

Reports on Iceland Field Trips (August 2003)

*Excursion to Reykjanes peninsula (18 August 2003) -
Report by Jean Poesen and K. U. Leuven*

Guðrún Gísladóttir and Vigdís Hardardóttir organised this mid-conference excursion to the area Southwest of Reykjavik in order to illustrate land formation, land use and land use conflicts, past and on-going land degradation.

Our first stop was ca. 10 km from Reykjavik in a bumpy landscape which developed on post-glacial historical (1000 - 1226 AD) lavaflows colonised by mosses. Here we witnessed (and smelled) what happened with the remains (i.e. heads and bones) of cod. After air-drying these fish remains, they are processed for fish powder!

At the second stop near Kleifarvatn lake, we could observe the impacts of a recent earthquake on the lake level, i.e. a 4 m drop down!

The third stop was at Krisuvik. Here we could see and smell hotwater springs in a colourful landscape. This particular site was shaped after a hydrothermal spring exploded.

Our excursion then continued along an explosion crater with a lake (with water having a pH of 2!) to a refreshment stop at Krisuvikurhverti organised in a very small church built from driftwood. Based on detailed accounts of how people lived in this part of Iceland, as reported in historical documents (Jarda book), the evolution of land use and its impact on the environment was reconstructed. In this nowadays treeless area, we were informed that in 1703 local farmers still produced charcoal from birch trees. In the next 150 years, charcoal production decreased whereas the number of farms in the area increased. People survived on meat from sheep, fish, eggs and birds caught on the nearby sea cliffs. Because of intense forest cutting and overgrazing, intense water and wind erosion occurred, resulting in strongly denuded areas with spectacular *rofabards* (i.e. Icelandic name for up to 2 m high escarpments eroded in earth and capped by grass mats) separated by low-lying areas covered by stone pavements in which we could observe stone polygons and stone stripes.

A breath-taking picnic was organised on top of a coastal cliff where we could observe many sea-birds (including puffins) and even whales.

At the next stop (Husholmi) we started a two-hour walk into a fascinating historical lavaflow landscape. Here we were shown how farmers were forced to move from their original sites following a volcanic eruption in the 12th century. During this walk, we experienced the consequences of a low pressure moving over Iceland. When reaching the bus, all of us were soaked. We also experienced that soils, rich in allophane (clay type) are thixotropic. As a consequence of this phenomenon, our bus got stuck in the muddy road and despite huge efforts by all participants to repave the road, we had to give up and walk back home in the rain. Meanwhile, Guðrún Gísladóttir was able to warn a rescue team of Grindavik. Thanks to the efficient action of these volunteers, and after a cup of coffee, we reached Reykjavik before sunset!

*Excursion to Southern Iceland (20 August 2003) -
Report by Elna van Niekerk*

On this first day, the '*rofabard* brigade' (as Hanoch started calling this group) set out from Reykjavik to explore Southern Iceland with Guðrún Gísladóttir, head of the department of Geology and Geography of Iceland University, as our very competent guide. She was assisted by Fanney Gísladóttir (no relation) from the Icelandic Soil Conservation Service.

It was not a typical Icelandic day since the weather was perfect. The sun was shining and the wind was often only a breeze. We set out from the City Hotel with a new 4 WD bus and drove in a westerly direction across basic and intermediate interglacial and supraglacial lava of the Upper Pleistocene (younger than 0,8 m.y.). Most of the lava fields are covered with moss heath. Our first stop was at Pingvellir, which was already visited on the 16th August as part of a Conference excursion, but as the weather was so good, a photo-stop at this historic site was again undertaken. It is situated on the tectonic plate boundaries of the Mid-Atlantic Ridge and therefore crustal rifting is evident.

From Pingvellir the group travelled in a northwesterly direction across basic and intermediate hyaloclastite and pillow lava of the Upper Pleistocene. Several areas of Birch woodland were admired. The group stopped at one of the river crossings for tea and coffee and discussed the use of Alaskan Lupin to re-vegetate the area. The influence of sheep farming on the Icelandic environment was also discussed but the focus of the day was on eolian material and erosion.

