Landslides and related phenomena on Suðuroy, the Faeroe Islands

GUNNI JØRGENSEN

Jørgensen, G.: Landslides and related phenomena on Suðuroy, the Faeroe Islands. *Bull. geol. Soc. Denmark*, vol. 27, Special Issue, pp. 85–89. Copenhagen, July 30th, 1978.
https://doi.org/10.37570/bgsd-1978-SI-10

The formation of landslides on Suðuroy, the Faeroe Islands, is greatly favoured by the geological setting and the tectonic pattern of the island. Some landslides involve lavas, the coal-bearing sequence and the tuff-agglomerate zone, which served as lubricating agents for the slipped masses. The biggest landslides occur along scarps with the direction NW–SE and are believed to have a relation to the lamellar zones which are characterized by closely spaced fissures. The NW–SE trend is the main tectonic direction on Suðuroy.

G. Jørgensen, Geologisk Museum, Øster Voldgade 5–7, 1350 Copenhagen K. April 1st, 1978.

No systematic account of the landslides on the Faeroe Islands has ever been made. Geikie (1800) observed several landslides when he visited the islands in 1879, and J. Rasmussen, The Museum of Natural History, Tórshavn, has during field work since 1945 also observed many landslides (pers. comm.).

Geology

The basaltic lava flows which build up the Faeroe Islands are of Tertiary age (Rasmussen & Koch 1963). A full account of the geology of the area is given by Rasmussen & Noe-Nygaard (1969, 1970). The ca. 3000 m thick lava pile is divided into a lower, a middle and an upper series. The greater part of Suðuroy, the southernmost island of the archipelago, belongs to the lower series, only in the northernmost part of the island is the middle series dominant. The lower series is characterized by 10–30 m thick flows of aphyric, tholeiitic basalts with interbasaltic tuff-clay sediments.

The lower series is overlain by a ca. 15 m thick coal-bearing shale sequence. The tuff-agglomerate zone which initiates the formation of the middle basalt series is usually 20–30 m thick. After extrusion of the upper basalt series, tension fractures gave way for magma forming minor intrusions which on Suðuroy are represented by dykes and, in the tuff-agglomerate zone, by irregular intrusive bodies. A new tectonic phase created closely spaced parallel fissures, the so-called lamellar zones, with the main trend NW-SE. The dip of the lava flows on Suðuroy is about 6° eastwards in the southern part, further north it becomes north-easterly, in the north-western part of the island it is 3° to the north.

Landslides in connection with the coal-bearing sequence

On the north-eastern slopes of Prestfjall two landslides are seen in the northern part of the valley south of Hvalba. The coal-bearing shale sequence is here about 110 m a.s.l. The road from which entrances to the western Hvalba coal mines are found runs across the two landslides. The northern landslide mass lies everywhere below 107 m a.s.l., is elongated about 500 m in a north-westerly direction and extends downhill to about 60 m a.s.l. (fig. 1, loc. 1). The greatest thickness of the landslipped mass is about 15 m, thinning out towards the bottom of the valley. A small valley has been formed between the mountain side and the landslide. Thick vegetation cover conceals the nature of the debris mass. On aerial photographs it can be seen that the landslide at its northern end is bordered by a short E-W running lamellar zone or fissure.

The second and smaller landslide (fig. 2) occurs about 300 m further to the south along the same

