FIELD-SCALE DEMONSTRATION OF THE SEDIMENT BED PASSIVE FLUXMETER AT A CVOC IMPAIRED SITE

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Laboratory and preliminary field testing have been completed to demonstrate a new tool for providing accurate characterizations of vertical water, pollutant and nutrient fluxes at the groundwater-surface water interface through direct in-situ measurement. The Sediment Bed Passive Fluxmeter (SBPFM) was designed to passively and directly provide simultaneous and independent measurements of volumetric water and solute mass fluxes exchanged vertically through the GW-SW interface. The SBPFM consists of an internal, permeable, carbon-based adsorbent media impregnated with a suite of water-soluble tracers contained in a dedicated drive-point with upper and lower screened openings for fluid intake and exhaust. This configuration generates passive flow driven by the vertical hydraulic gradient between surface and groundwaters. Once deployed, tracers are displaced at rates proportional to the average, advective flow through the device. The loss of tracers is used to calculate the cumulative water flux over the deployment period. Simultaneously, the cumulative mass of adsorbed pollutants provides a direct measurement of the contaminant mass flux through the sediment.

This presentation involves a field-scale demonstration of the SBPFM in characterizing the magnitude and distribution of chlorinated solvents exchanging between impaired groundwaters and a tidally-influenced estuary. Here we present a comparison of pre- and post-remedial flux assessments using an array of SBPFMs within a 20,000 [m^2] plane of estuary sediments. Both assessments consisted of a 4X8 array of probes deployed for two weeks. The first deployment (2015) estimated a mass discharge of 115 TCE [g/d] and was used to establish infrastructure supporting a targeted pump-and-treat system. A similarly constructed redeployment (2018) investigated the effects of the pumping after 10 months. Preliminary analyses of the results show the spatial distribution for both periods and evidence that the TCE mass discharge to the tributary was reduced by more than 99%.

PRESENTER BIO: Scott Augustine graduated in 2016 from the University of Florida with a B.S. in Environmental Engineering Sciences. He is pursuing a PhD in Environmental Engineering with a focus on contaminated site characterization and remediation.