The group drove further in a northwesterly direction, crossing basic and intermediate postglacial lava to Skaldbreiður, an active shield volcano. Several photo-stops were made on the way where the desert pavement and *rofabard* formation was discussed and debated. The group enjoyed lunch on one of the black Icelandic deserts. They were formed because of the retreating glaciers and glacier lakes. These deserts are a big concern in terms of the development of eolian material, which may travel large distances by wind action and cause severe land degradation in areas already very sparsely vegetated.

From our lunch spot the group travelled west again, with Skaldbreiður and several table mountains on our right and Langjökull glacier on our left, across the basic and intermediate postglacial lava. One of the sand traps set by Fanney was emptied to show the group how much sand is actually moved by the wind. From here the group travelled in a southerly direction to Geysir across the hyaloclastite and pillow lava. Geysir is a breathtaking geyser spouting out superheated water every 10 to 15 minutes. From Geysir the group travelled to Gullfoss onto basic and intermediate extrusive rocks of the Upper Pliocene and Lower Pleistocene (0,8 to 3,3 m.y.). Most of it is covered by sand and gravel. At Gullfoss, a magnificent waterfall, the group had quite a lengthy stop to take pictures and debate the rate of backward erosion of the waterfall.

The group left Gullfoss and even though the sun was still shining drove to Laugavatn where we stayed overnight in a school that doubles as hotel accommodations during the summer holidays. Here the group had a delicious supper and enjoyed an evening of poetry and singing with true Icelandic hospitality.

*Excursion to Laugarvatn-Skógar (21 August 2003) -
Report by Freddy Rey*

We first crossed an agricultural zone, which was wetlands after the last glaciation. Horses are bred in many farms. This region is very active: steam vents, recent earthquakes (of which one was 6.5 on the Richter scale). There are large rivers (Hvitá, Þjórsa), where several dams were built, especially for production of electricity.

We then approached to the Hekla volcano (photo 1), which has had many eruptions (more than 20 since 1104). The most recent one occurred in 1970. Significant damage was caused by tephra from eruptions; in particular, many sheep were killed (bus stop at Arnes).



Photo 1: The hekla volcano

At Gaukshófi (bus stop), we saw a nice and very windy viewpoint on a large valley which was entirely recovered by black layers of tephra after an eruption of Hekla volcano in 1970 (photo 2). This area was then revegetated in the 1980s and 1990s with lupin (*Lupinus nootkatensis*), conifers and fertilizer. In some places, natural recolonization by lupin is important. But the problem with soils in Iceland is that they are very permeable, so that water, nutrients but also fertilizers rapidly infiltrate in soils.



Photo 2: Viewpoint from Gaukshófi

Bus stop at Stóng. We visited a farm which was abandoned after an eruption of Hekla in 1104. Different layers of tephra with different colors could be observed, the one of 1104 being white with coarse materials.

We then crossed the area called „the ocean”, large flat area that is flooded during winter (photo 4). This area has been revegetated, using aircraft and tractors. Reclamation was made with different species, especially with *Deschampsia*, an Alaskan species, the seeds of which are produced in local Icelandic nurseries. The farmers participated in the reclamation works, and they were helped for that.



*Photo 3: Waterfall Hjalparfoss
(Photo stop, © J. Poesen, 2003)*

But some revegetation works were entirely re-covered by black layers of tephra after eruptions. However, we saw an „island” of vegetation which has not been buried by tephra. Vegetation is there composed of thick shrubby plants, such as willows (*Salix* sp.) and *Betula pubescens*. This island can represent a picture of the landscapes which were present before the volcano eruption,

and also a picture of the landscapes which could be rehabilitated after reclamation. Species from this island could be used for revegetation.

We then saw hydroelectric dams.

Long bus stop at the headquarters of Icelandic Soil Conservation Service (SCS) at Gunnarsholt. We were welcomed by the director of the SCS, who explained the history of the SCS (with the use for seeding of famous aircraft such as the Douglas DC 3) and its main roles today: preserving soils against erosion and revegetating degraded lands.

