

Paleotectonics in the Euganean hills (Venetian region, Italy)

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In the Euganean Hills, near Arquà Petrarca (Padova), discontinuous layers of whitish incohesive material crop out. These layers are along south-vergent slip planes within Scaglia Rossa and underlying Maiolica, which both are Cretaceous in age.

In the Monte Bignago area (Arquà Petrarca) the whitish incohesive (flour-like) material extends up to 15.00–20.00 m with a thickness of 0.05–0.40 m within Scaglia Rossa, also affected by metric asymmetric folds. The incohesive material (cataclasite) found in the Maiolica is few meters long and 0.10–0.20 m thick. The paleontologic, mineralogical and chemical compositions of these flour-like materials and cataclasite confirmed similar compositions between the flour-like material and the surrounding rocks.

The geotechnical properties of these flour-like material has been investigated and compared with the characteristics of the surrounding cohesive rocks. The mechanical properties have been investigated in the Laboratory of the Geological Survey of the Trento Province to verify their behavior when submitted to stress. Uniaxial compression tests have evidenced high difference in compressive strength of Scaglia Rossa and Maiolica, respectively 105.6 MPa and 28.7 MPa. No flour-like material was produced during these tests. Ring shear test performed on powder produced from Scaglia Rossa showed a high friction angle, about 35°, which is coherent with the mechanical response of the tested samples.

Moreover, a seismic analysis carried out above the gouge layer has evidenced P-wave velocity of about 300–400 m/s, reaching values up to 2000 m/s in depth.

The geological process that has created these flour-like materials is interpreted as likely related to tectonic activity related to south-verging thrusts in relation with the opposite Northern Appenines activity along the section Arquà Petrarca- Mirandola.