



## **Analysis of the response to rainfall of Apulian aquifer in relation to their geological characters**

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The study regards the recharge of two groundwater system in Apulia region (Southern Italy) that can be considered as examples of the two kind of aquifer that are present in Southern Apulia region.

The first one is the surficial aquifer hosted in the recessive alluvial deposits of Brindisi plain (Polemio e Ricchetti, 1996). It is a local aquifer supplied only by direct rainfall. The second one a large coastal aquifer hosted in the cretaceous fissured and karsted limestone of Salento peninsula (Cotecchia, 1977). The behaviour of piezometric level has been obtained on the base of data measured in two phreatic level gouge station of the ex National Hydrographical Office.

1. phreatic level gouge station - *Casa Cantoniera (Via Appia km 717);*
2. phreatic level gouge station - *Lecce (Scuola Agraria).*

For this two phreatic level gouge station are available a long series of data. Two data a week of piezometric level for about 44 years (1952-1996) that have made it possible to made a lot of evaluation on the behaviour of the aquifer in relation to rainfall.

In Brindisi surficial aquifer the maximum phreatic level are reached in march April and the recharge is more intense moving from Autumn to Winter. Intense rainfall during the Autumn or Winter period saturate the surficial strata so that infiltration become much more difficult, so that intense period are not able to recharge the aquifer. On the contrary intense rainfall in dry period can give a contribution to groundwater

because water can percolate through fracture opened as a consequence of shrinkage of soil. Prolonged not intense rainfall gives always a recharge to groundwater. An analysis of the periodic stochastic component has shown that the unsaturated soil is a sort of filter to the response of groundwater to rainfall that made it possible the flow of low frequency (not intense rainfall well distributed) and stops high frequencies (intense rainfall).

Lecce karst coastal aquifer as a different behaviour specially in relation to the intense rainfall. For this aquifer intense rainfall always give a clear influence on groundwater level. It is due to the high permeability of fractured and karsted limestone where groundwater is hosted. In this aquifer there is a minimum level during the summer season, while there is not a clear maximum because after the dry period there is a quite rapid increase of groundwater level.

For both aquifer long period analysis has shown that there is a trend in lowering of piezometric level in certain accord with lowering of rainfall amount. The lowering is about 1 m in Brindisi surficial aquifer and about 60 cm for Lecce coastal aquifer. This last value is particularly worrying because in a coastal aquifer it means that the position of the interface has had a variation of about 20 m with a severe pauperizing of deep groundwater resources.