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Ground deformations along Ionian coastline of the northern Calabria (Southern Italy) from Capo Trionto to Capo Colonna detected by InSAR data

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The study area is located along the Ionian coast of the northern Calabrian Arc, in correspondence of the Crotone and Spartivento fore-arc basins. The investigated coastal area represents the western margin of the Gulf of Taranto. The seafloor of this sector has been investigated by several authors during the last three decades and is characterized by numerous submarine depositional systems strictly related to main drainage basins which feed into the Ionian Sea.
Northward, the area is limited by the Corigliano Canyon which connects the continental shelf with the Taranto Valley and separates the Cariati and Cirò Ridges. The latter is bounded, along its southern side, by the NW-SE trending Alice Canyon which reaches the inner continental shelf offshore Punta Alice and is not related to an onshore drainage system. Southward, the wide Neto-Lipuda Canyons system originates close to the coastline and is connected to the Neto and Lipuda Rivers. Toward South, this system is separated from the Esaro Canyon by the Luna-Hera Lacinia High. The southernmost canyon is connected to the Esaro River and runs subparallel to the coastline.
Previous authors have been highlighted ground deformations, with sometimes associated km-long surface fractures and damages to buildings, in the Cirò coastal plain and in the area southward from Crotone. The cause of these deformation is attributed to megaslides.
The multi-temporal (1958, 1985, 1998, 2008) analysis of the coastline variations shows a general erosive trend characterized by m and dm coastline retreats.
We applied the multi-temporal StaMPS SBAS technique for two SAR datasets, one acquired from 2003 up to 2010 by Envisat ASAR instrument, and another from 1995 up to 2000 from the ERS satellite (ESA, European Space Agency) to investigate ground displacements in the studied coastal area.
The Up component (recording the vertical ground deformation) allows to identify the main subsidence areas in correspondence of the Capo Colonna promontory, Punta Alice, the deltas of the Neto and Nicà Rivers, the Crotone, Cirò Marina and Cariati harbours.
The East component (recording the horizontal ground deformation) shows a weak stability/eastward movements from Capo Trionto to the mouth of the Esaro River, while the coastal sector moving southward from Crotone city records an eastward displacement.
In addition to SAR data, we have used a set of aerial photogrammetric scenes collected in the time span 1940-2007. Therefore we have reconstructed in detail the timing of the continuous changes of the coastlines in the areas of Punta Alice due to vertical land deformation and sea level change.
Our preliminary results allow to suppose a correlation between ground deformations of the coastal area and the morphobathimetric setting and evolution (e.g., canyon head retreat) of the offshore sector.