



Meistaraverkefni / *Mastersproject*

**Kortlagning berggrunnns  
Breiðuvíkur á Austfjörðum**  
***Mapping the Bedrock Geology of  
Breiðavík, East Iceland***

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Leiðbeinandi / *Supervisor*: Olgeir Sigmarsson



HÁSKÓLI ÍSLANDS  
JARÐVÍSINDAÐEILD



# Overview of the presentation

- The area studied
- Previous research
- Methods and data
- Breiðavík geology
- Conclusions
- Hypotheses





# Research area



- Breiðavík - inlet in Víkur, northernmost part of the East Fjords
- Research area: 30 km<sup>2</sup>
- Defined by mountains surrounding the inlet and valley
- Breiðavík central volcano (first described by Lúðvík E. Gústafsson et al., 1989)





# Previous geological research in Víkur

## Geological mapping

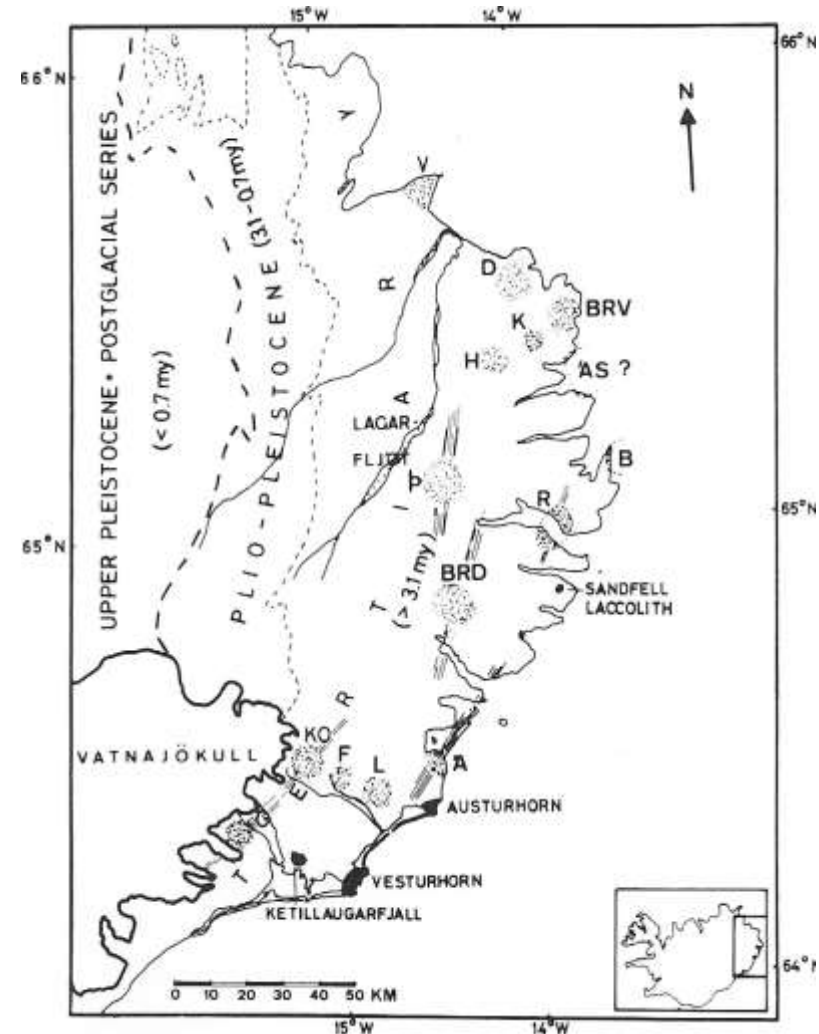
- Dyrfjöll central volcano, Lúðvík E. Gústafsson (1992)
- Just north of Loðmundarfjörður:
  - Ray Dearnley (1954)
  - Manuel Lapp (1990) – silicic rocks
  - Bernhard Lapp (1988) – basaltic rocks
  - Lutz Thomas (1988) – pyroclastic rocks
  - Lúðvík E. Gústafsson et al. (1989) - Kækjuskörð

