

The use of multi-level pressure and salinity data to understand freshwater-lens dynamics

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ABSTRACT

In this contribution we present the results of field measurements made using a multi-level sampling device to characterise the vertical variation of groundwater pressure and salinity in a siliciclastic aquifer below a tiny island in the Ria de Aveiro lagoon in Portugal. The setup and installation of the system are described, and the results of an experiment where pressure and salinity were measured at regular time intervals during a tidal cycle will be presented. The dual nature of the vertical pressure gradients suggests that there is a distinct two-layer behaviour, with gradients being much higher at shallow depths (up to 4 metres below the ground surface) than at deeper depths (more than 4 metres below the ground surface). The hydraulic conductivity is estimated using the vertical displacement of the groundwater, which is inferred from the variations of the salinity with time, in combination with the measured pressure gradients. Finally, the implications of the layered nature of the aquifer for the conceptual and numerical model of the island aquifer are discussed.

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