

Paleomagnetic stratigraphy of the Mosfellssveit area, SW-Iceland : a pilot study

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ABSTRACT

A pilot stratigraphical study has been carried out of the basalt lava and hyaloclastite pile between Gufunes and Hafrahlíð in the Mosfellssveit area, Southwest Iceland, using paleomagnetic remanence polarities for correlation. About 200 units, mostly lavas, were sampled and measured for this purpose. Due to inadequate outcrops and to tectonic disturbances, the results are not entirely satisfactory, especially as regards the usefulness of the remanence data for geomagnetic secular variation studies. We provide descriptions and maps of the sampling profiles used in constructing a tentative polarity column for the area, which is predominantly of reverse polarity corresponding to the Matuyama geomagnetic chron. Two normal-polarity intervals in the lava pile are correlated with similar zones in the nearby Mt. Esja. There is evidence of at least eight glaciations in the area.

INTRODUCTION

A large number of paleomagnetic projects have been undertaken in Iceland in the last thirty years, mostly in conjunction with stratigraphic mapping efforts. Among these is the study of Kristjánsson et al. (1980) in the Esja-Akrafjall area of SW-Iceland, where K-Ar dating substantiated earlier suggestions that the Esja

volcanism is of Lower to Middle Matuyama age. Further confirmation of the age estimates of Kristjánsson et al. (1980) has recently been provided by K-Ar dates quoted by Geirsdóttir (1991). The presence of two normal geomagnetic polarity zones in the Esja succession was also confirmed, the older one of which is the "N3" of Einarsson (1957). Kristjánsson et al. (1980) were, however, unable to determine whether it should be correlated with the Olduvai or the Reunion subchron but they favoured the latter.

Knowledge of the Quaternary geology of the region from Reykjavík to Esja is potentially of some economic importance, since aquifers at 1–2 km depth in the region provide geothermal heating for a population of approx. 130,000. A map of its surface geology has been available (Tryggvason and Jónsson 1958) but it is indeed remarkable that no stratigraphic work has been published up to now. Paleomagnetic polarity determinations on lava samples in outcrops and geothermal drill cores were made by the late Th. Sigurgeirsson around 1954 according to his notebooks in our possession, but the results were not written up in detail. Some parts of the region were mapped by geology students (e.g. theses by Torfason 1974, Theodórsdóttir 1972, Thors 1969, 1974).

The present paleomagnetic project was initiated in 1972 by sampling in profile UL and was gradually