## Zircon age dating

- 12 Ma – 13 Ma
  - Edward Martin & Olgeir Sigmarsson (2010)
  - Edward Martin o.fl. (2011)
  - Tamara Carley, Calvin Miller and Olgeir Sigmarsson (unpublished)
  - Sylvia Berg et al. (2014)

## Specifically in Breiðavík

- Hvítserkur, Olgeir Sigmarsson (2011)



Lúðvík E. Gústafsson o.fl. (1989)



# Methods and data

- Data
  - Black-and-white aerial photographs (LMÍ, 1994); colour (NASA JSC, 1073)
  - SPOT satellite images (Spot Image, 2004)
  - Aerial landscape photographs (Skarphéðinn Þórisson and Erla Dóra Vogler)
  - Hiking map: *Víknaslóðir* 1:75,000 (Helgi M. Arngrímsson & Hafþór S. Helgason, 2007)
  - Aerial photograph database Loftmyndir ehf. 78 A4 photographs, 1:4000
- Field work: July-September 2012 and July-August 2013
- Bedrock mostly analysed in the field –Walker’s classification method (1959, 1960)
- 21 thin sections of bedrock samples
- 2 chemical analyses
- 1 röntgen analysis of spring deposits
- Bedrock map in ArcGIS 10.2, scale 1:4000. Thesis map 1:50,000
- All photographs, maps and drawings here by Erla, unless otherwise stated.





# Breiðavík geology

- Sediments covering bedrock
- Exposed bedrock
  - South part of research area
  - North part





# Breiðavík geology

## Sediments covering bedrock

- Moraine often closest above bedrock
- Scree slopes
- River sediments on valley floor
- Shoreline terraces 20-40 m AMSL





# Breiðavík geology

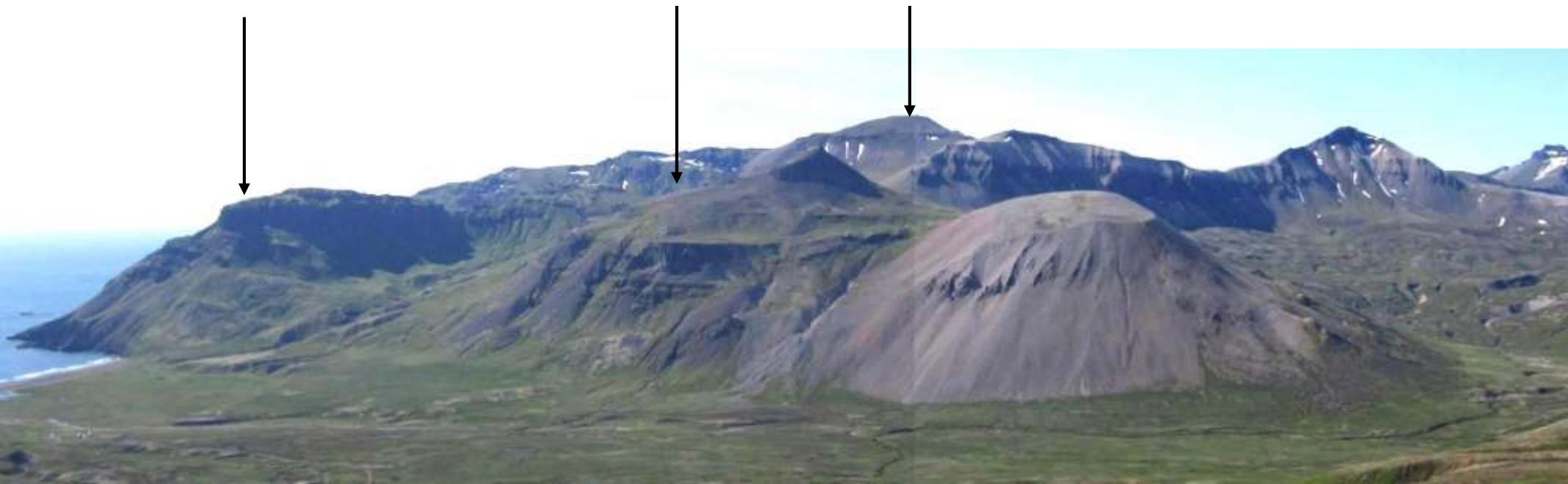
Bedrock – south part

- 3 cross-sections:

