Reviewed research article

Historical lava flow fields at Hekla volcano, South Iceland

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Abstract — *Hekla volcano is known to have erupted at least 23 times in historical time (last 1100 years); often producing mixed eruptions of tephra and lava. The lava flow volumes from the 20th century have amounted 80% to almost 100% of the entire erupted volume. Therefore, evaluating the extent and volume of individual lava flows is very important when assessing the historical productivity of Hekla volcano. Here we present new maps of the historical lava flow fields at Hekla in a digital format. The maps were produced at a scale of 1:2000–10000 using a catalogue of orthophotos since 1945, acquired before and after each of the last five eruptions, combined with field observation of stratigraphy, soil profiles, tephra layers and vegetation cover. The new lava flow maps significantly improve the historical eruptive history of Hekla, prior to the 1947 eruption. The historical lava flow fields from Hekla cover ∼233 km^2 and the lavas reach up to 16 km from Hekla volcano. Flow lengths up to 20 km are known, though lava flows only travelled up to 8–9 km from Hekla in the last 250 years. Identified historical vents are distributed between 0 and 16 km from Hekla volcano and vents are known to have migrated up to 5 km away from Hekla during eruptions. We have remapped the lava flow fields around Hekla and assigned the identified flow fields to 16 eruptions. In addition, ca. 60 unidentified lava units, which may be of historical age, have been mapped. It is expected that some of these units are from known historical Hekla eruptions such as the 1222, 1341, 1510, 1597, 1636 and potentially even from the previously excluded eruptions such as 1436/1439.*

Keywords: Hekla volcano, lava flow fields, historical eruptions, tephrochronology

INTRODUCTION

Hekla is one of the four most active volcanoes in Iceland and has erupted ∼23 times since the settlement of Iceland in CE 874 (Thorarinsson, 1967; Larsen *et al.*, 2013). Its activity made a huge impact on the surrounding landscape changing the vegetation patterns, the depositional/erosional environments and affecting the human settlement since the occupation of Þjórsárdalur (Thorarinsson, 1967; Hreiðarsdóttir *et al.* 2015). Farms were abandoned, destroyed or affected during Hekla eruptions by earthquakes, tephra fall or