

Glacial striae, roches moutonnées and ice movements on Sandoy (Faeroe Islands)

(With an accompanying map).

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The paper is a continuation of a former work on glacial striae, roches moutonnées and ice movements on Suðuroy (Jørgensen & Rasmussen 1977) where the pre-glacial geology and major landscape features of the Faeroes and earlier literature on the subject also are mentioned.

Sandoy.

Sandoy is situated between Suðuroy to the south and Streymoy to the north. A row of three little islands, Skúvoy, Stóra Dímun and Lítla Dímun, continues the trend of the north-west coast of Sandoy. Sandoy is 23 km long in NW-SE direction and 14 km from E to W. The area is about 112 km².

A broad valley runs NW-SE through the island from Skopun on the north coast to Sandsvágur on the south coast including the lakes Norðara Hálsavatn and Heimara Hálsavatn, Sandsvatn and Gróthúsvatn. Norðara Hálsavatn and Heimara Hálsavatn are situated near the watershed. Sandsvatn is separated from the bay of Sandsvágur by a barrier of sand and Gróthúsvatn from the bay of Grótvík by boulders.

The highest mountain east of the valley is Tindur, 479 m a. s. l. situated in the middle of the mountain ridge Reynsendi — Tindur — Pætursfjall. On the east coast small inlets are found at Skálavík, Húsavík and Dalur. On the south-

eastern part of Sandoy a valley runs eastward crossing the island and bifurcates north-east to Skálavík and south-east to Húsavík.

The highest point west of the valley is Eiriksfjall, 411 m a. s. l., situated in the middle of the mountain ridge, Endin — Eiriksfjall — Bøllufjall. From the inlet at Söltuvík at the west coast, low-lying terrain runs towards SE to the south coast.

Sandoy is mostly built up of lava flows belonging to the upper basalt series (*Rasmussen & Noe-Nygaard* 1969, 1970). From Skopun the C-horizon — boundary between the middle basalt series and the upper basalt series — can be followed westward and southward into the steep bird-cliffs on the western coast to the east of Salthøvdi. The dip of the lava flows is ENE.

The major landscape feature is that typical of the upper basalt series (step-like landscape with alternating layers of basalt and tuff), but although the step-like appearance of the slopes is evident, the hills generally appear smooth and rounded with a dense vegetation cover. The number of dikes and greater lamellar zones, the main direction NNE-SSW, is highly limited compared with the number found on the northern islands.

Ice movements on Sandoy.

The direction of ice movements on Sandoy has been determined by means of glacial striae and the stoss and the lee sides of roches moutonnées. Glaciated bedrock exposures are common, but not all of them are useable in determining the direction of glacier movement because of their state of weathering. *Geikie* (1880) and *Helland* (1879, 1880) have given a few comments on glacial striae on Sandoy which are indicated on an accompanying map.

Synopsis of localities.

In the following synopsis the orientation of the roches mou-

tonnées and the striae is indicated at each site. In the case of roches moutonnées the compass direction indicates the direction in which the ice moved (see accompanying map).

Skopun.

- Site 31. Roches moutonnées (NNE).
- Site 32. Roches moutonnées (N).
- Site 33. Roches moutonnées (NNW).
- Site 34. Roches moutonnées (NW).
- Site 35. Roches moutonnées (NNW).
- Site 36. Roches moutonnées (NNW).
- Site 37. Roches moutonnées (NNW).

Norðara Hálsavatn and Heimara Hálsavatn.

- Site 7. Roches moutonnées (N and NNW).
- Site 8. Roches moutonnées (N).
- Site 9. Roches moutonnées (N).
- Site 10. Roches moutonnées (SE).
- Site 11. Roches moutonnées (SE).

Søltuvík.

- Site 13. Roches moutonnées (SW).
- Site 40. Roches moutonnées (SW).
- Site 41. Roches moutonnées (NNW).

Sandur.

- Site 1. Roches moutonnées (SW). Striae (NE-SW).
- Site 2. Roches moutonnées (SW and SSW). Striae (NE-SW and NNE-SSW).
- Site 3. Roches moutonnées (SSE).
- Site 4. Roches moutonnées (S).
- Site 5. Roches moutonnées (S and SSW).
- Site 6. Roches moutonnées (SE).
- Site 14. Striae (NNE-SSW).
- Site 15. Roches moutonnées (SSE).
- Site 25. Roches moutonnées (SE).
- Site 26. Roches moutonnées (SW).

