

Stratigraphy and Paleomagnetism of the Lava Pile South of Ísafjarðardjúp, NW- Iceland

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Abstract – A composite 2.6 km stratigraphic section has been constructed from 12 well-exposed lava profiles in the fjords on the south side of Ísafjarðardjúp, in the Vestfirðir peninsula of NW-Iceland. Its age is around 13 Ma. Oriented cores for paleomagnetic measurements were collected from 307 lava sites, 225 of them in the composite section. The lavas carry a stable primary remanence, and ten or more reversals of geomagnetic polarity are recorded in the composite section. There is also evidence for extended excursions (periods of instability) of the geomagnetic field, with some 15 lavas in the section being erupted during one of these.

The paleomagnetic polarities are used along with geological information for correlation with the composite section of McDougall *et al.* (1984) along the western side of the Vestfirðir peninsula. Sediments correlated with the Brjánslækur sedimentary horizon occur near the top of the Ísafjarðardjúp section. We suggest that the two sections mapped by McDougall *et al.* on the western and eastern sides of the peninsula fail to overlap, possibly by over 1 km of lava thickness.

INTRODUCTION

Scope of the present study

In Iceland, the chief difficulties in regional stratigraphic mapping include the episodic character of the volcanism, and tectonic complications connected with shifts in the position and direction of the volcanic zones. The coverage of extended stratigraphic sections is sparse, and few radiometric age determinations are available. These circumstances make long-distance correlations by conventional mapping methods quite uncertain, so it is becoming necessary to develop new and improved methods.

Under favorable circumstances, lava sequences can furnish important data on the age of geomagnetic chron boundaries, to supplement and confirm similar data available from sediments and ocean-ridge anomaly inversion. The chief requirements are a constant rate

of build-up of a lava pile, preferably without any breaks exceeding 10,000 years, and accurate radiometric dating. In the nineteen-sixties good progress was made world-wide in establishing the age of some Quaternary reversals, and it seemed reasonable to expect that a complete geomagnetic polarity time scale would be established before long. Unfortunately, complications including the presence of numerous short chrons and variable fidelity of the available "tape recorders" have turned up. In spite of individual successes such as the dating of Gilbert subchrons in Iceland by McDougall *et al.* (1977), the various approaches to a polarity time scale have still not converged sufficiently.

The Vestfirðir (Western fjords) peninsula of NW-Iceland is a region very suitable for detailed stratigraphic studies and for age dating of chron boundaries. It is a basalt lava pile of 15 - 8 Ma age, largely