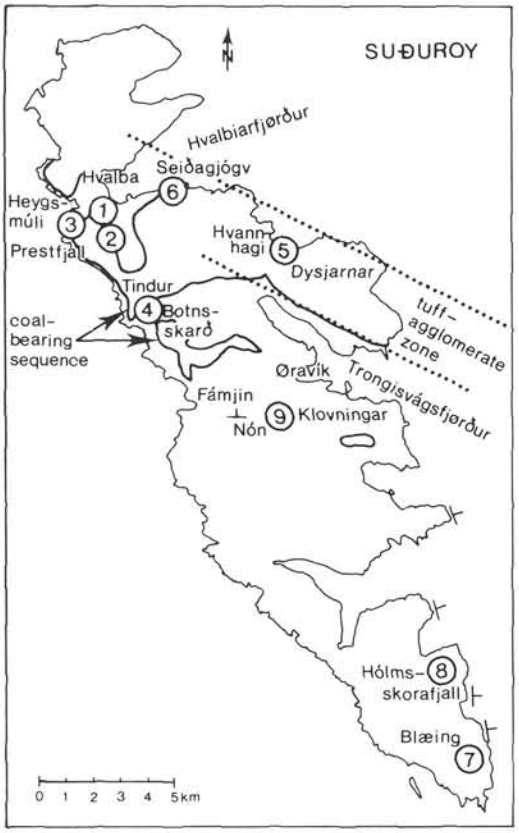

Fig. 1. Sketch map of Suðuroy.

road (fig. 1, loc. 2). It has the appearance of an earth tongue or lobe. Its extension along the road is nearly 300 m, and it extends downhill untill about 25 m a.s.l. Many stones are strewn on the surface of the distal part of the lobe.

On the north-west side of Prestfjall, at Heygsmúli, there is at the foot of the mountain a third landslide in the form of a NE-SW elongated hillock the top of which is 116 m a.s.l. (fig. 1, loc. 3). This slipped mass is situated a few metres to the north of a nearly vertical cliff where the coal-bearing horizon is found 135 m a.s.l. The hillock is about 85 m long, 30 m broad in the southern end, and 65 m in the northern end. Its thickness is approximately 9 m. It has a dense cover of vegetation and the flank that faces the mountain side carries many stones. A shelter for sheep has been dug into the eastern side of the hillock, but this section reveals nothing but soil material.

At the coal-bearing shale sequence at Botnsskarð, in the westernmost part of Trongisvágsdalur on the south-east flank of the mountain Tindur, a fourth landslide (fig. 1, loc. 4) can be observed, just west of the entrance of the road tunnel and of a conspicuous fault. This landslide which is somewhat smaller than the northernmost one in the valley south of Hvalba, is situated between two lamellar zones. Its top is about 300 m a.s.l. and

Fig. 2. Landslide south of Hvalba. Viewed from the south.

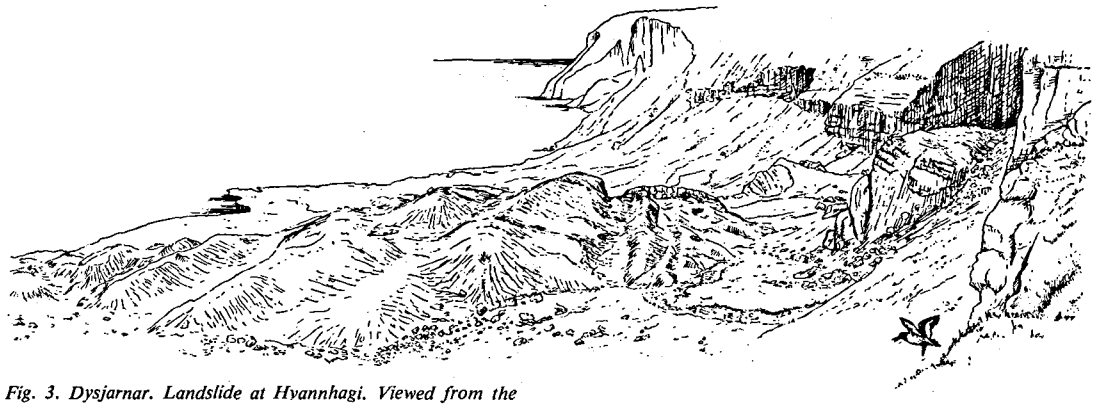

Fig. 3. Dysjarnar. Landslide at Hvannhagi. Viewed from the west.

the bottom is 240 m a.s.l. It consists of an upper portion still resting on the mountain side, and a lower portion which rests on the basalt bench just beneath the coal-bearing sequence, the bottom of which is about 260 m a.s.l. and is covered under scree and vegetation, but it can easily be traced because all the small water courses start as springs just beneath this sequence. Large fragments of basalt flows are seen in the landslide.

Landslides in the tuff-agglomerate zone

Dysjarnar (Faeroese: dys = cairn, dolmen) is a considerable landslide at Hvannhagi in the northern part of Suðuroy (fig. 1, loc. 5). At the small bay off Hvannhagi the upper flows of the lower basalt series can be seen on the shore. Then follows uphill the tuff-agglomerate zone with irregular intrusives. The uppermost part of the steep mountain side is made up of lavas of the middle basalt series. The top of the mountain scarp above the landslide is 160 m a.s.l. The boundary between the 20–25 m thick tuff-agglomerate and the overlying middle basalt series on the east side of Dysjarnar is 110 m a.s.l. (Rasmussen & Noe-Nygaard 1969, 1970). Most of the mountain beneath this boundary consists of irregular intrusive basalts.

The landslide consists of 8–10 ridges, the outermost end of the debris mass thinning out like a fan. The ridges are low, from under 1 m to about 2 m. Those nearest the back wall are somewhat higher and contain fragments of middle series basalt flows, which in their present position dip towards the back wall (fig. 3). The landslide is more than 200 m from west to east, and most of it has a dense vegetation cover. Above the landslide there are on the edge of the scarp deep gullies formed by erosion of short lamellar zones.

A smaller landslides has occurred at Seiðagjógv on the south coast of Hvalbiarfjørður (fig. 1, loc. 6). The debris mass is situated about 60 m a.s.l., its top is 70 m a.s.l. It forms a ridge about 100 m long, and part of the material still rests on the rather steep side of the coastal cliff. There are many stones on the surface of the landslide, especially on the side facing the sea. This debris mass also has a dense vegetation cover. In this area some deep gullies are cut into the lamellar zones in the mountain wall, and above the landslide two of them cross each other. At Seiðagjógv the tuff-agglomerate zone extends from the coal-bearing sequence at the coast at sea level to about 100 m a.s.l.

Landslides in connection with lamellar zones

At Blæing (fig. 1, loc. 7) in the south-eastern part of Suðuroy solifluction lobes and stone streams are found in an area about 2500 m in length and, at its widest point, about 1200 m across (Jørgensen 1972). In the southern part it is bounded towards the west by a more than 1600 m long scarp with a NW-SE trending face below which winding stone streams are found. At the northern end the scarp continues in a ridge with the same direction and parallel to the general strike direction of the lamellar zones. The earth lobes are in places 10–

20 m thick; only few stones are exposed on the surfaces. Part of the debris material may originally have been deposited as a moraine, but a major part is believed to derive from landslides along the scarp, where to the south three crescentic scars are seen.

At the north-eastern scarp of Hólmsskorafjall (fig. 1, loc. 8) about 1700 m to the north of the Blæing solifluction area, a similar but much smaller landslide can be seen on aerial photographs. It occurs below a lamellar zone running NW-SE. The top of the scarp is 240 m a.s.l. and the debris mass extends downhill about 100 m. From NW to SE it is about 450 m in length. The length of the scarp is 200 m.

The most spectacular and the largest landslide on Suðuroy is Klovningar (Faeroese: klovna = cleave). It occurs to the south-west of Øravík along the north-eastern flank of the 430 m high, wedge-shaped mountain Nón (fig. 1, loc. 9 + fig. 4). The road from Øravík to Fámjin cuts right through the debris masses. The landslide comprises a series of ridges some of which contain fragments of at least three basalt benches from the flank of Nón. This is one of the few localities where the basalt flows are rather thin compared with the average thickness of the flows on Suðuroy. The uppermost part of the debris mass consists of 4 big ridges and 6–7 smaller ones. One of the big ridges is 20 m high and 300 m long. The longest one is 700 m in north-westerly direction. To the north-east the distal part has the form of earth lobes and ends about 120 m a.s.l. The extension of the landslide from NW to SE is about 1 km, and from Nón towards NE about 600 m. The top of it is 340 m a.s.l.