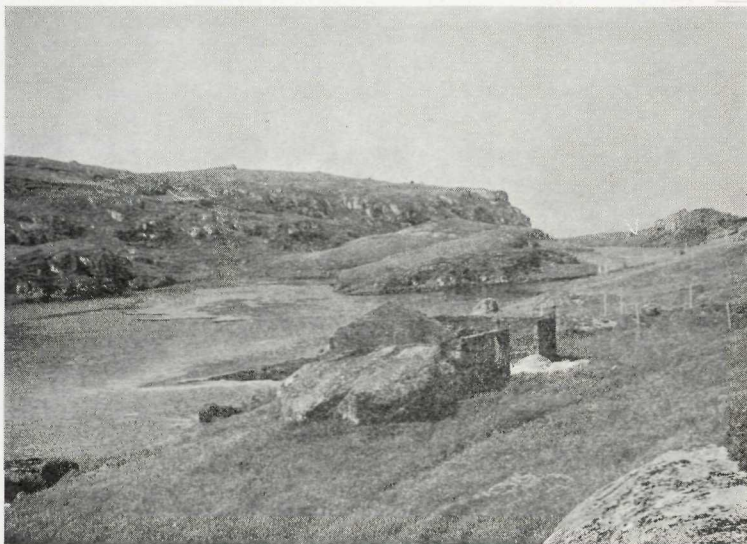


Fig. 1. *Lykkjuvatn west of Skopun.*

1. mynd. *Lykkjuvatn vestan fyri Skopun.*

Stórávatn and Lítlavatn.

- Site 21. Roches moutonnées (W).
- Site 22. Roches moutonnées (W).
- Site 23. Roches moutonnées (W).
- Site 24. Roches moutonnées (W).
- Site 27. Roches moutonnées (SW).
- Site 28. Roches moutonnées (WSW).
- Site 29. Roches moutonnées (W).
- Site 30. Roches moutonnées (W).

Skálavík.

- Site 16. Roches moutonnées (ENE).
- Site 17. Roches moutonnées (NE).
- Site 18. Roches moutonnées (NE).

Húsavík.

- Site 19. Roches moutonnées (SE).
- Site 20. Roches moutonnées (SE and SSE).

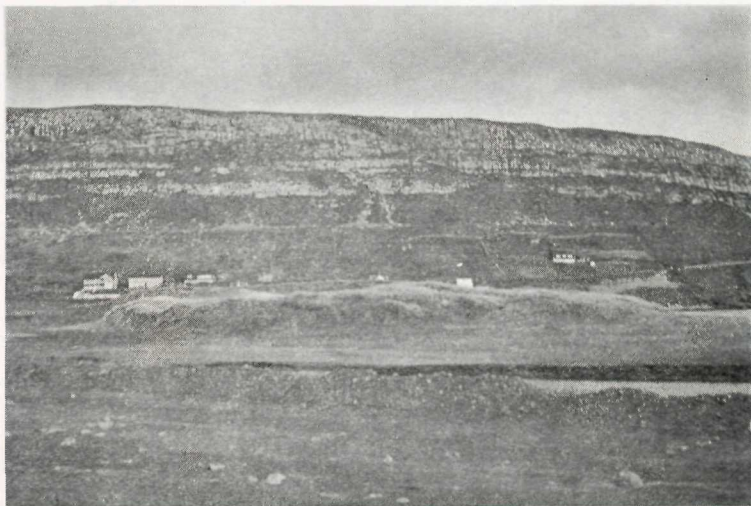


Fig. 2. Sand barrier and dune landscape between Sandsvatn and Sandsvágur.
2. mynd. Sandurin og mólheygarnir heima á Sandi.

Dalur.

Site 39. Roches moutonnées (ESE).

Description of localities.

Skopun.

This locality comprises the area west and south of the settlement of Skopun on the north coast of Sandoy. The north coast is rather steep except at the harbour of Skopun. In the investigated area sea cliffs attain heights up to 112 m a. s. l. The terrain is hummocky. Low basalt ridges trending NNW-SSE occur west of Skopun. They are clearly smoothed and rounded at their south-eastern ends. Small, narrow lakes are found between some of the ridges (Fig. 1). These are mostly elongated NNW-SSE, the same trend as the valley from Skopun to Sandsvágur which include the elongated lakes Norðara Hálsavatn, Heimara Hálsavatn, Sandsvatn and Gróthúsvatn.

