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[The Impact of Sea Level Rise on Arsenic Cycling and Mobility:pH and Ionic Strength Effects in a Goethite System](#)

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Abstract

Arsenic (As) soil contamination is a global environmental issue that has several detrimental effects on many aspects of nature. Areas of soil contamination can develop from different geogenic or anthropogenic circumstances. With the sudden increase in sea level rise, coastal contaminated areas are at a greater risk of toxic element perturbation than ever before. The coastal state of Delaware has multiple former industrial sites that are heavily contaminated with toxic elements, including arsenic, that are now at risk of being exposed to a changing hydrologic regime. As a result, As may be mobilized, which is a great concern because it is known as a carcinogen to both the human and animal populations. To help address this issue, the adsorption of As (III and V) to goethite as a function of pH was observed across a range of artificial waters: river water, sea water, and a 50/50 mix of the two. Samples consisted of 2 g/L of goethite and 125 mg/L of As in each respective water and adjusted to a pH range from 3 to 9. All samples were shaken in the dark for 24 hours and were analyzed via inductively coupled plasma mass spectrometry (ICP-MS) for As concentration within the supernatant. The data were used to develop pH envelopes to show sorption trends across the range of pH as well as in different types of water. The findings of this experiment will help elucidate As partitioning behavior in the face of sea level rise, which will lead to positive applications to human health.

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