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150-17 The Impact of Sea Level Rise on Arsenic Sorption in Phragmites Australis Root Plaques.

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Monday, November 3, 2014: 2:35 PM
Long Beach Convention Center, Room 104B

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Coastal wetlands sequester large amounts of heavy metals in their sediments and biomass; however, sea level rise and invasive exotic plant species destabilize marsh ecosystems and may cause previously sorbed arsenic (As) to be released. The roots of marsh plants may play a critical role in capturing arsenic mobilized by influxes of seawater through direct absorption into root tissue or by sorption of the metals to iron plaques formed around the roots. These relationships were tested on *Phragmites,* which was grown in a controlled growth chamber and exposed to seawater of a given concentration (0%, 10%, 25%, 50%, 70%, or 100%) and for various time periods. A storm surge was also a simulated by freshwater followed by 70% seawater (the highest tolerance of *Phragmites)*. Arsenic in the root plaques was analyzed using a modified dithionite citrate bicarbonate (DCB) method and concentrations of total As(III)/As(V) were measured with inductively coupled plasma mass spectrometry (ICP-MS). The distribution/association of arsenic in the roots collected from these experiments was also investigated using synchrotron-based micro-X-ray absorption near edge structure (micro-XANES) and micro-X-ray fluorescence (micro-XRF) spectroscopy, respectively, at the National Synchrotron Light Source. Roots and outer plaques were analyzed as whole and cryosectioned 30 µm cross-sections to spatially differentiate the oxidation state of the arsenic sorbed on the plaques and absorbed in different regions of the roots. This study provides key insight to more fully understand the impact of sea level rise on the cycling, mobility, and speciation of redox sensitive arsenic, and other heavy metals, in contaminated wetlands.

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