Immediately around Skopun, roches moutonnées indicate di-

verging direction of ice movements from NNE at the most easterly site (site 31) to N (site 32), NNW (site 33) and NW (site 34). Farther west in the ridge-and-lake area the movement of the glaciers has clearly been towards NNW (sites 35, 36 and 37). This is indicated not only by the stoss and lee sides of the roches moutonnées, but also by the landscape features at a larger scale i. e. the shape of the NNW-SSE trending ridges.

Norðara Hálsavatn and Heimara Hálsavatn.

Norðara and Heimara Hálsavatn are two small lakes about 500 m long and 100 m broad situated in the northern part of the NNW-SSE trending valley from Skopun to Sandsvágur. Norðara Hálsavatn is bordered to the north by a slightly elevated area, which is the highest area in the valley, about 130 m a. s. l.

At the northern end of Norðara Hálsavatn the roches moutonnées indicate ice movement towards N and NNW (sites 7 and 8). The terrain is covered with vegetation and many blocks are strewn on the surface. Not until the southern end of Heimara Hálsavatn can bedrock exposures be seen (site 9). Here again glacier movement is towards N, but immediately to the south of this locality roches moutonnées are found indicating ice movement towards SE (site 10). Thus the iceshed is apparently to be found just south of Heimara Hálsavatn. The present watershed is located at site 7 at the northern end of Norðara Hálsavatn.

Søltuvík.

Søltuvík is a little inlet on the west coast of Sandoy. From here an area of low land runs in a south-easterly direction. The exposed bedrock is glaciated. Roches moutonnées indicating ice movement towards SW were observed at the western end of Hvíthamar (site 13) and north of the bay (site 40), coincident with Geikie's observations (Geikie 1880). In the valley head south of Søltuvík the roches moutonnées indicate ice movement in NNW direction (site 41).

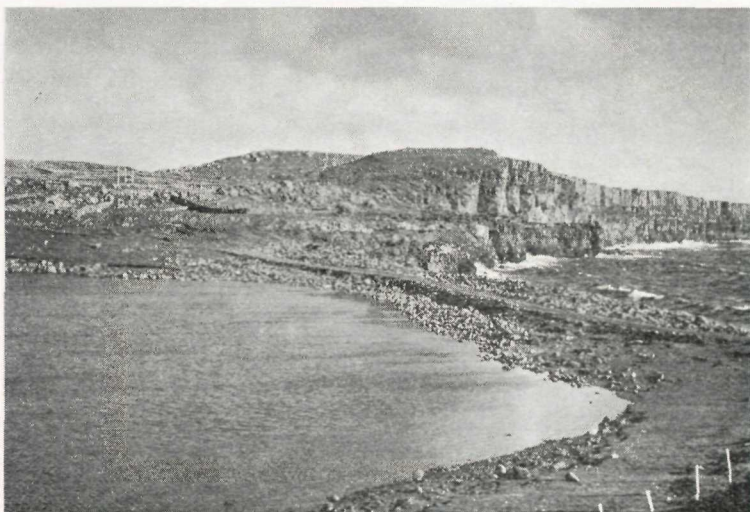


Fig. 3. Barrier of boulders between Gróthúsvatn and Grótvík.

3. mynd. Malarbrúgvín millum Gróthúsvatn og Grótvík.

Sandur.

The settlement of Sandur lies on the east side of a little peninsula between Sandsvágur and Grótvík. Lake Sandsvatn, a little more than 2 km long and 2—4 m deep, is separated from the bay of Sandsvágur by a 400 m broad sand barrier, the only dune landscape on the Faeroes (Fig. 2). Lake Gróthúsvatn west of the peninsula is about 1 km long and 200 m broad. It is separated from the bay of Grótvík by a barrier of boulders (Fig 3).

The peninsula between the two lakes is strongly glaciated close up to the edge of the approximately 40 m high, vertical sea-cliff to the west (Fig. 4).

On the south end of the peninsula roches moutonnées and striae indicate glacier movement towards SW (site 1).

On the north-western side of the peninsula the ice movement is towards SW and SSW (site 2 and site 26). (Fig. 5).

