

## **Investigation of Sea Water Intrusion in the Ildırı Region (Çeşme-Turkey) Coastal Aquifer**

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### **ABSTRACT**

Coastal aquifers are considered to be significant sources of groundwater and are mostly under threat due to sea water intrusion as a result of anthropogenic (i.e., over exploitation, reduced recharge due to climate change, etc.) and natural sources (i.e., tectonic features and fault line orientations) in many parts of the world. Seawater intrusion is also a common problem on coastal aquifers of Turkey.

A perfect example to this problematic situation is experienced in the Ildırı (Çeşme) region which is located about 50 km to the west of the city of Izmir. Çeşme region is not only a significant spot for the city with regards to its tourism potential but also an area of important natural, historical and ecological heritage for the Mediterranean Region. The water supply for the town of Çeşme have been supported by the eight groundwater wells located in Ildırı region situated 22 km north-east of the Çeşme.

The hydrogeology of Ildırı region is fairly complex and is mostly characterized by highly permeable karstic formations with significant water storage in an otherwise water scarce area. The karstic aquifers of the region were recently found to be under severe salt water intrusion, which significantly altered the position of fresh water/sea water interface as a result of excessive pumping and fault lines cutting the karstic network.

In this study, geological, tectonically, hydrogeological and hydrochemical properties of the groundwater resources of Ildırı are evaluated and the status of salt water intrusion is assessed. The results indicated that significant levels of karstification in the carbonates of the region, created a number of karstic structures. These karstic structures are tectonically controlled and are oriented along EW and NNE directions. Karstic aquifers in Ildırı region were found to be affected by sea intrusion with electrical conductivity values reaching to levels as high as 3870 µS/cm, respectively.

**Keywords:** Coastal aquifer, groundwater, karstic aquifer, seawater intrusion, Ildırı

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