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GIS thematic layers for assessing karst hazard in Murgia region (Italy)

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The assessment of karst hazard in a carbonate area may be somewhat complex for the multiplicity of involved factors (geological, hydrological, morphological, anthropogenic, etc.), their history and the slow rate of evolution of the processes. In coastal areas, moreover, the long term sea level variations and the short term oscillations generally influence the generation and evolution of the karst process.
Another peculiarity of the karst hazard assessment consists in the difficulty for identifying the location of subsurface forms, which may develop over very large areas without any kind of surface signal.
The karst processes and landforms often require specific methods of investigation and mitigation, due to the unique and highly variable characters of karst environments. In addition, the hidden character of the karst processes, often accelerated by human activity, is an issue with significant economic impact, affecting many regions of the world.
The assessment of karst hazard in the Murgia plateau (in central-west of Apulia region) is the main goal of this research.
For this aim, the typologies of karst phenomena, able to produce hazard in the study area, were individuated and collected in a specific database.
The hazard was evaluated on the basis of the probability of occurrence of a phenomenon of instability, active (produced by human activities) or passive (natural evolution of karst process), in relation to the presence, evolution or generation of karst forms on surface or at critical distance from the surface. The critical distance from the surface is defined as the distance at which the local or general destructive evolution of a karst process can produce a variation of the usability of the area or of the value of elements involved in the instability.
The thematic layers relative to the factors influencing karst processes and landforms (doline, sinkholes, polje, lame, gravine, caves) were elaborated and managed in a GIS system.
The archives of the main karst landforms were reviewed by crossing different cartographic information.
Appropriated spatial buffers were defined around the landforms, according to the type of karst phenomenon and to the elevation of the karst forms, as recognized by previous researches.
Finally, the karst hazard map was obtained by using an heuristic model that includes all the basic thematic layers.