Geikie (1880) and *Helland* (1880) found the ice movement

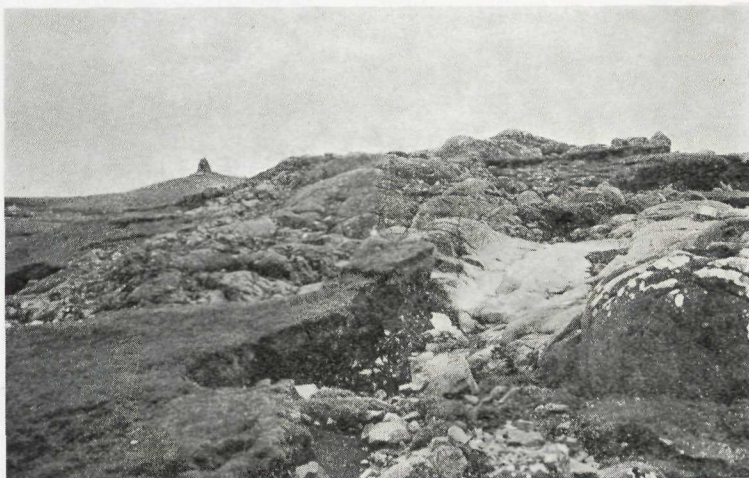


Fig. 4. *Glaciated rock close up to the edge of the vertical western sea-cliff of the peninsula between Sandsvágur and Grótvík.*

4. mynd. *Isbrýnt lendi út ímóti eggini vestantil á nesinum millum Sandsvág og Grótvík.*

at the south end of the peninsula to be $S\ 40^{\circ}\ W$ and somewhat nearer the village $S\ 15^{\circ}\ W$.

In the area near Gróthúsvatn a few exposures indicate ice direction towards SSW and S, east of the lake (site 5), and SSE (site 3) and S (site 4) west of the lake.

In the cultivated area NW of Sandur the ice direction indicated by roches moutonnées is SE (site 6).

The southerly direction of glacier movement can still be found west of Gróthúsvatn at the south-eastern slope of the NW-SE trending mountain ridge Endin — Eiríksfjall — Bøllufjall, where roches moutonnées indicate ice movement towards SSE (site 15). On the western slope, striae follow the direction NNE-SSW (site 14).

The valley of Lækjá has a dense cover of soil and vegetation and the ground is marshy and hummocky. Some of the hummocks are slightly elongated NW-SE. Now and then the bedrock is exposed, but it is extremely weathered. Roches mouton-



Fig. 5. *Glaciated rock at site 2.*

5. mynd. Ísbrýnd hella við staðin 2.

nées indicating ice movement towards SE were observed at the coast SE of Lækjá (site 25). Geikie has observed roches moutonnées SW of Lækjá (Geikie 1880).

Stóravatn and Lítlavatn.

On the south-west coast of Sandoy, north of Skarvanes, a valley runs eastward, including the lakes Stóravatn and Lítlavatn. It bifurcates NNE to Skálavík and SE to Húsavík. The area immediately east of the watershed is marshy with no exposures, but around Lítlavatn the bedrock is glaciated. The finest examples of roches moutonnées are found NE of Lítlavatn (sites 21 and 22), they clearly demonstrate ice movement towards W. The same direction is indicated by roches moutonnées south of Lítlavatn (sites 23 and 24).

South and east of Stóravatn the bedrock is heavily glaciated. To the south of the lake roches moutonnées indicate ice movement towards SW (site 27) and WSW (site 28). East of the lake the roches moutonnées show ice movement to the W (site 29). The same direction is found north of Stóravatn (site 30).

Skálavík.

Because of dense vegetation cover the bedrock is sparsely exposed in the valley at Skálavík. Near the stream Stórá, at the western end of the cultivated area, a rock exposure indicates ice movement towards ENE (site 16). Where the bedrock is exposed on the slopes the exposures are rather weathered. On the north slopes of Heiðafjall some roches moutonnées can be seen. They indicate ice movement towards NE (sites 17 and 18). Immediately west of the cultivated area on the north side of Stórá several NE-SW elongated hillocks are seen.

Húsavík.

The valley at Húsavík is almost entirely cultivated, only the western part is glaciated. Bedrock appears as roches moutonnées. Very fine examples indicating movement towards SE are found at Takmýrar (site 19). Roches moutonnées at site 20 indicate direction of glacier movement towards SE and SSE.

Dalur.