Sólarfjall

Brúnir/Hákarlshaus

Móhöttur







# Breiðavík geology

## Bedrock – north part

- 9 cross-sections:

8 west of valley head and Bálksfjallaraðir

1 Stóraneshnaus





# Conclusions

- Bedrock map and rock types
- Faults and intrusions
- Strata dip
- Alteration and amygdales
- Fossils

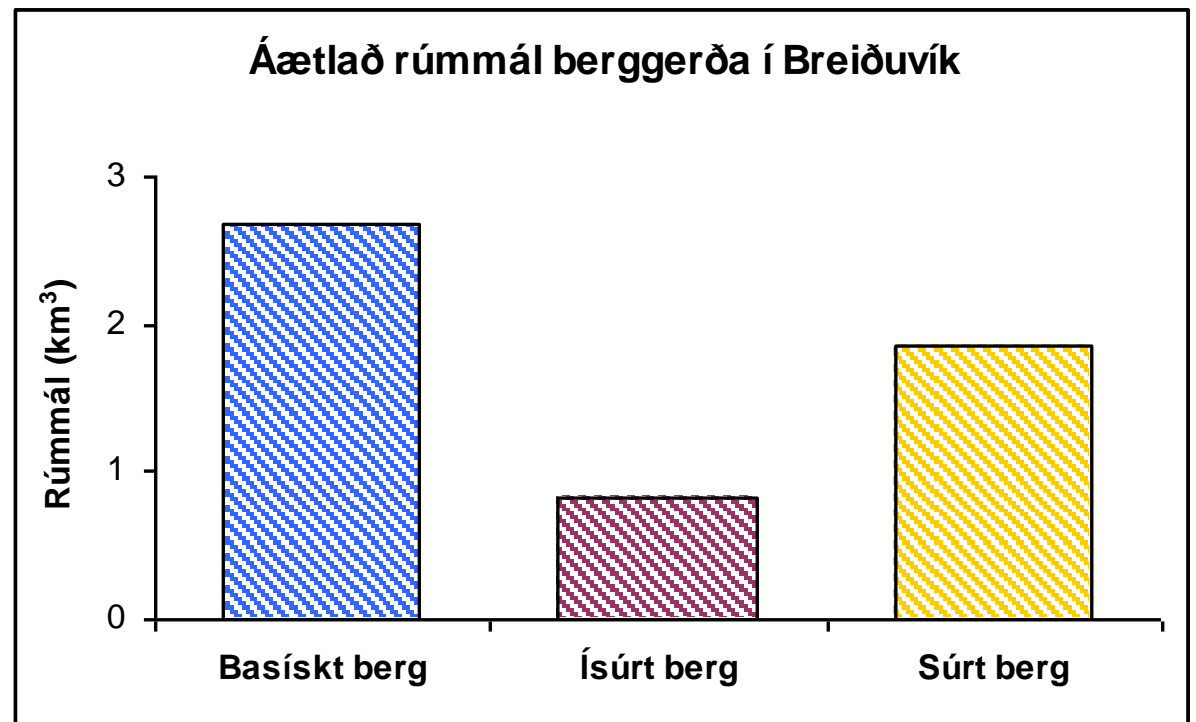




# Conclusions

## Rock types

- Mafic – 50%
- Intermediate – 15%
- Felsic – 35%





# Conclusions

## Faults and intrusions

- Normal fault – only at Grenmór
- Dykes – few  $>1$  m thick
- Sills – at Móhöttur, Hvítserkur
- Intrusions – frequently pyroxene porphyritic





# Conclusions

## Strata dip



Photo: Skarphéðinn Þórisson



# Conclusions

## Strata dip and bending

- North of research area (Víðidalsfjall)
- South of research area (Herjólfsvík)





# Conclusions

## Alteration and amygdales

- Carbonate and quartz stones – common amygdales
- Zeolites – uncommon amygdales
- Pyrite in some regions
- Some silicified bedrock
- Spring water precipitates
- Altered mafic dykes



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**Takk fyrir áheyrnina!**  
**Thank you for listening!**







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**Spurningar / Questions?**

