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Karst geomorphology of the “Canale di Pirro” polje, Apulia (Southern Italy)

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In karst environment, a geomorphological map is a powerful instrument, which play a crucial role in understanding earth surface processes and landscape evolution. Furthermore, it could be very useful for speleological perspectives, natural resources exploitation and geo-hazards management (flood, sinkhole, subsidence, etc.), providing useful information that enhance the knowledge of the territory.
In this work, we present a geomorphological map of the polje of “Canale di Pirro”, sited in the central part of Apulia Region, in Southern Italy, among the most interesting karst lands in the Mediterranean area. The map covers 150 km2 with an elevation range of 100-450 m a.s.l. This area is one of the most remarkable karst landforms in the region, characterized underground by a very interesting system of caves, that reaches the water table at a depth of -264 meters. The karst system, known as “Inghiottitoio di Masseria Rotolo”, following scuba-diving exploration below the water table, has become with a depth of 324 m, the deepest known cave in Apulia. The polje is bounded on both sides by tectonically-controlled ridges, showing an overall length of some 12 km. In ancient maps, dating back to the 16th century, the area is represented as crossed by a long river, called Cana.
The map obtained derives from the integration of interpretation of aerial photographs, analysis of a digital elevation model and field surveys in order to obtain a correct distribution of landforms and fluvial processes, such as different varieties of karst depressions, conical hills, erosional gullies, alluvial fans and tectonic structures. It provides relevant information about the surface drainage processes, and for understanding, among other things, the groundwater circulation and the related recharge processes.
This geomorphological map is part of a wider project, that combined geological, hydrogeological research and chemical analyses of the groundwater. It provides support to the ongoing studies of this part of Apulia region aimed to better understand the geological processes that originated the polje and its later evolution, and the related underground cave system. Further, it might also suggest possible improvements in land management and in the future choice of useful tools for the control of the quality and quantity of karst groundwater.