

Field trip to Veiðivötn – Heljargjá – Jökulheimar

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Veiðivötn –Steindór Guðmundsson

Bárðarbunga volcanic system in the eastern volcanic zone is the biggest volcanic system in Iceland, 15-25 km wide and extends over 180 km from the **Torfajökull volcano** in the south to the **Dyngjufjöll mountains** in the north. The system derives its name from a great central volcano situated beneath north western **Vatnajökull glacier**. Moreover the **Bárðarbunga volcano**, being 2009 m high and with a 10 km wide caldera, coincides with the center of the Icelandic hot spot. It may not therefore come as a surprise that the **Bárðarbunga volcanic system** is one of the most active and productive in the world.

As an exception from the rule the **Bárðarbunga volcanic system** has two central volcanoes (instead of one), with the second volcano **Hamarinn** (1573 m) situated south west of the

Bárðarbunga volcano, also covered by the **Vatnajökull ice sheet**. In the northern part of the system it is worth to mention one of the biggest shield volcanoes found in the country, **Trölladyngja** (1460m), from early Holocene like other shield volcanoes on Iceland.



Veiðivötn e. Fishing lakes –Steindór Guðmundsson

Our fieldtrip is headed to the southern part of the volcanic system, sometimes referred to as the **Veiðivötn fissure swarm**. Here, many volcanic and tectonic features with SW lineament are recognized. Those include: crater rows, single craters, cinder cones, faults, fissures, rift valleys, hyaloclastite ridges and mountains, pillow lava sheets along with many lakes. Here we find the **Tröllagígar craters** which were formed during the latest eruption in the system, between 1862-1864 AD, and produced the **Tröllahraun lava sheet**. This is where we also find the great rift valley **Heljargjá**, the mountain **Póristindur** (826m) and the extremely long volcanic fissure **Vatnaöldur** which prouds itself with a beautiful lineament of craters and cindercones formed in 870 AD. The cindercones **Máni, Fontur and Saxi** in the vicinity of **Heljargjá rift valley** were probably formed in the early Holocene. Gravity measurements show that the cindercones are part of a crater row, not unlike those seen in the **Vatnaöldur fissure**, which has been buried beneath 50-100 m thick lava in Heljargjá valley. The craters

found in the **Veiðivötn** lakes were formed during the last major eruption in the fissure swarm in 1477 AD.

All lavas originating from the **Veiðivötn fissure swarm** have common chemical composition of tholeiitic basalt. Recent GPS measurements show that the location of the maximum surface velocity gradient in the eastern volcanic zone is on the **Veiðivötn fissure swarm**, presumably the locus of subsurface magma accumulation (LaFemina et al., 2005).

The great Þjórsárhraun lava sheet was formed during a magnificent fissure eruption which occurred close to the **Heljargjá rift valley** and south-west of the **Gjáfjöll mountains**. It has been dated back to 6500-6700 BC. The fast spreading lava ran west south west all the way to the sea, or a distance of 140 km. The eruption site has been covered by more recent lavafloes but geologists believe that the fissure was 20-30 km long. The average thickness of the lavaflow is 22 m and it covers an area of 950 km². The minimum volume is thus 21 km³ but could also be closer to 30 km³. Even the lower number tells us that **the Þjórsárhraun lava is the greatest lavaflow erupted in a single eruption on earth during the Holocene!**



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Kristín Jónsdóttir put together using the following references:

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