



2003-2010 InSAR time series at Dallol, a proto-volcanic magmatic system in Afar (Ethiopia)

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Quaternary extension and volcanism in Afar focus along magmatic segments, like the Erta Ale Ridge. Here we study the ground deformation at Dallol, in northern Afar (Ethiopia) along the Afar rift axis. Dallol rift lies in a depressed area ~ 120 m below sea level, it includes a ~ 40 m high mound and an active hydrothermal field.

In 1993 a seismic swarm occurred NW of Dallol and was probably associated to a dyke intrusion. In 2004 another seismic swarm occurred SE of Dallol. In a previous study we used InSAR data to show that this seismicity was induced by a dyke intrusion in October 2004, probably fed by a shallow (1.5-3.3 km) magma chamber. Here we analyze the ground deformation at Dallol between 2003 and 2010, using InSAR time series computed with pi-rate software.

These data suggest that after the dyking event, during ~ 3 years, the mound slowly uplifted, until 2008, then subsided very quickly up to 2010.

Preliminary inversion of the InSAR data between 2008 and 2010 for the subsidence period shows a deformation source shallower than the dike source. We tested different sources (Mogi, ellipsoid, Sill). Depths vary between 0.8-1.8 km depending on the chosen source.

Preliminary analysis highlights a mean-term correlation (2007-2010) between long term deformations in Dallol and other volcanoes belonging to the Erta Ale Ridge.