



Potential Offshore Submarine Groundwater in the Albufeira-Ribeira de Quarteira aquifer system (Algarve, Portugal)

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The Albufeira-Ribeira de Quarteira aquifer system on the south coast of Portugal is an important source of groundwater for agriculture and tourism, as well as contributing to significant freshwater discharge along the coast in the form of inter- and sub-tidal springs and maintaining groundwater dependent ecosystems along the Quarteira stream. Submarine groundwater discharge (SGD) in the area was investigated within the scope of a multidisciplinary research project FREEZE (PTDC/MAR/102030/2008) which aimed to identify and characterize the effects of the hydrological/hydrogeological conditions on associated ecosystems. As well as near shore submarine springs, signs of SGD were found several kilometres from the shoreline during offshore CTD and geophysical surveys. On-land geophysical and offshore seismic surveys supplied data to update the 3D hydrogeological conceptual model of the aquifer system. Numerical models were applied to test the possibility of an offshore continuation of fresh groundwater over several kilometres under local conditions. Due to the high computational demand of variable density modelling, in an initial phase simplified 2D cross section models were used to test the conceptual model and reduce uncertainty in regards to model parameters. Results confirm the potential for SGD several kilometres from the coast within a range of acceptable values of hydraulic conductivity and recharge of the system. This represents the initial step in developing and calibrating a 3D regional scale model of the system, which aims to supply an estimate of the spatial distribution of SGD as well as serve as a decision support tool for the local water resources management agency.