

K/Ar Ages of Rocks from the Flatey Borehole in the Offshore Skjálfandi Basin, North Iceland

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ABSTRACT

K/Ar age determinations of lava flows penetrated in the FL-1 borehole section on Flatey confirm the conclusions drawn by previous workers. The whole sequence was accumulated within the Matuyama geomagnetic chron. All the lava flows are reversely magnetized. The uppermost lava flow was extruded at 0.81 ± 0.08 Ma ago, i.e. some time after the Jaramillo geomagnetic subchron. The middle flow, of which two samples yielded ages of 1.39 ± 0.10 Ma and 1.67 ± 0.18 Ma, is significantly older and was erupted some time between the Jaramillo and Olduvai geomagnetic subchrons. The lowermost flow predates the Olduvai geomagnetic subchron and shows an age of 1.96 ± 0.33 Ma. Comparison between the Flatey section and the Tjörnes sequence indicates that the glacial horizons beneath the oldest Flatey lava flow may correspond to the oldest glacial horizons on Tjörnes.

INTRODUCTION

The island Flatey lies off the north coast of Iceland in the Skjálfandi Bay (Fig. 1), and is tectonically separated from the mainland by faults associated with the southern margin of the Tjörnes Fracture Zone (Ward, 1971; Sæmundsson, 1974). A very distinct WNW trending fault south of Flatey was revealed by shallow seismic work by Thors (1982). Although the island is made up of two lava flows visible above sea level, separated by a conglomer-

ate, its location within a negative gravity anomaly (Pálmason, 1974) indicated the existence of low density rocks beneath.

A 554 m deep borehole was drilled in Flatey in 1982, and a nearly continuous 47.6 mm diameter core was recovered (Gunnarsson *et al.*, 1984). Only three lava flows of total thickness of about 40 m were penetrated, including the two flows already seen in outcrops on the island. A third flow was encountered at a depth of 382 m in the core. The remainder of the core, over 500 m, is made up of sedimentary rocks. It has been estimated that the total thickness of sediments beneath Flatey amounts to 2 km, increasing to the west (Gunnarsson *et al.*, 1984). This is supported by the existence of over 1000 m thick sediments with intercalated lava units of Tertiary and Quaternary age which are exposed on the Tjörnes horst to the east of Skjálfandi (Bárðarson, 1925; T. Einarsson, 1958; Strauch, 1963; Th. Einarsson *et al.*, 1967; Albertsson, 1978; Eiríksson, 1985).

The Flatey core was analyzed and interpreted by Eiríksson *et al.* (1987), who found evidence of 5 glaciations within the sequence, which is terminated by an erosional surface with glacial striations on the topmost lava flow. A cyclical accumulation was demonstrated with diamictites, deformation structures, shear planes and associated erosional unconformities in the core being typically followed by poorly sorted conglomerates, sandstones and then by