

# Iceland's Eastern Volcanic Zone – Field Trip

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The Eastern Volcanic Zone (EVZ) extends from the Bárðarbunga and Grímsvötn central volcanoes within the Vatnajökull ice cap in the northeast, to the Vestmannaeyjar central volcano in the southeast.

Style of activity in the zone is very different north and south of its junction with the South Iceland Seismic Zone (SISZ). Rifting structures (fissure swarms and hyaloclastite ridges) dominate north of the junction, in the so called Eastern Volcanic Rift Zone (EVRZ). South of the junction with the SISZ, little spreading has occurred and large central volcanoes are the dominating structures. This part of the EVZ is called the Eastern Volcanic Flank Zone (EVFZ).

Geodetic measurements indicate that spreading across the EVZ mainly takes place across the EVRZ, but not the EVFZ. At the latitude of the EVRZ, majority of the 2 cm/year spreading in Iceland is currently being accommodated. The deformation is distributed over more than 100 km wide area, resulting in low strain rates in the rift zone and long time intervals between major rifting events.

Central volcanoes visited during the field trip include the Hekla, Torfajökull, Katla and Eyjafjallajökull volcanoes. Fissure swarms will be visited as well, including those of Vatnaöldur and Veiðivötn (eruptions in about 1480, 900, and 150 A.D.), and the Eldgjá fissure that erupted in 934.

We start our traverse of the EVZ at the Hekla volcano. An outline of its regional geology and volcanic history is given in appendix 1 (from Sigmarsson et al., 1992).

Then we continue to the Torfajökull, Iceland's largest silicic volcanic centre. The latest eruptions produced silicic tephra and lava, and were simultaneous with basaltic eruptions in the Vatnaöldur-Veiðivötn fissure swarm. Characteristic doubled coloured tephra layers are formed, with white tephra from the Torfajökull, and black tephra from Veiðivötn. We will visit a tephra profile demonstrating this magma mixing, as well as getting an overview of the Vatnaöldur-Veiðivötn eruptive fissures (weather permitting). We will visit Landmannalaugar, with their geothermal springs (good for bathing) and a silicic lava field erupted in 1480. Recent eruptive activity in the area is described in an appended paper by Larsen (1984).

After visiting Landmannalaugar we will drive to Eldgjá, which is a part of the fissure swarm that links to the Katla volcano. It erupted catastrophically in 934, with the largest basaltic lava flood eruption on Earth in the last millennium (about 19.6 km<sup>3</sup>). This event and its environmental consequences are described in an appended paper by Thordarson et al. (2001).

After visiting Eldgjá we will drive towards the south coast, and head west along the lowlands, with views towards the subglacial Katla and Eyjafjallajökull volcanoes. These volcanoes have been the sites of recent intrusive activity and elevated seismicity. Katla volcano is currently inflating. Appended paper by Sturkell et al. (2003) provides a general description of the geology and the current unrest episode.

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