

Current magma accumulation in the deep magma chamber under of the Hekla volcano, Iceland

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Hekla is one of the most frequently erupting volcanoes in Iceland, with at least 18 eruptions in the past 1000 years. During the last 40 years it has erupted about every 10 years. The most recent eruption occurred on February 26 - March 8, 2000. The initial sub-Plinian phase lasted less than one hour, later the eruption became effusive. The crustal deformation network around Hekla consists of strainmeters, campaign GPS, optical tilt stations and InSAR. The far strain stations and one tilt station are used to model the magma chamber, located at 11-km depth under the summit of Hekla. The eruptive fissure is 6.6 km long on the surface and with a width of 0.8 m. The dike is constrained by a strainmeter at 15 km distance and by GPS, and is estimated to be about 1 km in height, and fed by a narrow conduit. Diking associated with the 2000 eruption of Hekla appears to be limited to very shallow depth, suggesting that the dike is mostly within the topographic edifice of Hekla (about 1.5 km height). From this it seems that Hekla is presently behaving as a stratovolcano, rather than a typical Icelandic rift-zone volcano. The tilt signal from the Næfurholt station (station located 11 km directly west of Hekla) is rather small but is still significant. It suggests inflation beginning directly after the 1991 and 2000 eruptions. Eastward upward tilt generally increases with time, as the volcano builds up pressure for the next eruption, when a co-eruptive pressure decrease occurs. The most recent measurement of the tilt station at Næfurholt shows upward tilt towards Hekla. The east component indicates pressure increase under the volcano, which is of the same scale as prior to the 1991 and 2000 eruptions.