The little inlet at the settlement of Dalur on the east coast continues westward as a small valley. The valley head is acute and the slopes are steep. No rock exposures can be seen in the valley floor and those on the slopes are highly weathered. On the northern slope near the valley head roches moutonnées indicate ice movement towards ESE (site 39).

Conclusion.

The striae, roches moutonnées and the icesheds in the valleys point to the fact that the ice cap on Sandoy like that on Suðuroy (*Jørgensen & Rasmussen 1977*) radiated from the present land area during the last glaciation. On the east side of Sandoy the ice direction varies from NNW (Skopun) to SE (Dalur). At the western side the direction is westerly at the valley north of Skarvanes and at Söltuvík. East of Salthøvdi it is SE, but at Sandsvágur the direction was locally changed



Fig. 6. Sandsvágur (to the left) and its western flank.

6. mynd. Sandsvágur og nesið millum Sandsvág og Grótvík.

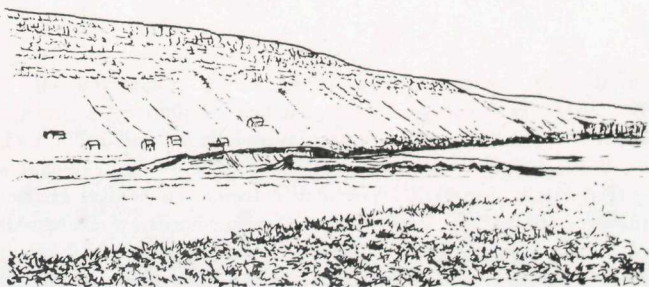


Fig. 7. The eastern flank of Sandsvágur.

7. mynd. Landslagið eyttan fyrir Sandsvág.

by the pre-existing relief. In the NNW-SSE trending valley from Skopun to Sandur the main glacier thus moved from the iceshed between site 9 and 10 northward to Skopun and southwards to Sandur, where the direction of the ice was changed to southwesterly due to the lower western flank of Sandsvágur (Fig. 6 and 7).

Acknowledgements.

The authors would like to thank Mrs. Ragna Larsen for drawing the map and Mr. Seán Sweeney for improving the English text.

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ÚRTAK

Greinin snýr seg um ísgongdina á Sandoyinni, og er hon framhald av grein í 25. bók av *Fróðskaparriti* um ísgongdina í Suðuroy.

Sandsdalur tvíbýtir Sandoyinna. Vestan fyri dalin er fjallarøðin Endin — Eiriksfall — Bøllufjall og eystan fyri dalin fjallarøðin Reynsendi — Tindur — Pætursfjall. Ísmarkið í Sandsdali er beint sunnan fyri Heimara Hálsavatn, og vatnsmarkið, sum nú er, er beint norðan fyri Norðara Hálsavatn. Norðan fyri Skarvanes gongur ein dalur eystur móti Skálavík og Húsavík. Ísmarkið er her millum Lítlavatn og Takmýrar, vatnsmarkið eitt sindur vestari.

Í Sandsdali er ísurin ikin norðureftir og suðureftir frá ísmarkinum. Vestan fyri Skopun vísir seyðagrótið, at ísurin gekk í útnyrðing, men eystan og sunnan fyri Skopun norðureftir.

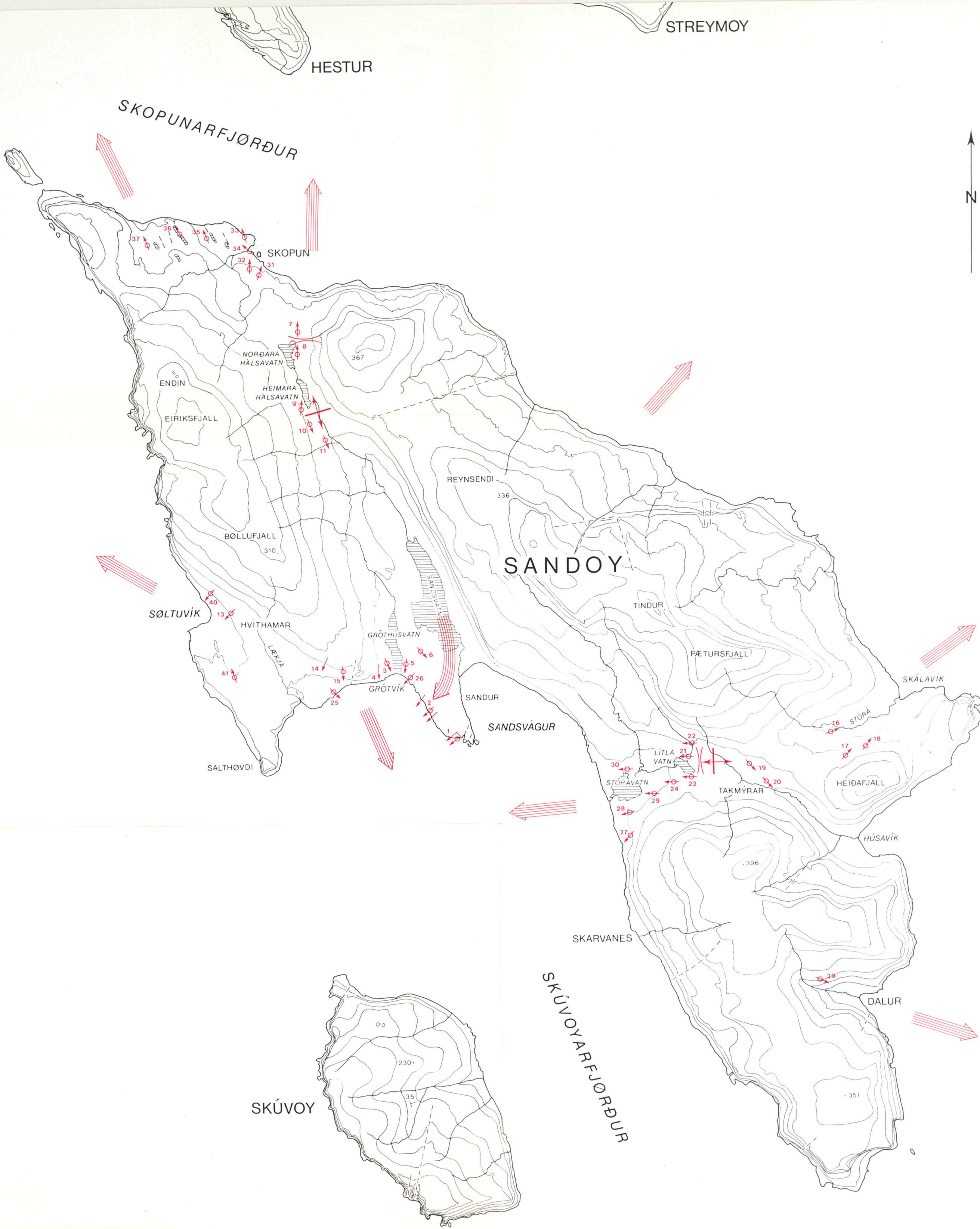
Heima á Sandi eru eingi merki eftir ísinum fram við váginum, men vestari og á nesinum millum Grótvík og Sandsvág eru bæði ísskønur og seyðagrót í hópatali. Uttan um Gróthúsvatn sæst skiliga, at ísurin er gingin suðureftir, men í nesinum millum Sandsvág og Grótvík vísa ísskønur og seyðagrót, at ísurin, sum er ikin suðureftir gjøgnum dalin, her bendir vesturá. Nesið er sera hart ísbrýnt heilt vestur á eggina, har bakkin er steyrrættur og o. u. 40 m høgur.

Í dalinum norðan fyri Skarvanes er ísurin gingin vestureftir, út av Söltuvík er hann farin í útnyrðing.

Eystantil á oynni vísir seyðagrótið í landnyrðing og landnyrðing eystan í Skálavík, men í landsynning, landsynning sunnan og landsynning eystan í Húsavík og Dali.

Ísurin er tí eins og í Suðuroy ikin út í allar ættir, men í støðum avbendur av landslagnum, eftir sum tað var vorðið, tá ísurin seinastu ferð fór um tað.

Sjá annars hjálagda kort.



SANDOY

- | | | |
|--|--------------------------------|----------------------|
| | Watershed | (vatnsmark) |
| | Iceshed | (ismark) |
| | Main direction of ice movement | (isgongdin) |
| | Roche moutonnée | (seyðagrót) |
| | Glacial striae | (isskøtur) |
| | Site no. | (staður nr.) |
| | Dip of strata | (hall) |
| | Lamellar zone | (rivulag) |
| | 50 m contour lines | (50 m hæddarstrikur) |

0 1 2 3 4 5 km

DÍMUNARFJØRÐUR

