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Figure 1: Bláfjöll Mountain and Stóra-Bollhrauni lava field

In many ways, Iceland is a fascinating part of the Earth. Outside, it is covered with snow (as its name suggests) and surrounded by the sea, and inside, it glows (hence the colors of Iceland flag: white, blue and red). Compared to the “leftover” Earth, it is often “extraterrestrial”. Its remarkable landscape is due to numerous (about 130), mainly basaltic volcanic mountains, fields of lava, snow and ice, geysers, glacial glaciers and glaciers. Iceland belongs to the volcanic most active areas of the Earth because it is located on the Mid-Atlantic Ridge, lying on the border between the North American and Eurasian tectonic plates that are moving one from the other. The Mid-Atlantic Ridge “passes” from the north to the south more or less in the middle of the island, and the uttermost southwestern part of Iceland (Reykjanes peninsula) continues to the Atlantic Ocean. About thirty kilometers south of Reykjavik, approximately in the area where the border of the Reykjanes peninsula lies, there stands Bláfjöll Mountain (Blue Mountain, see **Figure 1**) and the Stóri-Bolli large crater of about 150 m in diameter.

At the foot of Bláfjöll Mountain lies the Stóra-Bollhrauni lava field (see **Figure 1**), and in it the Leiðarendi lava tube (see **Figure 2**). Lava tubes are natural struc-

tures in the form of a pipeline through which the lava has traveled below the surface. During an eruption, the lava usually flows through the channels where it remains hot, while the outer parts are cooling. During the cooling process, the outer channels begin to create walls because the lava solidifies. These channels can penetrate deeper and shape the tunnel that continues to flow magma (less lava). Interestingly, the lava loses heat at such a flow for only about 1°C per kilometer of flow (<http://volcano.oregonstate.edu/lava-tubes>). Such a tunnel can be described as a space that occurs when the surface part of a lava stream cools and cures, while the lava of less viscosity under this hardened surface layer continues to flow. A broad lava-flow field often consists of a main lava tube and a series of smaller tubes (<http://volcanoes.usgs.gov/Products/Pglossary/LavaTube.html>), which are often called “volcanic veins”. Such tunnels can be ten meters wide or more and very long – ten or even more kilometers (e.g. on the Hawaii islands). The longest tunnel in the European Union is the Spanish “Cueva del Viento-Sobrado”, 17 kilometers long, and situated on Tenerife island (<http://www.caverbob.com/lava.htm>).

A narrow entrance in the lava tube Leiðarendi (see **Figure 2**) is barely noticeable on the surface of the ground, and perhaps that is the reason why this lava tube



Figure 2: The entrance to the lava tube Leiðarendi



Figure 3: The interior of the lava tube Leiðarendi



Figure 4: Ice in the lava tube Leiðarendi



Figure 5: Stalagmites in the lava tube Leiðarendi



Figure 6: The roof of the lava tube Leiðarendi

Figure 7: Troll's toilet in the lava tube Leiðarendi

was only just found and explored in 1992. The bones of sheep that had fallen inside and couldn't get out were found, according to which the lava tube was named. Namely, the name Leiðarendi can be translated as "the end of a journey/path".

The lava tube Leiðarendi is 900 m long and divided into two separate tunnels, which are subsequently reconnected. The genesis was estimated at about 2000 years ago. As you enter the lava tube, sculptures of ice can be seen (see **Figures 3 and 4**), the exceptional shapes and the rock textures, the stalagmites (see **Figure 5**), the stalactite, the roof from which the lava drizzled until it cooled (see **Figure 6**).

In Iceland, great attention is paid to the protection of the environment and nature, both on the surface and below it. Therefore, boundaries are marked by placing chains in the lava tube in order to prevent visitors from damaging the magnificent underground forms. Even that was not enough to prevent someone from taking the largest stalagmite from the lava tube – someone probably thought that it would look better somewhere in their living



room than here in the underworld. So, in **Figure 5** some of the smaller stalagmites can be seen along with a replica of the largest one. Besides the protection of the environment and nature, most Icelanders support folk tales about the existence of elves and trolls and there is a rich legacy tradition of rock formation throughout Iceland which were tanned after the Sun was shrouded. Here, in the underground, there is also evidence that trolls exist and that they live in the underworld, and it is a troll's toilet (see **Figure 7**), which is also enclosed by chains.



