



The Dinaric fault system in the Gulf of Trieste (Northern Adriatic)

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The setting of the Dinaric fault system and its tectonic and neotectonic activity has been recently identified in the Gulf of Trieste (Northern Adriatic), using 525 km of multichannel seismic profiles acquired in 2005 and 2009 by OGS.

The Gulf of Trieste area belongs to the northernmost part of the NW-SE External Dinaric foreland. In particular, the gulf represent the foredeep constituted by the flexured Mesozoic - Paleogenetic carbonate Friuli Platform, and filled by the Eocene turbidites, both also outcropping onland. The Dinaric faults present in the area are at the eastward coastal side of the gulf, the Karst frontal ramp of the External Dinaric (the Trieste Fault), southward in the Istria Peninsula, with the Črni Kal, Buzet, Hrastovlje, and Gračišće Thrusts, and norhtward the thrusts buried below the Friuli Plain, as the Palmanova Line.

The geological setting identified from the dataset is constituted by the tilted Mesozoic Carbonate Platform reaching depths of more than 1200 metres to the East at the Karst frontal ramp, and a minimum depth of 350 m in the centre of the gulf, with the shelf margin characterised by the NW-SE Dinaric trend, with minor indentations southward with a NE-SW orientation, as the saw-toothed NW-SE Dinaric and NE-SW antidiaric trends present on land. The filling of the foreland consists of the Eocene turbidites of the “Flysch”, with a marked erosive surface at the top from Late Miocene (Messinian) to Early Pliocene, and overlying by Quaternary marine and continental sediment.

Evidence of a Dinaric fault system in the Gulf of Trieste correlated to onshore structures, have been identified, and it consist of: a) at the coastal area, the Karst frontal ramp (Trieste Fault), with a deformation zone of about 2-3 km wide and more than 1500 m of vertical displacement of the carbonates buried below the gulf and outcropping onland: b) across the gulf, the occurrence of Dinaric compressive/transpressive feature with fault strands that affects also the Quaternary sediment, and in some case almost up to the sea floor. The South-Eastern part of the thrust system links up to the Hrastovlje Thrust presents onland in the Istria Peninsula.

The tectonic deformation of Late Quaternary sediment provide an unique information in the area, as the lack of neotectonic activity evidence onland has suggested, up to now, that the overall area is tectonically quite inactive or poorly active. Moreover, despite the Gulf of Trieste area is surrounded by seismogenetic zones (Dinaric faults in Slovenia and Croatia and also Alpine faults in the Friuli area), from the historical and instrumental seismicity catalogues, it has been considered to have low seismicity, as only low magnitude and shallow events has been recorded. However, the occurrence of neotectonic deformation of the Dinaric thrusts provide new insights into possible seismogenetic activity.