We saw a presentation about maps (vegetation, erosion, reclamation operations...) and land classification in Iceland with Arc-View GIS. We visited the production unit of seeds used for revegetation (*Leymus arenarius*, *Lupinus nootkatensis* ...). We also looked at an old video of 1944 presenting revegetation operations in the past.

We then visited experimental plots of revegetation. 40 plots of 1 ha each, where different reclamation techniques are being tested. A discussion occurred between the participants of the conference field trip to comment on the reclamation experiments and to propose solutions.



Photo 4: The „ocean“

*Excursion (22 August 2003) -
Report by Wojciech Zglobicki*

We had extreme sunny weather in the morning. No clouds. Are we still on the Iceland? A short walk to the Skógafoss (waterfall) just after breakfast. Then another great point. We explored the end of glacier's tongue (Sillheimajökull). The glacier was in fact white and black (because of the tephra layers and ridges). Amazing view! Some of us practised walking on the glacier surface. Going up is easier but going down is for sure faster. A few people checked it.

After that we stopped in a village called Vik to leave Hanoch and had some ice-creams.

Next stop a „picnic under the hanging rock“. We listened to the story about origin of the name of Katla subglacial volcano. It is very interesting why names of almost all Icelandic volcanoes take its name after female names? After lunch we climbed on the top of the former island. The second settler on Iceland was killed there (875 AD). From the top of the hill we saw Vatnajökull and an outwash plain with vegetation strips made to protect the road from the sandstorms. Each of us signed also a nice guest-book stored in a small box.

The next point was lava field. Our guide and organiser of the meeting - Guðrún Gísladóttir - asked everybody to lie down on the lava. Thick layer of moss - very comfortable natural bed, covered rocks. Almost everybody experienced such a nice exercise. Some of the participants would like to wait a few hours lying on the moss to see the Aurora Borealis. Suddenly „a sexy landscape“ appeared in the middle of the lava field. Geologists use the term „pseudocraters“ for such forms but everybody knows what we saw. At the end of the day we had dinner at Efrivik. It was a village where we spent the last night of the post conference tour. We were sleeping in very nice, small houses made of wood.

Excursion (23 August 2003) -

Report by Eygerður Margrétardóttir and Björg Gunnarsdóttir

We set off at 8:30 from Efri-Vík in Landbroti where we had spent the night. It had been raining during the night and the humidity could still be felt. The visibility was not so much but the weather was nevertheless mild and warm. The travellers had not been fortunate enough to see the Northern lights (Auroras) as some of them had at the night before, but they had seen a little red star low on the sky. Nobody was sure what it was but someone claimed it was Mars that had not been so close to earth in 60.000 years.

We drove back the same way we came the day before, along Skaftáreldahraun where the moss had become more greenish than it was when everyone rested in the soft dry moss, the day before. We headed to the river Eldvatn; which is in the middle of two lava flows, which have had a critical impact on the flow of the river. The lavas are Skaftáreldahraun from the year 1783 and older basaltic lava that is more than 1100 years old. The river is very successful in breaking down land by the riverbed especially when it overflows.

The 'tourist farmer' in Efri-Vík had told us at breakfast that there had been many earthquakes by Krísuvík, in the southwest of Iceland, during the night, some strong enough to being felt all the way to Snæfellsness. After listening to the nine o'clock news, Guðrún translated the story about the earthquake into English. The quake had been a 5 on a Richter scale and a few aftershocks had followed up to 3,9 on Richter scale. Nobody was hurt and no real damage was made on constructions. Someone in the group got the idea that we should drive to the earthquake area and stay there during the night to experience earthquakes, but thankfully that idea was terminated.

Next stop was by Skaftá River, where the town Kirkjubæjarklaustur could be seen. A few majestic swans swam near by, ignoring all the people who were taking photos of them. The landscape by the river was rather erotic, with hills that looked like beautifully created breasts that every woman would be happy to have. All the landscape was rounded and soft. By the river was a 'rofabard' (erosion escarpment) where underneath the thin vegetation, coarse pieces of lava could be seen. Those pieces originated from the Skaftáreldar eruption but we could also see older lava flows. Many took a piece as a souvenir of their tour to Iceland.

