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Extended Abstracts

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Environmental and artificial tracers in hydrogeology

title: **The distribution of saline groundwater and its relation to the hydraulic conditions of aquifers and aquitards, examples from Israel**

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This study deals with the effect of separation by aquitard layers on the hydraulic conditions and distribution of saline groundwater in coastal aquifers. Two examples of Israeli coastal aquifers are given, the Mediterranean Sea and the Dead Sea, both are built of several sub-aquifers. The clayey aquitard layers in the Dead Sea area form vertical separation even in cases where its thickness is only ~1 meter. This is exhibited by large differences in hydraulic heads (2–5 m differences), salinity (TDS = 50–350 g/l) and chemical composition (e.g. Na/Cl variations in the range of 0.30–0.55). Spatial variability in salinity, on the horizontal dimension, occurs in this aquifer due to variability representing the sediments according to the specific location in the alluvial fan (gravel at the active flow and clayey material away from the flow stream).

Similar feature is evidenced in the Mediterranean coastal aquifer, although the separating aquitard layers are thicker (~5–10 meters). Here, the different sub-aquifers host groundwater of different ages (variation ^{14}C ages from several tens to thousands years), as well as different chemical compositions.

The main factors controlling the salinity of groundwater in specific sub-aquifers in coastal aquifers are its connection to the sea, existence of brines, salinization and flushing rates and separation by aquitard layers.

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