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187 - Impact of sea level rise on arsenic and chromium sorption in *Phragmites Australis* root plaques

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Abstract: 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 contaminants, such as arsenic (As) and chromium (Cr), to be released. The roots of marsh plants may play a critical role in capturing As and Cr 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 (5 min to 7 d). A storm surge was also a simulated by adding freshwater followed by 70% seawater (the highest tolerance of *Phragmites)*. Arsenic and Cr in the root plaques were analyzed using a modified dithionite citrate bicarbonate (DCB) method and the total As and Cr were measured with inductively coupled plasma optical emission spectrometry (ICP-OES). The distribution/association of As and Cr 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, Argonne National Laboratory, and SLAC National Accelerator Laboratory. Roots and outer plaques were analyzed as whole and cryosectioned 30 µm cross-sections to spatially differentiate the oxidation state of the As and Cr 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 As, Cr, and other heavy metals, in contaminated wetlands.