

Substrate Temperature Measurements and Location of Thermal Areas on Surtsey Summer 1970

By

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INTRODUCTION

During the summer of 1970, measurements of temperatures of the substrates in Surtsey were taken, at the same time as the plant studies were undertaken. The object of these measurements was to establish the location of the thermal areas, for comparison with the distribution of vegetation on the island.

METHOD OF RESEARCH

A thermometer of the thermistor type was used for the aforesaid measurements. They were taken in all parts of the island and at a depth of 20 cm to avoid effects of air temperature. However, it was not possible to measure at this depth in some areas of lava, as the layer of substrate was too thin, but in those cases the greatest depth available was used.

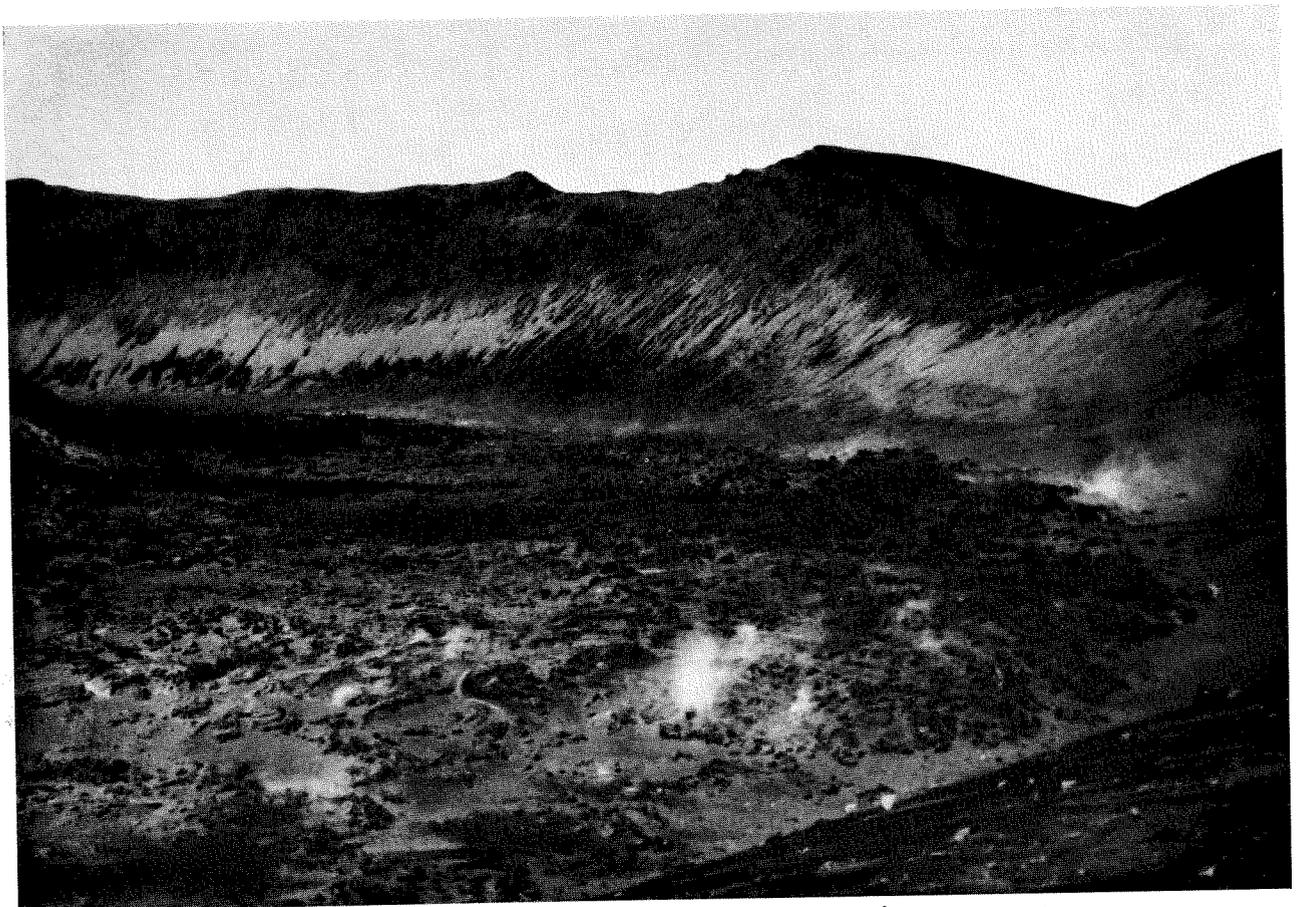
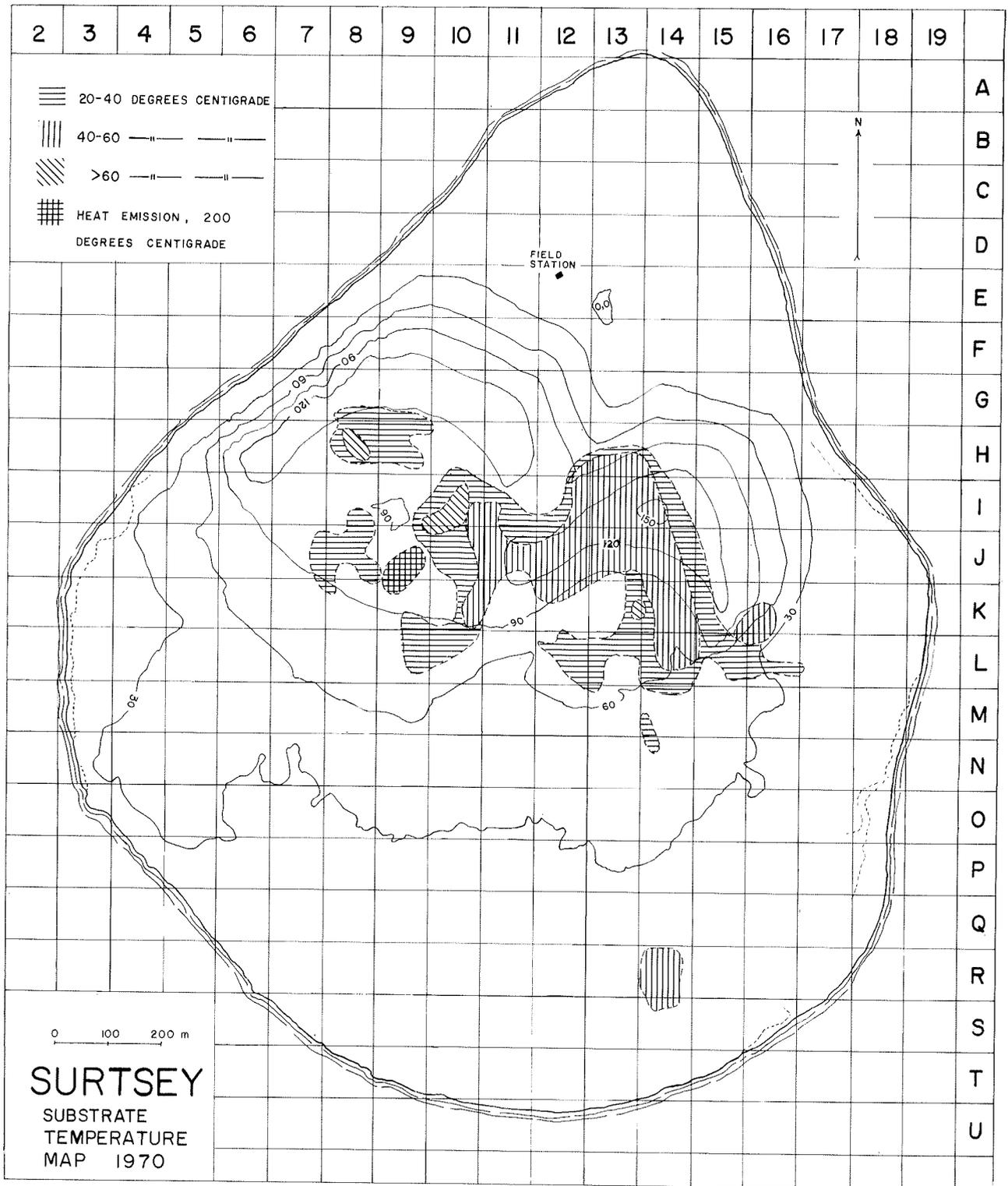


