

Hydrogeology and Seawater Intrusion in the Arborea Plain (Sardinia, Italy)

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We have conducted a hydrogeological investigation in the coastal plain of Arborea, availing of a monitoring network comprising some 70 wells, selected from among the 600 or so that exist in the area. The Arborea plain, which extends over about 70 square kilometres across the Campidano plain in the Oristano region in central west Sardinia (Italy), has undergone profound modifications over the last century as a result of reclamation works that have upset the natural hydrogeological pattern in the area. This, along with the recurrent droughts of latter years, has led to seawater intrusion into the aquifers.

Field work consisted in logging water levels, electric conductivity and pH in the wells with a view to characterizing the aquifers.

The data collected concerning well characteristics and sampled waters have been processed and cross-correlated with the aid of a computer in order to check every possible combination of the factors governing the aquifers' behaviour in time and space. Bearing in mind the geologic and stratigraphic features of the area, a critical analysis of all the processed data allowed to recognize two main aquifers within the plain, well distinct as to both water quality and groundwater level, separated by a continuous clayey layer from 10 to 20 m thick.

In the unconfined aquifer sporadic seawater intrusion has been observed in zones near to the sea. By contrast, salinity of the groundwater in the confined aquifer, though low in the northern portion of the plain, reaches peaks of over 3000 mg/l in the southern part. This provides evidence of a broad front of seawater encroachment stretching inland from the coastline up the plain as far as the eastern boundary of the study area.

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