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Ground deformation and associated risk in the Gulf of Corinth (Greece)

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The potential of repeat-pass satellite SAR (Synthetic Aperture Radar) interferometry has been exploited to detect, map and characterize ground deformations in the western part of the Gulf of Corinth (Greece). The Gulf of Corinth separates the Peloponnesus from the continental Greece and the northern coast area of the Peloponnesian peninsula is identified as one of the most rapidly developed intercontinental rift in the Mediterranean region. Active deformations affect the whole study area caused by faults, sub-aerial and sub-marine earthquakes inducing landslides, changing drainage patterns and seismic activity, both historical and recent. ERS and Envisat dataset, covering the period from 1992 to 2008 have been analyzed at both local and wide scale, with the support of thematic maps (i.e. topographic, geomorphologic, geological and land use maps), high-resolution optical images (both aerial and satellite data) and in situ data. The combination of all data allowed to investigate wide urbanized and vegetated areas for the investigation of geological processes to obtain an accurate analysis of the phenomena (i.e. typology, spatial extension, causes and its temporal evolution). A landslide inventory map has been compiled for the study area, integrating, at the scale of single slope, satellite-based ground deformation measurements with geomorphological analysis of landforms, that is, coupling a new remote sensing technique with a conventional approach. Mapped landslides have been classified according to their type and state of activity. Furthermore, interferometric results have been analyzed at a basin scale as support for land subsidence mapping and for investigating of aseismic deformations of active faults.