



Morphological Effects of historical Tsunamis along the Coast of Apulia Region  
(southern Italy)

**G. Mastronuzzi**(1), P. Sansò(2)

(1) Dipartimento di Geologia e Geofisica, Bari University, Italy, e-mail:  
g.mastrozz@geo.uniba.it

(2) Osservatorio di Chimica, Fisica e Geologia ambientali, Dip. di Scienza dei Materiali, Lecce University, Italy, e-mail: paolo.sanso@unile.it.

Apulian region stretches for 350 km in the southern part of Italy, between the Adriatic and the Ionian Seas. It is a low seismic region surrounded by highly seismic zones: the coast of Albania and Ionian Islands (western Greece) to the east, the Calabrian arc and southern Apennines to the west, and the Gargano promontory to the north. Seismic activity has been responsible for the recording of numerous earthquakes in this region during the last millennium and can explain the historical tsunamis which have struck the southern Adriatic and Ionian coasts.

The geomorphological survey of the Apulian coastal landscape points out the occurrence of peculiar landforms that would suggest the action of tsunamis during the Holocene.

At the northern coast of Apulia region (Gargano Promontory) four wide washover fans mark the sandy coastal barrier which divides the Lesina Lake from the Adriatic Sea. They would be formed by seismic waves rushed into the lake through coseismic cracks which affected the barrier. Morphological analysis and radiocarbon age determinations reveals that three distinct tsunamis struck the barrier about 2430 years BP and in connection with the strong earthquakes occurred the 493 AD and the 30 July 1627.

In several localities of southern Apulia, a decimetric layer made of marine laminated sands containing pumice, cuttlebones and coals has been detected inside the foredune

at about 1.7 m above m.s.l., interbedded to aeolian sands with pulmonate gastropods. A number of radiocarbon age determination suggest a very recent age for this event.

Along low sloping rocky coasts of southern Apulia large boulders accumulations have been found. Boulders are arranged either isolated, in small groups or rows composed of a few imbricated elements. The lower surface of some of the boulders is covered by biogenic encrustation which suggests that they were possibly carved from the mid or sublittoral zone and that they capsized during their transport. Other boulders, detached from the supratidal zone, have their surface affected by tilted rock pools; new, horizontal solution pans are continually forming.

A detailed survey of a large boulder accumulation was carried out at Torre Santa Sabina, along the Adriatic coast of Apulia. Collated data from both the survey and the direct observations including some radiocarbon age determinations and hydrodynamic calculations suggest that the studied accumulation was due to the superimposed effects of one or two tsunamis as well as of storm waves. The collated data suggest that two tsunamis may have recently struck the Adriatic coast of southern Apulia. The first possibly took place on the Dalmatian coast as a result of the earthquake on the 6th of April 1667 which destroyed Ragusa (modern day Dubrovnik). The second tsunami would have accompanied the strong earthquake which hit southern Apulia on the 20th of February 1743.

Along the Ionian side, slabs of Pleistocene calcarenites, up to 80 t in weight, were carved and scattered up to 1.8 m above m.s.l. and positioned as much as 40 metres inland; their presence is assumed to be directly related to a tsunami which was most likely caused by a submarine landslide triggered by the earthquake occurred the 5<sup>th</sup> of December 1456.

The geomorphological research reveals that the Apulian coast has been affected by the destructive action of tsunamis several times in historical times. Moreover, it points out the incompleteness of historical reports about these catastrophic events since the Apulian coastal area was generally deserted because of malaria disease until the XIX century.