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Anticorrelated ground deformation pattern between Mauna Loa and Kilauea

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The contrasting dynamics between Mauna Loa and Kilauea has been studied during the last 100 years from different points of view. In this work we used DInSAR and GPS datasets to analyze the complex ground deformation patterns associated to the activity of Mauna Loa and Kilauea volcanoes. We used a DInSAR dataset spanning the interval from 2005 to 2011 that consist of ascending and descending orbits images from ENVISAT satellite, with different look angles. Three tracks used in this study covers both volcanic edifices and were chosen from a total of 10 analyzed tracks.
To analyze DInSAR data we applied the Independent Component Analysis (ICA) to decompose the time-varying ground deformation pattern of both volcanoes. The results revealed a marked anticorrelated behavior in the ground deformation pattern of the summit areas of Mauna Loa and Kilauea.
We also analyzed a GPS dataset to support our results. In particular we calculated the areal strain on 15 triplets of stations for Kilauea and 11 for Mauna Loa. The GPS data confirmed the anticorrelation between the ground deformation pattern of these two Hawaiian volcanoes. These results indicate that, despite the petrology suggests two separate feeding systems for the volcanoes, the geodesy seems to indicate that, at some level, a connection between the magmatic reservoirs located beneath the volcanoes exists.