

Continued geophysical measurements in Surtsey

by

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Geomagnetic measurements

Magnetic field measurements were continued at the magnetic stations Surtsey I and Surtsey II. A proton precession magnetometer was used to measure the field intensity. The results are given in Table I and compared with simultaneous values at Leirvogur Magnetic Observatory. Previously the field at Surtsey I was found to decrease, but now the decrease has stopped and it seems to be increasing. However, as the magnetic field was quite disturbed on Sept. 8th so the last value may not be reliable. For the same reason H and D measurements, which were carried out on Sept. 8th are considered to be of questionable value and are not given in the table.

The table also contains results from a new magnetic station Surtsey III situated at the SW edge of the old lavacrater. At this place there is a large negative anomaly in the field intensity and the field is very inhomogenous as seen from measurements made at different elevations. If this anomaly is caused by high temperatures in the underlying lavapile the intensity should increase as the temperature falls.

A survey of total magnetic field on the sea around the island was carried out with a proton precession magnetometer operated by Mr. Sverrir Karlsson in a rubber boat on June 30th and August 2nd. The measured field was reduced to mean values with the help of magnetograms from Leirvogur Magnetic Observatory. Measurements were made on 33 evenly spaced lines out from the coast at the same time as bathymetric measurements were made by Mr. Sigurjón Rist. All positions were measured by the Icelandic Survey Department as explained in a report by Sigurjón Rist.

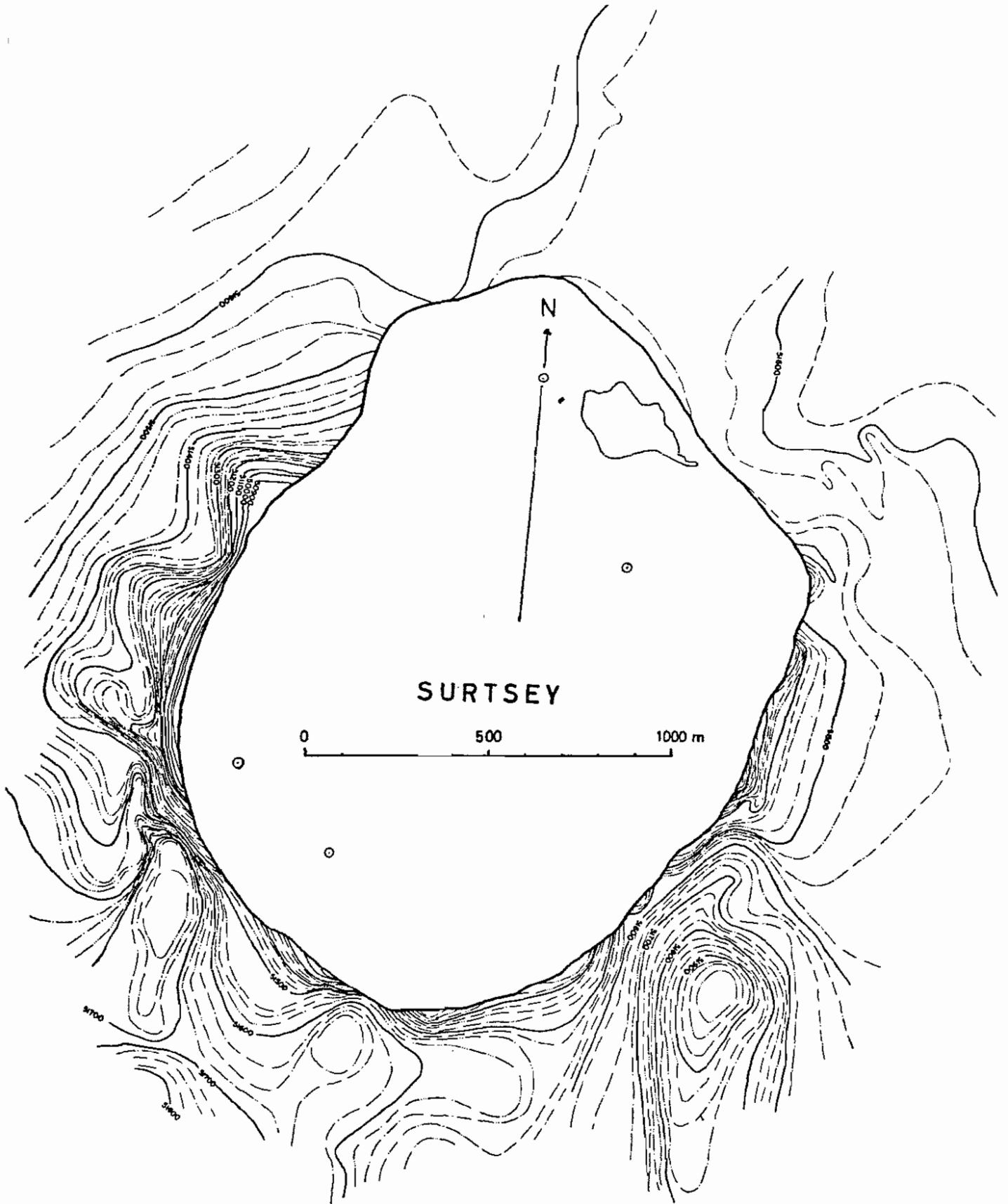
Temperature measurements

On August 19th, a new lavaeruption started in Surtsey. The next day the temperature was measured at the edge of the flowing lava 50-100 m from the crater with the same thermocouple as was used for previous measurements. The results were very similar to those obtained earlier in lava from the old lavacrater and gave a maximum temperature of 1145°C . The same result was obtained on August 28th at the edge of the lava about 150 m from the crater, and again on Sept. 25th, 100 m from the crater. On January 8th, 1967, exceptionally favorable conditions for temperature measurements were found at the coast 700 m south of the crater. Here a lavastream was flowing in a tunnel, only visible through some small openings in the roof of the tunnel. The velocity of the lava was about 0,6 m/sec and the flow was estimated about $0,5 \text{ m}^3/\text{sec}$. The thermocouple was inserted through one of the openings and gave a temperature of 1155°C in the surface of the lava. The temperature of the air just above the lava was 1110°C .

TABLE I

Magnetic field intensity in gammas

Station	Date	U.T.	F	F (Leirv.)	F	Above ground
Surtsey I	1966 April 17	12:15	51321,0	50999,0	322	
"	" July 4	20:53	51376,3	51047,4	329	
"	" Sept. 8	16:00	51496,6	51146,2	350	
Surtsey II	" April 17	11:12	51455,8	50979,9	476	
"	" July 4	20:06	51529,8	51063,6	466	
"	" Sept. 8	12:45	51557,6	51058,5	499	
Surtsey III	" April 17	14:22	48937	51012	- 2075	0,9 m
"	" " "	14:08	48988	51010	- 2022	1,8 m
"	" " "	14:34	49160	51015	- 1855	3,5 m
"	" July 4	21:53	48833	50939	- 2106	1,0 m
"	" " "	21:49	48908	50938	- 2030	2,0 m
"	" " "	21:43	49045	50949	- 1904	3,0 m
"	" Sept. 8	16:31	49076	51156	- 2080	1,0 m
"	" " "	16:38	49025	51119	- 2094	1,3 m
"	" " "	16:43	49175	51123	- 1948	3,0 m



Magnetic field intensity in gammas
measured at sealevel on june 30 and aug.2 1966