Crossing rivers many times, added the spice of primitiveness and danger to our drive through the barren wilderness. After a short visit to the bathroom the travellers were able to look around and take some pictures in Hólaskjól. There was a fox cub that had lost his mother. It seemed like the people who took care of the pavilion that was there had taken his mother's place. It was obviously raised on chops and other luxury food and rambled around for the tourists' enjoyment, when it wasn't taking refuge in a little hole by the pavilion.

Next stop was in the north of Hólaskjól. There we could see two clear spring-fed rivers flow into the muddy glacier river Skaftá which developed a nice colour scheme by the conflux. There were lavas from the modern times and also rocks from the last part of the ice age.

Near the road by the Eldgjá gulch we took a look at three large 'rofabards'. They lay high in the landscape and could



be compared with three humps on a very long worm. Perhaps they owed its existence to the road above and were more likely to have originated from run-off from upslope than wind and water had dug its way into the soil although it could have played some role in the formation of the 'rofabard'.

It was decided to hold a contest of the best photo taken in the tour and everyone should send his or her contribution by e-mail to Arthur Conacher.

We took a coffee break by Eldgjá which Ófærufoss, means inaccessible waterfall, flows through. Natural stone-made bridge was over Ófærufoss until the year 1993. Then the area was much more accessible. Despite lots of nerves and determination we couldn't walk down the gulch because the way didn't look safe. One could hear that large part of the group was very relieved when Guðrún told them that we wouldn't go down the gulch. Instead of walking down the Eldgjá we drove down and walked in to it, but we didn't have the time to walk all the way to Ófærufoss.



Next we drove from the basaltic lava area over rhyolite lava that originates from the year 1418. The area around Torfajökull is one of the largest rhyolite areas in Iceland. When we came to Landmannalaugar we could see how thick the lava is. There is Laugahraun that has its roots in the easternmost part of Brennisteinsalda high above the service centre in Landmannalaugar.



We had lunch in a small lava hole nearby Landmannalaugar. Then we drove to the service centre in Landmannalaugar and took a walk in the area to experience the colours that the rhyolite has created.

Large part of the group took an hour walk, but some went swimming in a hot river nearby after a short walk and others just sat in the lava to be inspired by the beauty of the colours in the lava.



After having enjoyed the good food Guðrún served us we drove back to the Hekla volcano area in Þjórsárdalur valley passing a lot of hydropower stations in both the Tungná and Skaftá rivers. The travellers got a little glimpse of an Icelandic sandstorm that moved around the dry sand deserts on their way to Flúðir.

In the Flúðir Hotel we had dinner. Delicious fish for a starter, chicken in main course and cheesecake in desert. Arthur Conacher and Moshe Inbar both held speeches, thanking Guðrún for successful tour in Iceland and gave her a gift on behalf of the group. A great search was held to find a good artist to decorate a book that would also be a gift to Guðrún but he was very hard to find.

We headed back to Reykjavík around nine because the tour was soon over. On the way people wrote greetings in the book for Guðrún. Björg said her goodbyes in Hveragerði where fireworks lightened up the sky. Most of us were very tired but happy after an excellent tour around Southern

Iceland and rested on the way back to Reykjavík. But everyone, especially Arthur, were woken up and encouraged to sing an Icelandic song that suited the tour. Everyone participated in the singing in amazingly good Icelandic under the control of Guðrún.

When we came to Reykjavík the travellers were returned to their Hotels one by one. Most of them had a long trip to get home in head of them the next day.

Further Reading:

Guðrún Gísladóttir, 2003: *Land Degradation and Mitigation: Problems - Conflicts - Solutions. Post Conference Field Trip South Iceland August 20-23*, Field Trip organised by Guðrún Gísladóttir, University of Iceland, with support from Soil Conservation Service Iceland and Agricultural Research Institute - Environmental Department, Iceland.

Olafur Arnalds, Elin Fjola Þorarinsdóttir, Sigmar Metusalemsson, Asgeir Jonsson, Einar Gretarsson og Arnhor Arnason, 2001: *Soil Erosion in Iceland*, Soil Conservation Service, Agricultural Research Institute, Iceland.