The 2012 Kilauea volcano, Hawai'i, slow-slip event captured by cGPS and satellite radar interferometry

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In the last decade or so, slow slip events (SSE) have been detected to occur along the southern flank of Kilauea volcano (Hawaii, USA). SSE have been recorded using continuous GPS stations and tiltmeters. Until now, no differential radar interferometry study has been presented conclusive results about the spatial pattern of vertical motion associated to these events, although GPS time series show a slight subsidence signal on the vertical component. Here, we use a dense network of continuous GPS stations and multiple different tracks from the Radarsat-2 satellite to map a nearly continuous ground deformation field during the 2012 SSE in the Southern flank of Kilauea. A fault-slip map associated to the 2012 SSE is inferred using elastic modelling of a realistic fault geometry of the decollement, the Koa'e fault system, Southwest and East rift zones and the caldera summit. The fault-slip distribution allow to simulate the elastic stress change due to the slip on the southern flank area. Stress change models are used to study the feedback relationship between intrusion of magma into the magmatic plumbing system and/or faulting/flank instability.

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