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 control 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 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: