K/Ar Ages of Rocks from Húsafell, Western Iceland, and the Development of the Húsafell Central Volcano

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ABSTRACT

The paper describes the uppermost 1000 m of a south-easterly tilted lava pile which borders the Reykjanes–Langjökull volcanic zone on the west in the area of Húsafell. Paleomagnetic stratigraphy and K/Ar age determinations allow a correlation with the geopolarity time scale. The section described begins with the Mammoth event of the Gauss epoch and is continuous up to the earliest part of the Matuyana epoch. It includes a central volcano which began its activity during the Kaena event 2.9 m. years ago and ended early in the Matuyama epoch. Acid volcanism occurred in three distinct phases, which are separated by intervals of basaltic volcanism. The first acid phase is represented by dacite flows and an ignimbrite which are exposed in a section running marginally to the west of the volcanic centre. The second acid phase, which was active during the last stage of the Gauss epoch, includes besides a large number of rhyolite flows also an ignimbrite sheet which may have measured more than 20 km³ by volume. A large number of minor basaltic intrusions accompanies this phase, among them southeastwardly dipping sheets. A small segment of a possible caldera fracture indicates that a caldera may have collapsed consequently upon the ignimbrite eruption of this phase. The third acid phase developed after lava shields had almost completely screened the slopes of the volcano. This phase produced both acid and intermediate lavas, and a minor ignimbrite. It is also characterized by numerous acid and composite dykes and plugs. The core area of this phase overlaps with that of the second acid phase but may have been shifted well to the west of it.

The first record of a glacial horizon is found near the base of the Mammoth event of the Gauss epoch 3.1 m. years ago. From there upwards altogether 8 glacial horizons occur until the end of the third acid phase. This gives an average of one glacial event per 100,000 years. Only two glacial horizons are associated with extensive hyaloclastites which is taken to indicate that most of the glacial events were of short duration. The rate of growth of the lava pile during the Gauss epoch based on mapping just to the SW of the volcano was found to be close to 100 m per 100,000 years. Growth rates in the core area of the volcano may have been as much as twice this value. A stratigraphic break occurs at the top of the third acid phase. It is overlain unconformably by a group of hyaloclastites and lavas of more than 200 m thickness which spread into the Húsafell area during the Gilsá event 1.8 m. to 1.6 m. years ago. Before that time several 100 m had been stripped off by erosion and the Húsafell area had become part of an extensive peneplain which is still recognizable to the west and north. The valleys which dissect the area are younger than the Gilsá event.

1. INTRODUCTION

The subject of this study is the uppermost part of a lava pile which borders the Reykjanes–Langjökull volcanic zone on the west. This lava pile shows a regional tilt of 5–8° towards the volcanic zone so that increasingly older rocks