19g Particle and Soluble Release of Organic Contaminants from the Sediment Bed

Danny D. Reible and Louis J. Thibodeaux

Traditionally, the transport and fate of hydrophobic contaminants at the sediment-water interface has largely been assumed to be controlled by sediment erosion and resuspension processes. Many sediment contaminants, however, lie in stable depositional environments where exposure and risk is defined by bioturbation, the mixing activities of benthic organisms, and bioaccumulation, the uptake of contaminants by these organisms, causing both direct toxic effects and indirect effects through the food chain. In addition, there is growing recognition of the importance of soluble release in controlling contaminant movement into the overlying water and as a source of exposure and risk to organisms in the water. This presentation will focus on efforts to understand and quantify these processes through experiments and modeling. Estimation of the depth and intensity of organism mixing processes and the relationship of desorption phenomena to accumulation in these organisms will be discussed. The coupling of physicochemical and biological processes will be emphasized. Pore water concentrations will be identified as a key indicator of exposure and risk. Deterministic models showing promise at predicting the dynamics of pore water concentrations and stochastic models reproducing some key characteristics of benthic community behavior will be developed. The presentation will seek to generate a discussion of the relative importance of soluble and particulate release in controlling exposure and risk to contaminants in the overlying water.