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**GROUNDWATER VULNERABILITY  
ASSESSMENT AND MAPPING**



**ABSTRACTS**

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## VULNERABILITY OF COASTAL AQUIFERS SUBJECTED TO ANTHROPOGENIC ACTIVITIES IN SOUTH-WESTERN SICILY, ITALY.

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This study was conducted in an area of about 900 km<sup>2</sup> situated between the north-western urban area of Marsala, south-west to Punta Granitola, the Gibellina ruins, Salaparuta in the north-east and south-east to Capo S. Marco.

The areas of hydrogeological interest are found in Castelvetro, Partanna, Campobello di Mazara and Mazara del Vallo where largely unconfined groundwater is contained in Pleistocene sandy calcarenites. Evidence of this can be attributed to the numerous well fields in the area.

In recent years, the area has been cultivated with crops requiring substantial water intake along with extensive vineyards planted beyond the old coastline between Marsala and Mazara del Vallo, inland to the hydrographic fluvial basin of the Delia, Modione and Belice sinistro rivers.

The increased need for irrigation progressively gave way to the drilling of numerous uncontrolled illegal wells; in some areas exceeding 10 wells per km<sup>2</sup>. The same situation repeats itself on the coastline when the population increases in the summer months. As a result, the hydrological resources are reduced in quantity leading to the quality impoverishment largely caused by seawater intrusion.

The area near Capo Granitola reveals evidence of diffuse submarine groundwater discharge documented through infrared survey.

The gypsum reliefs in the area, for example in the upper Santa Ninfa, indicates the presence of numerous karst forms that act as conduit systems creating preferential flow paths of possible contaminants. A non-karst layer above gypsum deposits has activated collapse phenomena resulting in saline lake formations near the Mazara urban area and the Delia river estuary (Lake Preola, Gorgi Tondi) due to seawater intrusion.

In conclusion, this study reveals important environmental impact in areas subject to intense anthropogenic activity. The assessment of this area should be indicated in a report like that drawn up by the U.O. 4.17 of the G.N.D.C.I of C.N.R to determine areas extremely vulnerable to contamination. These reports are an essential part of urban planning and growth-management purposes insuring the protection of the hydro-geological resources.

