

Hekla volcano, Iceland, in the 20th century: Lava volumes, production rates and effusion rates

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Lava flow thicknesses, volumes and effusion rates provide essential information for understanding behavior of eruptions and their associated deformation signals. Hekla mountain erupted five times (1947-1948, 1970, 1980-1981, 1991, 2000) in the 20th century producing tephra and basaltic-andesite lava flows. These five eruptions were monitored and have detailed descriptions of the course of events. However, the lava volume estimates are uncertain because they are based on the planimetric method, where the area of the flow field is multiplied by an estimated average lava thickness. Due to coarse sampling of lava thickness profiles, previous studies suggest that the planimetric volume estimates yields up to 50% uncertainties. Here we address this problem by generating pre- and post-eruption digital elevation models (DEMs) for the last five eruptions from historical stereo photographs to produce the first lava flow thickness maps at Hekla volcano, Iceland (Figure 1).

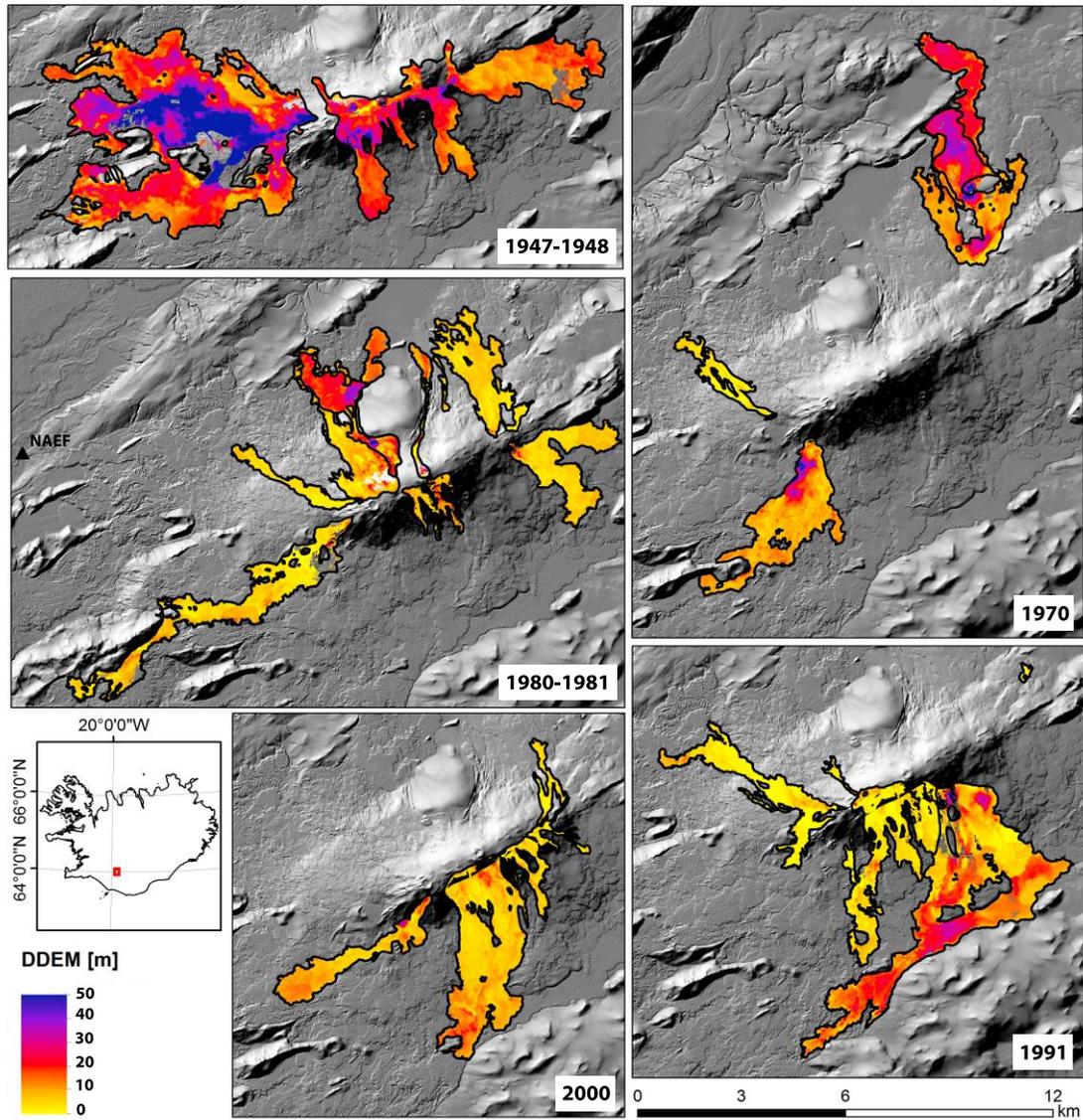


Figure 1. Lava flow thickness maps for Hekla Mountain in the 20th century. Background: hillshade from lidar DEM, with gaps filled with TDX DEM.