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Monitoring the rockfall hazard of the Montagna Spaccata, Gaeta, sea cliff

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The Gaeta promontory in the Tyrrhenian side of central Italy is characterized by a more than 100 m high vertical cliff, which extends for at least 1.5 km of coast. The promontory is a structural high bounded by NE-SW and NW-SE-trending normal faults, made of Late Cretaceous inner shelf carbonate deposits, with strata gently dipping to NE. Along the cliff, large fractures, often corresponding to normal faults, determine narrow and deep incisions (from here the name of the cliff originates, standing montagna spaccata for “broken mountain”); these weakness zones are sometimes preferred sites of karstic dissolution, whose best and most famous example is the gigantic vault of the Grotta del Turco. At the western side of the cliff the most popular beach of Gaeta stands, the Serapo. The important harbour of Gaeta is on its eastern side. The submerged portion of the cliff plunges for at least 15-20 meters. The fracture network and the karst development determine a number of even very large blocks, whose stability is evidently modest and needs to be carefully assessed by means of appropriate investigations, including geodetic monitoring and geomechanic analysis. Careful stability analyses and modelling of induced waves are needed because the sea area and the coast is densely frequented, specially in the summer season. Moreover, part of the cliff is a preferred climbing site. Such monitoring system, which will include also submarine prospecting to detect fossil rockfalls, is now under development by APAT.