Fig. 1. Thermal area at the border of lava and tephra north of Surtur II. (Photo by Á. H. Bjarnason.)



In the thermal areas, measurements were made much more densely than elsewhere on the island, in order to facilitate the drawing of isothermal lines with reasonable accuracy and to classify them according to temperature. All measurements were registered on an aerial photograph, and the temperatures marked on charts. The boundaries of the thermal areas were selected at

20°C. Outside the thermal areas the temperature was almost everywhere between 9°C and 14°C.

The following classification was used when making the attached temperature chart:

1. Areas with most measurements between 20° and 40°C.

2. Areas with most measurements between 40° and 60°C.
3. Areas with most measurements above 60°C.
4. Areas with heat emission, measured at 200°C in plots J and K9. The layer of substrate there was very thin.

Sveinn Jakobsson, a geologist from the Icelandic Institute of Natural History, lent the authors the results of similar measurements made by him on the tephra areas. These data were also used in the making of the chart.

DISCUSSION

If the attached chart and the vegetation map of Surtsey from 1970 (Fridriksson et al. 1971) are compared, it will be clearly seen that there is no connexion between the thermal areas having temperatures above 20°C in the substrate and the distribution of the vascular plants, as no vascular plant grows in the areas concerned. However, plants nos. 65, 73 and 74 were right on the fringe of such areas.

On the other hand, moss grows in many places within these thermal areas, and the most fertile

area of moss on the island is in fact found there (L-12). The best conditions for the growth of moss are near steam emissions, which are found mostly where the lava and the tephra meet and in Surtur I (L-12). The question as to how far the growth of the mosses near steam emissions is due to the higher temperature has not been investigated, but it is probable that the constant moisture concentrated in these areas is a much more important factor. (Bjarnason and Fridriksson, 1971.)

ACKNOWLEDGEMENTS

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