

STREAM CHANNEL MORPHOLOGY IMPACTS NATURAL SUBMARINE GROUNDWATER DISCHARGE TO OYSTER CREEK, GEORGIA

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Submarine groundwater discharge (SGD) is a natural process that transports groundwater and dissolved constituents to proximal coastal zones. SGD represents a major but inadequately constrained piece of coastal marine water and chemical budgets because it is spatially and temporally heterogeneous and is difficult to identify without using chemical or temperature tracers. We conducted a surface water survey via boat to detect and quantify groundwater discharge to the Oyster Creek area, which is a brackish tidal estuary near Savannah, GA that winds through extensive intertidal marshes of *Spartina alterniflora* and mud flats lined by eastern oysters (*Crassostrea virginica*). We used radon-222, which is a well-established tracer to detect and quantify groundwater discharge to surface water bodies. The data show the radon signature was everywhere we surveyed, suggesting that groundwater discharge is prevalent in the area and that the groundwater rapidly mixes with the surface water. Furthermore, most of the discharging water (94 and 99%) was recirculated seawater with the small remainder likely sourced from infiltrated precipitation. The spatial distribution of the discharge was heterogeneous, consistent with observations from numerous researchers working sites worldwide. However, we found that stream channel morphology exerted a strong control on the spatial distribution and magnitude of groundwater fluxes to the area. We hypothesize that groundwater discharge to brackish tidal estuaries is common in the southeast and that the discharge is dominated by recirculated seawater. In the future, a more thorough investigation of how ebb and flood tides interact with stream channel morphology to control groundwater discharge locations and fluxes is necessary as this is the first investigation, to our knowledge, to recognize the morphologic control of tidal streams on groundwater discharge.

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