

Ground- and space-based monitoring reveal where magma has moved under Kīlauea Volcano

May 24, 2018

Kīlauea Volcano is currently erupting at two locations: from Halema‘uma‘u, a crater within the summit caldera, and from the lower East Rift Zone (LERZ) in and near the Leilani Estates and Lanipuna subdivisions.

Small explosive episodes at Kīlauea's summit are a consequence of [magma withdrawing from a shallow reservoir beneath the east margin of Halema‘uma‘u](#). The eruption of lava along the LERZ resulted from the underground movement of [magma](#) eastward from the volcano's middle East Rift Zone.

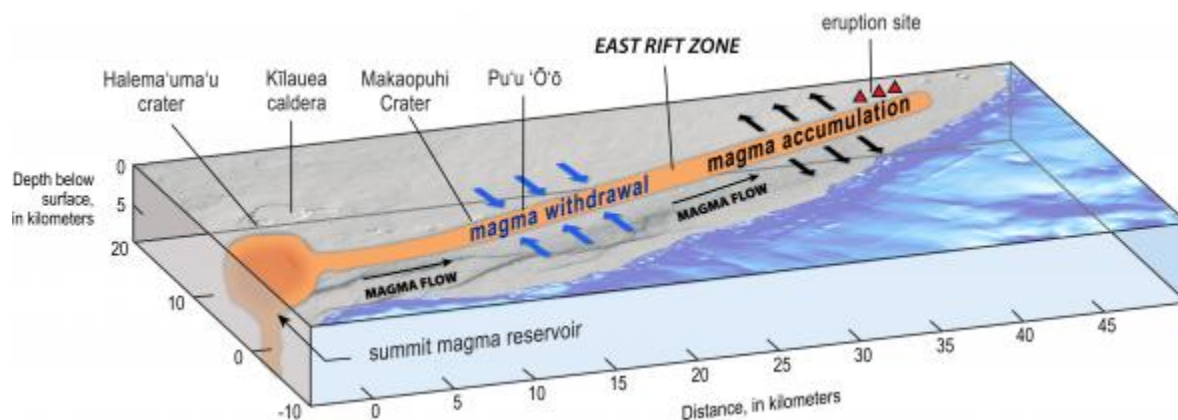
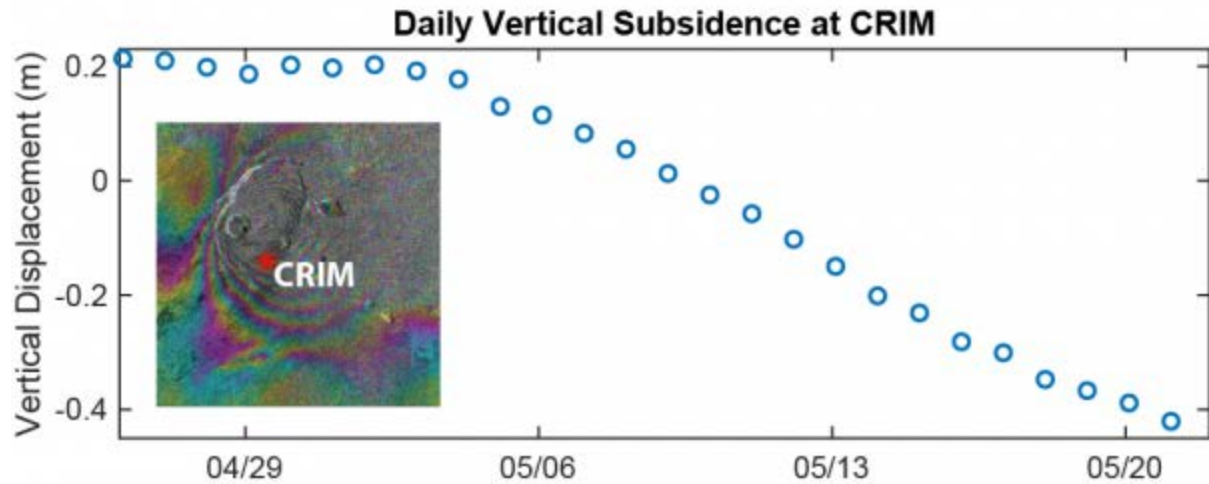


Illustration of Kīlauea Volcano from the summit caldera to the lower East Rift Zone (LERZ). Blue arrows = contraction across the upper and middle rift zone, black arrows = expansion in LERZ.

GPS, tiltmeters, and satellite radar (InSAR) data captured how Kīlauea's surface has moved since the Pu'u 'Ō'ō vent collapsed on April 30, 2018. These data allow scientists to infer where magma was removed and the location to which it was transferred. In the first days following the collapse of Pu'u 'Ō'ō, the largest signals indicated contraction across the upper and middle East Rift Zone—evidence that magma was being withdrawn from this area. This was followed by expansion across the LERZ—evidence that magma was intruding into this part of the rift zone at depths of less than about 3 km (2 mi). The forceful widening of the LERZ continued through May 18, at which time a GPS site north of the intrusion stopped moving northwestward and stabilized.

In early May, days after the collapse of Pu'u 'Ō'ō, the [lava lake](#) level in Halema‘uma‘u began to drop as the summit area subsided at a high rate. The lava lake surface disappeared from view on about May 10, at a depth of more than 325 m (1,070 ft) below the Halema‘uma‘u crater floor.



This plot shows vertical displacement of a USGS GPS (CRIM) station from April 26 to May 24, 2018.

Subsidence of the summit area continues. Between May 1 and May 24 the caldera floor subsided as much as 1.4 m (4.5 ft). The GPS station, labeled as CRIM on the edge of Kīlauea's summit caldera [Fig.2], has subsided about 0.6 m (1.9 ft). Continued summit subsidence indicates that magma is moving from the summit [magma reservoir](#) and into the East Rift Zone at a higher rate than magma is entering the reservoir from below. To date, geochemical analysis of erupted lava indicates that summit magma has not yet erupted from the LERZ fissures 1-23.