

The Quaternary Alpine Glaciation and marine Erosion in Iceland

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ABSTRACT

Geomorphological studies of the coastal areas of South-eastern and Eastern Iceland show the main topographical landforms eroded by alpine glaciation and marine abrasion. Those areas of Iceland which show predominantly alpine landscape are presented on a map as well as the largest ones of the coastal cliffs. Attention is drawn to the difference in the development of the strandflat and coastal scenery in the northern and southern parts of Iceland. This evaluation leads to that conclusion that the thickness of the Pleistocene glaciers has been much less in the Southeastern Iceland than in the North and that there have always been some ice-free areas during the glacials.

INTRODUCTION

The paper presented here is intended as a small contribution to the Quaternary geomorphology of Iceland. It is not a complete account, nor does it reach any definite scientific conclusions, but rather considers and discusses two important aspects i. e. the importance of alpine glaciers and of marine erosion in the formation of the landscape. The work is particularly based on observations on the coastlines and coastal areas of southeastern and eastern Iceland from Fljótsdalshérað to Eyjafjöll, although other areas are of course considered. In the light of these observations it is attempted to build up a picture of the thickness and extent of glaciers in previous glacial periods in this area, and indeed for the country as a whole, although it is as yet imperfect.

GEOMORPHOLOGY OF ICELAND IN QUATERNARY TIME

Few earth scientists will doubt that many of the more important features in the Icelandic landscape bear witness to Quaternary glaciation, such as

fjords, valleys, corries and serrated edges (arêtes). Many authors have discussed or pointed at these in their work. Mention can be made of *Thorvaldur Thoroddsen* (1905-06, 1908-1911), *Helgi Pjetursson* (1905, 1906, 1908), *Trausti Einarsson* (1959, 1961, 1962, 1972, 1977), *Gudmundur Kjartansson* (1943, 1955, 1961, 1962, 1966), *Sigurður Thórarinnsson* (1937, 1951, 1956, 1960), *Thorleifur Einarsson* (1961, 1968, 1969, 1976), *Kristján Semundsson* (1979), and *Thórdís Olafsdóttir* (1975) as well as various other papers by these authors not mentioned here. In addition a large number of other earth scientists both from Iceland and abroad have mentioned these features, it being sufficient to refer here to *Arthur Holmes* (1965), *Arne Noe-Nygård* (1962), *Gunmar Hoppe* (1968) and *Hubertus Preusser* (1976). No discussion will here be made on the theories of individual authors or their separate topics but reference is made to their work where relevant.

There are different opinions amongst these authors as regards the possible thickness and extent of glaciers during glacial periods and whether certain areas have been ice-free and even vegetated throughout the Quaternary Era. In the last few decades the opinion has become rapidly popular that Iceland has been covered by a very thick ice sheet, even 2000-3000 m, in previous glaciations and that it has calved off the edge of the continental shelf at depths of at least 200 m or more so that the country was completely covered by ice. This view is very similar to that held for the ice sheets of Scandinavia and Canada. According to this view the formation of the Icelandic landscape and its continental shelf should be foremost due to erosion by a thick ice sheet with an ice centre and main divide somewhere in the central highlands.

In my opinion many geomorphological and glaciological arguments are decidedly against this theory. In the discussion that follows I shall try to