Submarine Groundwater Discharge in Southern Portugal: Insights from stable isotope signatures

Descarga Subaquática de Água Subterrânea no Sul de Portugal: Evidências a partir das assinaturas dos isótopos estáveis

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Submarine Groundwater Discharges (SGD) occur almost all around the world and are considered to be significant contributors of high nutrient concentrations to coastal waters. In the Algarve region (Southern Portugal), previous studies have measured high nitrate concentrations in runoff waters from intertidal sandy areas of the Ria Formosa barrier island lagoonal system. However, the subterranean estuary that develops under the actual lagoonal environment interferes on most of the groundwater geochemical characteristics enabling the use of several tracers such as salinity and nitrate concentrations. The present work focuses therefore on the use of water oxygen and hydrogen stable isotopes ($\delta^{18}O$ and δD, respectively) for assessing water mass signatures and verifying the hypothesis of freshwater aquifer continental source to the lagoon. Accordingly, we analyzed waters from mainland boreholes, coastal seawater, lagoon main channel, beach surface runoff and beach pore-water. These samples include possible sources as well as the shallow subterranean estuary close to the beach face. Our results show that i) aquifer isotopic signatures are in agreement with the mean meteoric water data from the region based on the Faro station used by the International Atomic Energy Agency; ii) lagoonal main channel waters lies on the Faro Local Meteoric Water Line and represents the second end-member of the observed mixing line, and iii) beach pore-waters are on the mixing line between groundwater and the lagoon main channel, supporting the hypothesis of an existing subterranean estuary, in which there is a non negligible lagoon water recirculation.

Keywords: *SGD, $\delta^{18}O$, δD, tidal coastal lagoon, Algarve.*

Radionuclides in the NE Atlantic Ocean and sediment accumulation

Radionuclidos no oceano Atlântico Nordeste e acumulação nos sedimentos

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Radioactivity is present in all oceans and naturally-occurring radionuclides, such as 238U, 234U, 230Th, 226Ra, 210Pb, 210Po and 232Th can be useful tracers for large scale biogeochemical cycles. The distribution of their activity concentrations allowed modeling the cycling of these radionuclides in the water column and the computation of average residence times of dissolved 210Pb and 210Po in the upper layer at 5y and 1 y, respectively, and 0.6 y in the particulate phase for both radionuclides. In the deep ocean water layer, soluble 210Pb and 210Po mean residence times were 42y and 2y, respectively. The calculated 210Pb deposition flux at the abyssal sea floor is comparable with the flux derived from the 210Pb-excess inventory measured in NE Atlantic bottom sediments, and about 100 Bq m-2 y-1. The 210Pb atmospheric deposition flux at the ocean surface in this region was estimated at about 74 Bq m-2 y-1 and the 210Pb sink in the Northeast Atlantic is discussed. The overall cycling and activity balance of these radionuclides in the NE Atlantic is outlined. Although used to determine sediment accumulation rates in shallow waters, the 210Pb excess method is not suitable for dating of deep sea sediments. The sediment accumulation rates of deep sea sediments near the Iberia margin were determined using 14C dating and 230Th excess/232Th radionuclides and these geo chronology methods are discussed.

Palavras chave: urânio, polónio, chumbo, tempo média de residência, taxa de sedimentação.
Keywords: *uranium, polonium, lead, mean residence time, sedimentation rates.*

Biogeochemical drivers of phosphatase activity in salt marsh sediments

Influência dos factores biogeoquímicos na actividade da fosfatase em sedimentos de sapal

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Although nitrogen has become a major concern for wetlands scientists dealing with eutrophication problems, phosphorous represent another key element as well as its biogeochemical cycling. Microbial

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