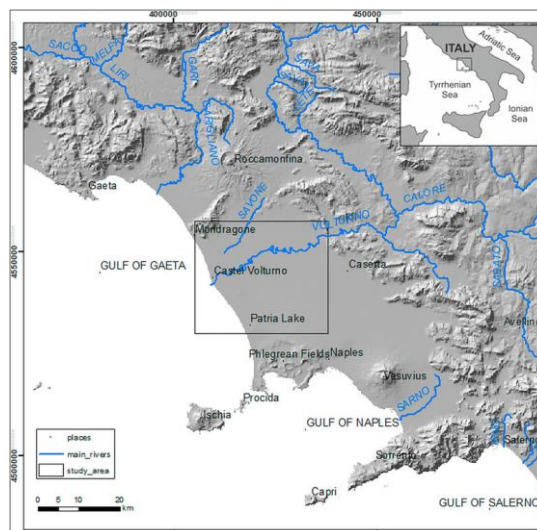


Subsidence and recent landscape evolution at Volturno Coastal Plain (Italy)

Summary

Alluvial plains along the coasts of the Mediterranean Sea are susceptible to subsidence due to natural sediment compaction, tectonic forces, urban growth and over-exploitation of groundwater resources. Subsidence process may largely affect coastal landscapes, especially in areas with compressible deposits in the subsoil. In this article, the historical changes of landscape (from 1600 to present) and the vertical ground movement (in the last 30 years) of Volturno Coastal Plain (VCP) were analyzed to shed light on the possible relations between the location of subsiding lands and the landscape changes in the last centuries mainly due to land reclamation works. To this aim, historical maps, satellite images, and radar interferometric vertical ground deformation datasets were acquired and integrated in a geographic information system. The historical cartography allowed to outline the landscape changes of coastal plain features that took place mainly in the marshy and swampy areas and in the dune system before and after the reclamation works. Ground deformation trends have been assessed between 1992 and 2021 based on processing several radar satellite data with Synthetic Aperture Radar Differential Interferometry (DInSAR) techniques. Vector and grid analysis tools have been used to draw features of past landscapes, to continuously represent the vertical movement of soil and to compare the available data. Before the mid-1950s, anthropogenic activity was limited and not associated with active subsidence processes in the marshes and lacustrine areas. However, in recent decades, satellite radar interferometric data show that high subsidence areas in the middle and lower sectors of Volturno Coastal Plain (VCP) are locally enhanced by anthropogenic activity. It is noteworthy that the subsidence of VCP today is related to the cumulative effects of several processes that have developed at different temporal and spatial scales.



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