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## Different varieties of black marble from “Monregalese” district in Piedmont (Italy)

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In Piedmont, where five main quarry districts can be recognized (Barale et al 2020), Maritime and Ligurian Alps, corresponding to the mountain area of southern Piedmont and characterized by a wide variety of marble and sedimentary carbonate rocks, includes the historic ‘Monregalese’ district (G.A.L. Mongioie, 2005).

Among the several varieties of “Monregalese” marble exploited in the past, Nero di Frabosa, Nero Nuvolato di Miroglio, Nero Vallone, Nero di Ormea and Nero di Garresio are black marble known and identified in Piedmont Cultural Heritage. These varieties of marble come from a small portion of the Mesozoic carbonate succession called Calcari di Rio di Nava and referable to the Middle Jurassic (Dogger). The entire stratigraphic series of the Brianzonese area consists of a limestone-dolomitic sequence of Trias, greater than 300 m in thickness, followed by pure Jurassic limestones (about 100 m thick) and Cretaceous marly-arenaceous limestones (thickness greater than 150 m). In the innermost sector of the Alpine chain, metamorphism and tectonic deformation were much more intense than in the outer portion. The result of this deformation is a high fragmentation of the entire stratigraphic succession with the formation of flakes and bands of carbonate rocks with sharply vertical geometries and small dimensions that alternate with the quartzites and metavulcanites of the base. The succession of Rio di Nava limestones consisting of dark limestones with abundant organic substance and the presence of levels rich in bioclasts, with an original thickness of about 50 meters, was affected by this metamorphic phase, originating the aforementioned Monregalese black marble varieties.

Nero di Frabosa has been employed in lower part of the Chapel of the Shroud (Turin), Vicoforte Sanctuary; Church of San Giorgio (Frabosa Sottana); Nero Nuvolato in the Mussocco cemetery (Milan), in the Church of San Madre di Dio (Turin); Nero Vallone in the Church of Santa Maria Assunta (Montaldo).

From the technical documents there are informations only on the employ in the past years of Nero Garessio (and none related to Nero di Ormea), characterized by numerous and thin white veins. Nero di Ormea differs from it for the darker color of the veins. All these black marble were used inside therefore their resistance to weathering is not well known. Only for Nero di Ormea, the last quarried one, there are data on ageing tests in order to assess their suitability to be used outside and not only for inner and aesthetical purpose.

