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“Variable Magma Supply to Kīlauea Volcano, Hawai‘i, and Impact on Eruptive Activity”

ABSTRACT: Data from the past 15 years indicate that the magma supply rate to Kīlauea Volcano, Hawai‘i, is an important control on eruptive activity. Joint inversions of geophysical, geochemical, and geological observations suggest that the supply rate nearly doubled during 2006 relative to 2000-2001, which resulted in an increase in the discharge rate of lava, summit inflation, and the formation of new eruptive vents. Subsequently, the magma supply during 2012, and likely through 2014, was less than that of 2000-2001. This lower supply rate was associated with decreased eruptive vigor and a lower lava discharge rate, which may have played a role in the stalling of lava flows above population centers in the Puna District. Renewed eruptive vigor may be expected if magma supply increases in the future; however, a further decrease in supply—which is likely already be below long-term averages—may result in cessation of the eruption. Multidisciplinary monitoring, and particularly tracking of CO₂ emissions and surface deformation, should be able to detect such changes in supply before they occur.