

MICRON-SCALE STRUCTURE OF TRACE METALS IN POPE WATERS. G.R. Fones, W.Davison, Environmental Sciences Division, IEBS., Lancaster University, Lancaster, LA1 4YQ, UK., G.W. Grime, Microprobe Unit, University of Oxford, Keble Road, Oxford, OX1 3RH, UK.

The technique of Diffusive Gradients in Thin films (DGT), can be used to measure solutes in situ by concentrating them on an immobilized binding agent, after diffusion through high porosity hydrogel. In situ assemblies (~1mm total thickness) using a chelating resin with a bead size of 0.2 μm and ceramic backing plates have enabled measurements to be made at 100 μm spatial resolution. During deployment in the sediment, metal ions are automatically pre-concentrated on the resin. On removal, the accumulated metal ions are measured using proton induced X-ray emission (PIXE). Two dimensional pore water image intensity maps reveal pronounced horizontal inhomogeneity for Zn and Mn. Vertical profiles at 100 μm resolution show sharp concentration maxima below the sediment water interface and also ~5 mm above it, coincident with a benthic algal layer. Within the sediment, maxima for different metals are ~2 mm apart, indicating different chemical processes controlling their release.