

A short account of the Holocene tephrochronology of the Snaefellsjökull central volcano, Western Iceland

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ABSTRACT

Three major acid tephra layers occur in the post-glacial soil cover in the Snaefellsnes peninsula. They are termed Sn-1, Sn-2 and Sn-3 with increased age. They have a common origin in the Snaefellsjökull central volcano at the tip of the peninsula. In all three eruptions a southwesterly wind spread the tephra to the northeast of the volcano. Reported C¹⁴-ages of Sn-1 and Sn-2 are 1750 ± 150 and 3960 ± 100 years, respectively. The exact age of Sn-3 is not known, but is estimated to be about 7000–9000 years.

INTRODUCTION

This work was carried out as a part of the United Nations University Geothermal Training Programme. Its aim was to demonstrate how past activity of an active central volcano can be established by studying the tephra layers emitted from it. The tephra usually forms distinct layers in the soil, and numerous such layers have been identified in Iceland. The number of layers in a single section can reach 150, but there exist only 12 widespread acid tephra layers in the post-glacial soils (Thorarinsson 1981).

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Tephra layers can be used to establish the history of volcanoes. Thorarinsson (1967) traced the historic eruptions of Mt. Hekla and by comparing the tephrochronology with literary sources obtained the exact age of each individual tephra layer. For layers older than Settlement (about 874 AD) one has to rely on C¹⁴-datings of vegetation remains close to the layers.

The tephrochronology of the Snaefellsnes peninsula is poorly known. Sigurdsson (1966) reports three acid tephra layers from the Setberg area. These layers are identified as I, II, and IV but III is basaltic. The layers are numbered from the base upwards. The basaltic tephra layer III originates from the cinder cones in the Berserkjahraun lava field in Helgafellssveit. Sigurdsson (1966) concludes that layers I and IV have their origin in the Snaefellsjökull central volcano.

Steinthórsson (1967) presents C¹⁴-datings of two acid tephra layers from a soil section at Fagrahlid in Fródárhreppur. These datings are most likely of layers IV and III mentioned above. The age of layer IV is 1750 ± 150 years and of layer III 3960 ± 100 years. Jóhannesson (1977) studied tephra layers in Hnappadalur, but no trace of the three acid layers were found there, only basaltic tephra from local cinder cones.

GEOLOGICAL SETTING

The Snaefellsnes volcanic zone stretches WNW-ESE from Nordurárdalur in Borgarfjörður west along the Snaefellsnes peninsula.