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Ground deformation monitoring in the Corinth rift laboratory, Greece

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The rift of Corinth covers an area $\sim$ 120 km x 40 km in central Greece. It consists of a system of en-echelon normal faults, with segments 5 to 20 km long, mostly dipping to the north, with some antithetic normal faults.
Some 20 years of research has been done in the framework of several European and nationally funded projects. After 10 years dominated by temporary geophysical campaigns and geological fieldwork in the broader rift, a restricted area located at the western end of the rift between the cities of Aigion and Patras was defined in 2000 as the target for the Corinth Rift Laboratory (CRL) which is an international pilot site for continuous monitoring and multidisciplinary research on earthquake processes (see http://crlab.eu).
The motivation for launching the CRL was manifold:
- the Corinth rift is the most active continental seismic region of the Mediterranean basin, with 10 destructive (M>6) earthquakes per century, among which 4 in the selected region of CRL;
- it is one of the fastest opening continental rifts in the world, with an opening rate of 1.5 cm/year in the CRL research area;
- the eastern part of the CRL area was the site of the last destructive earthquake (M=6.2) in 1995, and of the large 1861 event (M=6.7);
- the central part of the CRL area has not ruptured since the last destructive earthquake of 1887;
- the western part of the CRL area, near the city of Patras, has no reported large earthquakes since at least 300 years and the faults there are thus the target of a medium term prediction of one or two destructive earthquakes within a couple of decades, but this is still not properly quantified.
Within the CRL research area continuous and campaigns monitoring for seismology, GPS, InSAR and strain provides an exceptional data base which is presently analysed by several teams and CRL will be one of the pilot sites of the European Plate Observing System (EPOS) initiative promoted by the EU.
The GPS network of the rift of Corinth was designed to map the deformation of the entire rift with a density allowing to sample each known active fault longer than a few kilometres. About one hundred points, occupied during long sessions (several days) in several campaigns constitute a first order network (accurate at the level of 2-3mm in each campaign), while approximately four hundred points measured during short sessions constitute a second order network (accurate at the level of 10-15mm). Five permanent stations were installed in 2002 in the CRL research area.
The main results of the twenty years of GPS observations will be presented and discussed in combination with the results obtained in almost the same period with InSAR.
This research has involved and involves a large number of researchers, technicians, students and collaborators from several countries.