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Hazard and environmental impact of underground quarrying in karst areas

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The Murge area is represented by a NW-SE trending karstic plateau whose elevation decreases toward the northeast from about 680 m a.s.l. (“Murge alte”) down to the Adriatic sea (“Murge basse” and Apulian Adriatic shelf). The natural landscape is typical of a low-relief karst very rich in dolines, caves, conduits and slightly incised valleys, the latter locally called “lame”.

The karstic plateau is characterised by a 3-km thick Cretaceous carbonate succession, mainly made up of limestones and dolostones developed in a broad inner-platform system, overlain by discontinuous and thin Late Pliocene-Quaternary deposits belonging to the Bradanic Trough sedimentary cycle.

The peculiar geologic setting has favoured today, as in the past, an intense extractive activity, principally localized in open pit and, subordinately, in underground quarries. The methods of opening and excavating the pit, hole and cutting quarries differ according to the morphology and geology of the locality.

Several quarries are still active, while, on the other hand, a number of them has been abandoned. In particular, the abandoned underground quarries of Canosa di Puglia (“Pietra Caduta” locality), which give a powerful impression of the hard work required to extract material from them, induced relevant environmental alteration and damages, and high hazards as regards instability processes. Here, in fact, tunnels have been dug on various levels and create serious problems of roof stability.

This paper deals mostly with the analysis of the factors controlling the stability of these underground openings in soft and porous calcarenites. Examples of failure mech-

anisms and modes are illustrated at different scales.