

# The Geochemistry of Vanadium within the Subterranean Estuary of Stony Brook Harbor, NY

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The subterranean estuary (STE) is defined as the zone of mixing between fresh groundwater and seawater within coastal aquifers [Moore, 1999]. The boundary produced by this transition creates unique geochemical conditions that in turn controls the trace metal flux from terrestrial derived groundwater to the coastal surface water.

This study investigates the cycling and speciation of trace metals, in particular Vanadium, within the STE of Stony Brook Harbor, where oxic groundwater interacts with suboxic seawater. We address how this geochemical transformation in the STE may alter the final trace metal composition of the groundwater being discharged. Results from porewater samples indicate that total dissolved V displays a co-varying behavior (Fig. 1) within the salinity transition zone with that

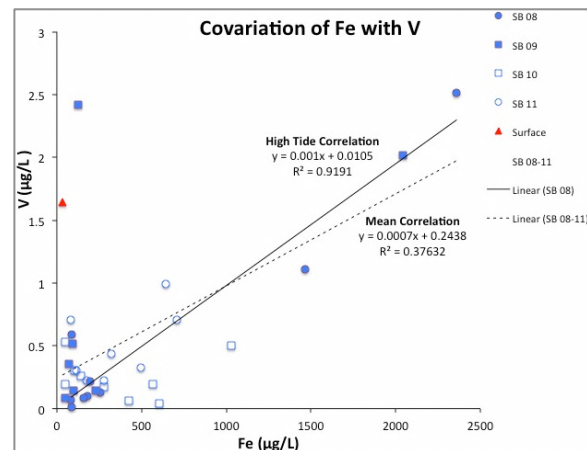


Figure 1. Total dissolved Fe vs.

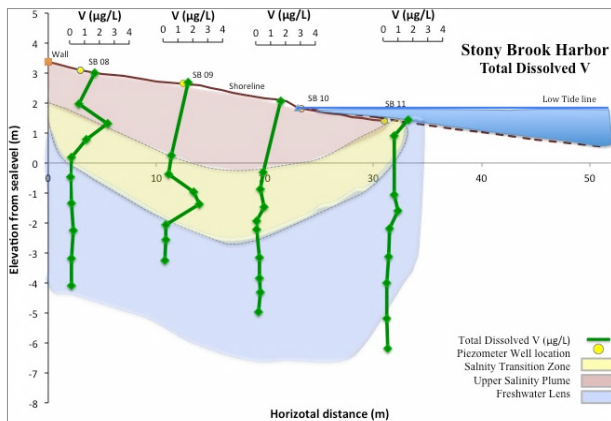


Figure 2. Dissolved V transect in the STE. The arbitrary plume emphasizes the salinity transitions.

of Fe. This trend is unique to this study site and indicates a mobilization of Fe and V due to the iron redox chemistry that is accompanied by re-sorption to the aquifer sediments upon reaching the upper salinity plume. However, this co-variation differs at the sediment water interface where V has an elevated concentration (Fig. 2). A spike in concentration at this interface makes V particularly interesting because this may indicate SGD as a potential source of

dissolved V to the surrounding surface water, which coincides with previous work done in the Great South Bay of Long Island, NY [Beck et al., 2010]. With V having both natural and anthropogenic sources, continually monitoring the fate of trace metal contamination in the STE becomes increasingly important.

## References:

- Beck, A., J. Cochran, and S. Sanudo-Wilhelmy (2010), The distribution and speciation of dissolved trace metals in a shallow subterranean estuary, *Marine Chemistry*, 121(1-4), 145-156.  
 Moore, W. (1999), The subterranean estuary: a reaction zone of ground water and sea water, *Marine Chemistry*, 65(1-2).