



## **Studies aimed at protecting and safeguarding the deep water table in the Apulian karst, S Italy**

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Apulia, the south-eastern sector of Italy, consisting of a elongated peninsula known as the “heel of the Italian boot” for its configuration, is almost entirely karst, due to widespread outcropping of carbonates, which make up the entire structure of the region with a thick sequence of mostly Cretaceous limestones. The deep aquifers in Apulia are subjected to a variety of threats leading to likely pollution, the first one being marine intrusion processes: the high tourist vocation of the area results in the summer months in a very heavy presence along the Apulian coastlines, with a consequent impressive increase in the demand of water. Further, fragility of the karst setting, combined with several other negative actions produced by human activities (soil and water contamination, illegal waste disposal, etc.), are at the origin of many episodes of pollution in the region.

Recently, Apulia Region funded a project dedicated to evaluation of the quantity and quality of the groundwater resources, starting from the study and analysis of those karst systems which directly connect the surface with the deep aquifer. This situation occurs in Apulia at two sites: the first in the central sector of the region (Low Murge), and specifically in a polje named Canale di Pirro, whilst the second is located in the southern part of Apulia (Salento).

Within the Canale di Pirro polje, excavating a swallow hole known since the 1960's but never explored in detail, allowed a few years ago to discover a huge cave system, entirely developed in the Cretaceous limestones, which now reaches the water table at depth of -264 meters; diving explorations brought the total depth of the cave down to -324 meters. The cave consists of a series of vertical shafts, rapidly reaching about 100 m below the surface, before developing through a mostly sub-horizontal course, gradually deepening until reaching the final, 100 m-deep, shaft, which bottom is occupied by the water table. Huge spaces and wide shafts characterize the system, which has become the deepest cave in Apulia, with explorations still ongoing.

In Salento, Vora Bosco is the other study site, where the water table is reached at depth of -72 m from the surface, after crossing the whole geological succession, in this case consisting of Quaternary Deposits, Plio-Pleistocene and Miocene calcarenites, before reaching in the very final meters of the cave the Cretaceous bedrock.

This contribution illustrates the activities so far carried out during the project, with a particular focus on geology, morphology and structural geology of the cave systems and their surrounding areas, together with hydrogeological research and chemical analyses of the groundwater.