The flank of Nón above the debris ridges is strewn with blocks and stones, all of dense basalt. Strips of stones are seen down the mountain side, not unlike those from the southern part of the Blæing area. The diameter of some of the blocks is 1 to 2 metres. In the small valleys formed between Nón and the ridges many stones are heaped up. Stones are also found on the front sides of the

Fig. 4. Klovningar. The biggest landslide on Suðuroy. Viewed from the south-west.

ridges. The flanks of the ridges have a thick vegetation cover. On the rear side of them, i.e. the side facing Nón, patches without vegetation reveal that the soil is argillaceous and red coloured because of the content of red tuff. Gravel of tuff is found everywhere behind the ridges and down their rear sides. A tuff layer below the lowest exposed basalt bench on the flank of Nón above the landslide is at least 70 cm thick; the lower part of it is hidden by scree.

Along the road there are sections in the debris mass, which in places are about 10 m thick. The material has a moraine-like appearance but not all of the blocks are rounded.

No lamellar zones can be detected along Klovningar on aerial photographs, but in the neighbouring broad and glaciated valley to the south they are extremely abundant, and most of them have the direction NW-SE, which coincides with the axis of Nón.

The landslides at Blæing, Hólmsskorafjall and Nón all occurred in the dip direction of the basalts.

Conclusion

Although the most prominent landslides on Suðuroy are found in somewhat different geological environments they have certain features in common. For those occurring in connection with the coal-bearing sequence and the tuff-agglomerate zone it is obvious that metre-thick coal/shale and tuffaceous deposits formed convenient lubricating layers. The formation of landslides at Nón and Blæing is believed to be dependent on the presence of NW-SE trending lamellar zones and fissures, even if no such zones have been observed where the landslides originated. Both slides are found below straight NW-SE scarps, leaving no curved scars behind them, except in the southernmost end of the scarp at Blæing. It is obvious that the landslide at the end of Hólmsskorafjall occurred along a lamellar zone with the same direction. In lamellar zone conditioned landslides the tuff layers separating the lava beds may have eased the movements due to their lubricating action.

The age of the landslides has not been precisely determined. None of them show signs of young age as they are all covered with dense and coherent vegetation. They could have originated in late or post glacial time.

Acknowledgements. The author wants to express her thanks to Jóannes Rasmussen, The Museum of Natural History, Tórshavn, for encouraging the interest in the Faeroese landslides and for help and advice. I also express my thanks to T.C.R. Pulvertaft, University of Copenhagen, who kindly improved the English text.

Dansk sammendrag

Den geologiske opbygning af Suðuroy, Færøerne, har i forbindelse med øens tektoniske mønster betinget dannelsen af adskillige fjeldskred. Skreddene er sket i den kulførende serie og i tuf-agglomerat zonen eller ud fra lamelzonerne. Materialet i den lerholdige, kulførende serie og i tuf-agglomerat zonen har virket som smøremiddel for skredmasserne, der ofte findes aflejret som en serie kulisser. De største skred på øen er sket langs brudlinier med retning NV-SØ og antages at stå i forbindelse med lamelzonerne, d.v.s. zoner med tætliggende brudlinier, hvis hovedretning ligeledes er NV-SØ.

References

Geike, J. 1880: On the Geology of the Færöe Islands. *Trans. R. Soc. Edinb.* 30, 217–269.

Jørgensen, G. 1972: An area of solifluction on Suðuroy, the Faeroe Islands. *Bull. geol. Soc. Denmark*, vol. 21, 368–373.

Rasmussen, J. & Koch, B. Eske 1963: Fossil Metasequoia from Mikines, Faeroe Islands. *Froðskaparrit*, 12, 83–96.

Rasmussen, J. & Noe-Nygaard, A. 1969: Beskrivelse til geologisk kort over Færøerne. *Danm. geol. Unders.* række 1, 24, 370 pp.

Rasmussen, J. & Noe-Nygaard, A. 1970: Geology of the Faeroe Islands. *Danm. geol. Unders.* række 1, 25, 142 pp.