

**Tectonics of neovolcanic fissure swarms in
Northern Iceland**

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TECTONICS OF NEOVOLCANIC FISSURE SWARMS IN NORTHERN ICELAND

1. INTRODUCTION

The Krafla volcanic system in Northern Iceland is situated in a fissure swarm trending north. Flanking the Krafla fissure swarm are 2-4 fissure swarms having the same trend, but with apparently less volcanic activity (in the Krafla area) in postglacial times.

The Þeistareykir fissure swarm which is west of the Krafla fissure swarm has been active in postglacial times, but activity has been rather small in the last 2000 years. The Fremrinámar fissure swarm which is east of the Krafla fissure swarm has also been active in postglacial times. East of the Fremrinámar fissure swarm is the northward extension of the Askja fissure swarm with extensive activity, mainly in the Askja region. The relationship between these fissure swarms is not known and they have not been studied as one unit.

2. TECTONIC PROJECT

The structure of the above mentioned fissure swarms has only to a limited extent been studied, and their interaction is not known if it is any. It is e.g. not known in detail if two swarms have been active at the same time or if one swarm is active at the time. The most complete studies are on the Krafla fissure swarm and a part of the Þeistareykir fissure swarm (the surroundings of the geothermal area nesting in the central part of the swarm has been mapped in detail).

In order to understand the Krafla system and the volcano-tectonic history of the Krafla fissure swarm as a whole, it is essential to map and study the fissure

swarms at either side. The rifting has taken place in possibly four different fissure swarms in the Krafla area and to be able to interpret geophysical and geochemical surveys it is considered vital to get the whole picture of that area, not only an isolated view of the Krafla system alone.

It is proposed to map the rift in northern Iceland with emphasis on several points, the main ones being the following:

- Fissures, fractures: age, length, dilation
- Faults: age, length, throw, dilation
- Eruption sites: age, length, dilation, faulting
- Fissure swarms: age, length, activity, extent
- Formations, lavas: age, dip, composition
- Comparison with other studies

The parts of the fracture systems already mapped will be included into this study and reviewed. Badly or not mapped areas will be mapped from aerial photographs, satellite images and field studies. Possibly some fixed geodetical points might be added to existing ones to be surveyed in the future.

The result of this part of the project would be an accurate map in 1:50.000 (or smaller) scale of the northern part of the neovolcanic zone in Northern Iceland. The result would include as accurately as possible dilation of fissure swarms normal to faults, fissures, volcanic eruption sites, rotated blocks etc. Analytical work on the fissure systems would lead to interpretation of the volcanism, rifting, rifting episodes etc, and with input from others it would shed some light on the relationship between tectonics and chemistry, volcanic history,

seismicity etc.

3. SCIENTIFIC COLLABORATORS

The collaborators suggested for this project are a group of geologists working in England. They have been involved in structural analysis of fracture systems, e.g. in coalmines and have extensive experience in this field. The leader of this group is:

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**PROPOSED
STUDY
AREA**

Peistareykir

Krafla

Fremrinámar

FISSURE
SWARMS

Askja

Hofsjökull

Tungnafellsjökull

Bárðarbunga

