

# The Stardalur Magnetic Anomaly, SW-Iceland

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## ABSTRACT

*Geological mapping at the site of major magnetic, gravity and seismic travel-time anomalies near Stardalur, SW-Iceland, has demonstrated the existence of a Quaternary central volcanic complex. The complex includes a caldera of 6.5 km size, a cone sheet swarm, sills, plugs and a laccolithic body, all of which are of Olduvai event age. A positive magnetic anomaly of 4500  $\gamma$  at 700 m above ground, essentially coincident with the caldera, is most probably due to the normally magnetized rocks, in particular the basic intrusives within the caldera.*

*A series of highly magnetic tholeiite lava flows was penetrated by drilling at the center of the highest maximum in the anomaly (79000  $\gamma$ ) as delineated by a ground survey. Investigations on samples from the drill core show that their high remanence intensity (averaging 0.06 Gauss) is partly caused by their unusually high magnetite content and partly by an unusually high ambient field strength at the time of their formation.*

## INTRODUCTION

The aeromagnetic survey of Iceland by Sigurgeirsson (1970; pers. comm. 1972) has revealed several distinctly localized magnetic anomalies. The strongest of these is a positive one located at Stardalur, about 20 km NE of Reykjavík, and a few km NW of the Langjökull-Reykjanes volcanic zone. The Stardalur magnetic anomaly is limited to a slightly oval shaped area 8–10 km across and amplitude 4500  $\gamma$  at 700 m altitude above ground. Subsequent ground

surveys (Kristjánsson 1970; Búason 1971) indicated that the magnetic anomaly is composed of two parts. First, there is an anomaly of dimensions 7 km by 5000  $\gamma$ ; second, there are a few sharp local maxima superimposed on it, the highest one reaching 79000  $\gamma$  at ground level (regional: 51700  $\gamma$ ).

From preliminary ground survey data Kristjánsson (1970) computed the dimensions of a possible single body causing the highest maximum as 200 by 600 m, striking NE, with an estimated upper surface at the depth of 50–70 m, and a total magnetic intensity (remanent plus induced) of 0.05–0.06 Gauss. A detailed survey and analytical treatment by Búason (1971) yielded a total magnetization of 0.08 Gauss and slightly different dimensions.

## GEOLOGICAL SETTING

The rocks immediately surrounding and to the west of Stardalur are of Quaternary age, with thick successions of basaltic lava flows intercalated, at intervals, with hyaloclastite ridges, morainic horizons and glacial tillites corresponding to several glacial periods (Fridleifsson 1973). The regional dip of the rocks is southeasterly with the oldest rocks outcropping on the coast furthest to the west and the rocks becoming progressively younger eastwards. The regular piles of basaltic lava flows and the less regular hyaloclastite intercalations

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