



## **Active faulting and related tsunami in Eastern Sicily and southern Calabria**

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The Calabrian arc and eastern Sicily are currently affected by large earthquakes and by an intense volcanic activity. This region is affected by extensional tectonics characterized by a regional ESE-WNW extension direction. The main regional feature in this area is given by a prominent normal fault belt that runs more or less continuously for a total length of about 370 km along the inner side of the Calabrian arc, extending through the Strait of Messina along the Ionian coast of Sicily as far as the Hyblean Plateau. The distinct fault segments are characterized by a very young morphology and control both the major mountain fronts of the region (Catena Costiera, Sila, Serre, Aspromonte, Peloritani, Hyblean plateau), and the coastline of southern Calabria and eastern Sicily. The different fault segments are responsible for the large earthquakes ( $M \geq 7$ ) that have occurred in this region as the seismic sequences of 1783 in Southern Calabria and of 1693 in the Eastern Sicily, and the 1905 (Monteleone) and 1908 (Messina) earthquakes. These events were caused by slip along 30-40 km long normal fault segments mainly located off-shore that also generated the largest tsunamis ever occurred in the southern Italy. The January 11<sup>th</sup> 1693 earthquake was generated by the slip of a normal fault extending about 12 km off-shore from Catania to Siracusa and caused a large tsunami that devastated the entire coast from Messina to Siracusa with waves which reached heights of 30 cubits (about 12 meters). The February 6<sup>th</sup> 1783 earthquake was triggered by a displacement occurred along a fault located along the coast from Villa S. Giovanni to Palmi and generated a tsunami that, with waves reaching heights of 6-9 meters, destroyed all the villages placed along the Straits of Messina. The 1905 Monteleone earthquake has been attributed to a slip that occurred along a fault segment located on the off-shore of Capo Vaticano peninsula. The main shock was followed by a large tsunami that hit the northern coast of the peninsula

with a few meters high waves. Finally the most recent and known tsunami occurred during the 1908 Messina earthquake that has been related to a rupture along the west facing Reggio fault that partially extends off-shore south of Reggio Calabria. This event was characterized by waves that reached the maximum heights of 13 meters in the Calabrian side of the Straits of Messina, inundating large portions of the eastern Sicily coast. Eastern Sicily and south-western Calabria are thus the most seismically active areas of the central Mediterranean characterized by normal faulting that, mainly occurring off-shore, also cause large destructive tsunamis.