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Sinkhole mechanisms in the Apulian karst

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Sinkholes constitute a significant risk in many karst areas worldwide, and may even threat human safety. Collapse sinkholes, in particular, that occur catastrophically without showing any premonitory sign may result in severe economic losses and casualties. In the last years, research on sinkholes and the related detrimental effects has significantly increased in Italy, in the aftermath of remarkable events in different sectors of the country. Many events certainly occurred in Apulia region, SE Italy, that is a region almost entirely made of carbonate rocks, ranging in age from Triassic to Cretaceous limestones and dolostones to Plio-Pleistocene calcarenites and Quaternary terraced deposits. Due to widespread presence of carbonates, the region is strongly affected by different types of sinkholes, related to both the natural karst setting and the presence of a high number of karst caves.

To the sinkholes of natural origin, those related to artificial cavities, that is voids excavated by man underground for a variety of purposes, have to be added. In the last decades, in particular, anthropogenic sinkholes have repeatedly affected many Apulian towns, due to the fact that urban expansion often moved toward those areas where in the past artificial cavities had been excavated. The interaction among present urban areas and infrastructures with the network of artificial cavities has to be carefully managed, in terms of land planning and safeguard of private and public properties.

Based upon a well documented sequence of sinkhole events, covering a time span of several decades, an overview of the main sinkhole mechanisms in Apulia is here presented, aimed at highlighting the related hazard, and the possible risk to society as well. Some recent examples of sinkholes will be dealt with in detail, covering the different settings where they develop, from the low coastlines, to inland karst, and eventually to urban areas.