



Submarine Groundwater Discharge controlled by wind: An example from Eckernförde Bay, Southwestern Baltic Sea

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Little information is so far available on the occurrences of submarine groundwater discharge (SGD) in the southwestern Baltic Sea. We report here on the results of a systematic SGD survey along the coast of German southwestern Baltic Sea. Based on geochemical tracer measurements (radon, radium isotopes, salinity) in seawater and measurements of pore water salinity in marine surface sediments, we could identify SGD locations related to coastal aquifers that are discharging directly at the beachfront. More frequently diffuse discharge from near shore sediments was observed. Such SGD was characterized by significantly lower pore water salinities compared to ambient sea water. Pore water salinity was monitored using an in situ CTD and water discharge was measured using seepage meters. Interstitial water salinity was marked by strong temporal variation, with generally lower values during periods of low sea level. This relationship indicates that diffusive SGD is largely controlled by the sea level, which, in turn, controls the hydraulic gradient between land and sea. In the Southwestern Baltic Sea the sea level is mainly determined by the wind regime. Within this study, several locations were identified in which SGD is associated with high nitrate concentrations indicating the importance of SGD for the nutrient balance of the Southwestern Baltic Sea.