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Slika 1: Planina Blálfjöll i polje lave Stóra-Bollahrauni

Island je po mnogočemu fascinantan dio Zemlje. Izvana je prekriven snijegom i ledom (kako mu i samo ime govori) te okružen morem, a iznutra užaren (odatle i boje na zastavi Islanda: bijela, plava i crvena). U usporedbi s „ostatkom” Zemlje nerijetko djeluje „izvanzemaljski”. Svoj izniman krajolik može zahvaliti brojnim (oko 130), uglavnom bazaltnim vulkanskim planinama, poljima lave, snijega i leda, gejzirima, glečerskim lagunama i ledenjacima. Island spada u vulkanski najaktivnija područja na Zemlji jer se nalazi na srednjoatlantskome grebenu, odnosno leži na granici između sjevernoameričke i euroazijske tektonske ploče koje se razmiču. Srednjoatlantski greben prolazi od sjevera prema jugu manje-više sredinom otoka te na krajnjemu jugozapadnom dijelu Islanda (poluotok Reykjanes) nastavlja u Atlantski ocean. Tridesetak kilometara južno od Reykjavika, približno na mjestu gdje počinje poluotok Reykjanes, nalazi se planina Blálfjöll (Plava planina, **slika 1**) i krater Stori-Bolli širok oko 150 m u promjeru.

U podnožju planine Blálfjöll nalazi se polje lave Stóra-Bollahrauni (**slika 1**), a u njemu tunel lave Leiðarendi (**slika 2**). Tuneli lave (engl. *lava tube*) prirodne su tvorevine u obliku cjevovoda kroz koje je lava putovala ispod

površine. Tijekom erupcije lava obično teče kanalima u kojima ostaje vruća, dok se vanjski dijelovi hlade. Pri hlađenju se oko kanala počinju stvarati zidovi jer lava očvrstnjava. Ti kanali mogu prodirati dublje i oblikovati tunel kojim i dalje teče magma (rjeđe lava). Zanimljivo je kako lava pri takvu tečenju gubi toplinu za samo oko 1 °C na svaki kilometar toka (<http://volcano.oregonstate.edu/lava-tubes>). Takav se tunel može opisati kao prostor koji nastane kada se površinski dio toka lave hladi i stvrdnjava, dok lava manje viskoznosti ispod toga stvrdnutog površinskog sloja nastavlja teći. Na velikoj površini prekrivenoj lavom (polje lave) često se može opaziti glavna i niz manjih cijevi (<http://volcanoes.usgs.gov/Products/Pglossary/LavaTube.html>), koje su često nazvane „vulkanske vene”. Takvi tuneli mogu biti široki desetak, pa i više metara te vrlo dugački desetak, pa i više kilometara (npr. na otočju Hawaii). Najdulji tunel lave u Europskoj uniji jest španjolska Cueva del Viento-Sobrado, dugačka 17 km, smještena na Tenerifima (<http://www.caverbob.com/lava.htm>).

Uzak ulaz u tunel lave Leiðarendi (**slika 2**) na površini terena jedva je zamjetljiv, pa je možda to razlog zašto je ovaj tunel pronađen i istražen tek 1992. godine. Pri tome su pronađene kosti ovce koja je upala unutra i nije uspjela izići, a prema kojoj je tunel imenovan. Naime, ime Leiðarendi može se prevesti kao „kraj putovanja/puta”.

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Slika 2: Ulaz u tunel lave Leiðarendi



Slika 3: Unutrašnjost tunela lave Leiðarendi



Slika 5: Stalagmiti u tunelu lave Leiðarendi



Slika 4: Led u tunelu lave Leiðarendi



Slika 6: Krovina tunela Leiðarendi

Tunel lave Leiðarendi dugačak je 900 m i grana se u dva odvojena tunela koji se kasnije ponovno spajaju. Postanak je procijenjen na prije približno 2000 godina. Na ulasku u tunel mogu se vidjeti skulpture od leda (slike 3 i 4), iznimni oblici i teksture stijena, stalagmiti (slika 5), stalaktiti, krovina s koje je kapala lava dok se hladila (slika 6).

Na Islandu se velika pozornost pridaje zaštiti okoliša i prirode, kako na površini, tako i ispod nje. Stoga su u tunelu označene granice postavljanjem lanaca kako bi se spriječilo posjetitelje da oštete veličanstvene podzemne oblike. Čak i to nije bilo dovoljno da spriječi nekoga da odnese najveći stalagmit iz tunela – vjerojatno je mislio da će bolje izgledati negdje u dnevnome boravku negoli ovdje u podzemlju. Stoga se na slici 5 uz neke manje stalagmite može vidjeti i replika najvećega. Osim zaštite okoliša i prirode većina Islandana podržava i narodne pripovijesti o postojanju vilenjaka i trolova, te postoji bogata tradicija legendi vezanih za stijenske oblike



Slika 7: Toalet trolova u tunelu Leiðarendi

diljem Islanda, prema kojima su to trolovi skamenjeni nakon što ih je obasjalo Sunce. Ovdje u podzemlju također postoji „dokaz” da trolovi postoje te da obitavaju u podzemlju, a radi se o toaletu trolova (slika 7), koji je također ograđen lancima.