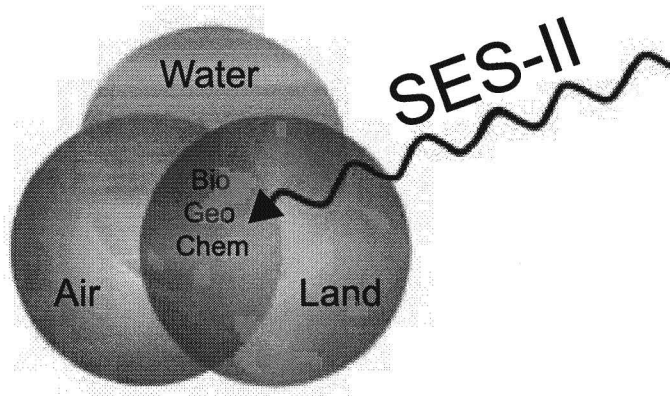


Synchrotron Environmental Science-II Speaker Abstracts



The Role of Synchrotron Radiation in Advancing Frontiers in Environmental Soil Science

Donald L. Sparks, *University of Delaware*

Over the past decade, with the advent of cutting-edge, molecular-scale *in situ* analytical techniques (particularly those that are synchrotron-based), significant advances have occurred in determining the speciation and reaction mechanisms of metals, oxyanions, radionuclides, and microbes in soil and water environments. These frontiers in molecular environmental science have major impacts on soil remediation, development of predictive models, and bioavailability and risk assessments. This presentation will focus on the use of x-ray absorption, x-ray fluorescence, diffuse reflectance spectroscopies, and x-ray spectromicroscopy to elucidate metal sorption/release kinetics and mechanisms at the soil mineral/water interface, to speciate metal- and metalloid-contaminated soils, and to investigate humic substance-metal complexation on mineral surfaces. Advances in elucidating the structure of soil organic matter, the chemistry of light elements that are important in subsurface environments, and microbially mediated processes will also be discussed.