



# Iceland glacier crevasse mapping project

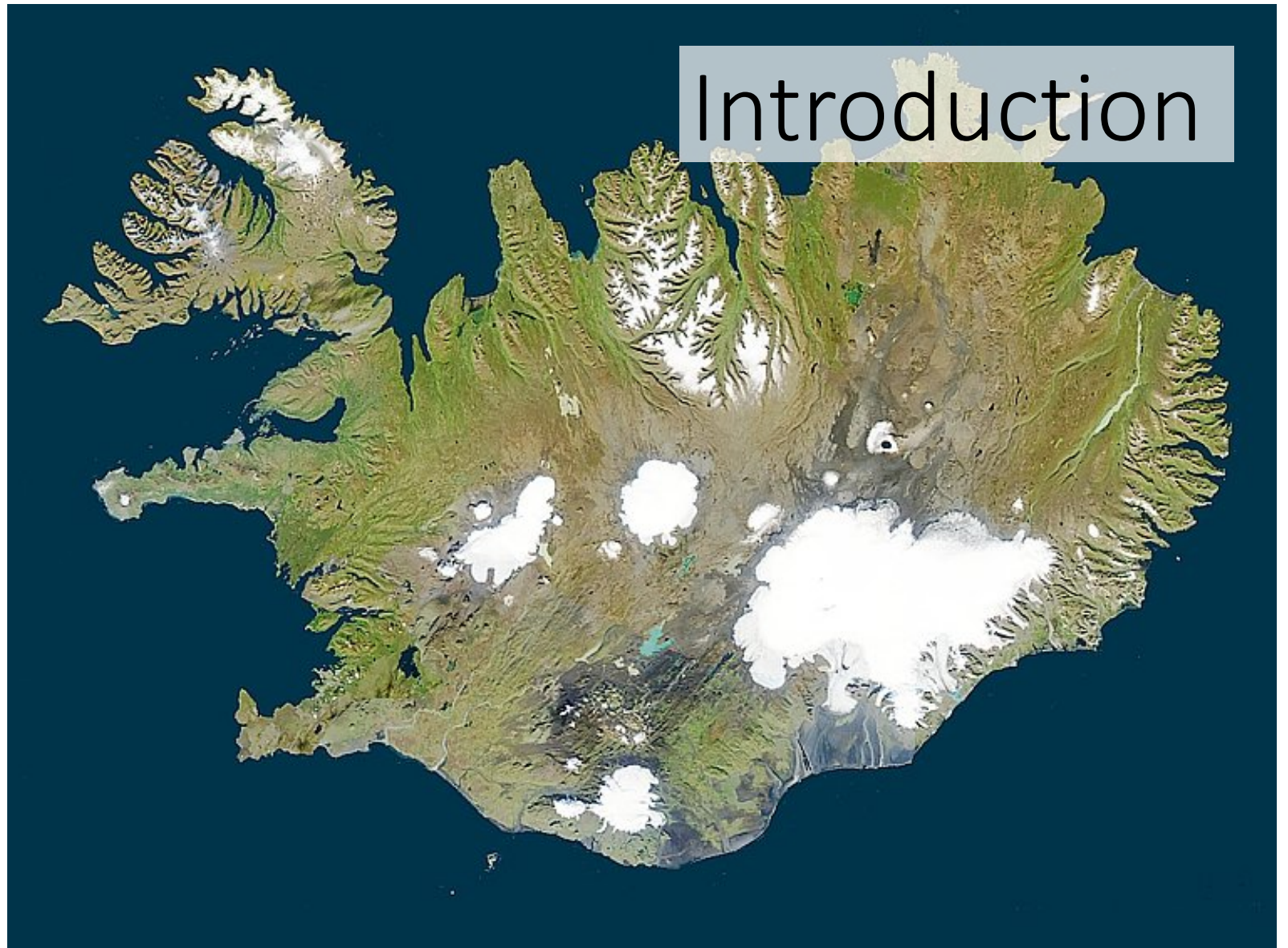
# Ágúst Þór Gunnlaugsson

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# Icelandic association of search and rescue



# Introduction



- Iceland is covered by roughly 11.000 km<sup>2</sup> of glaciers (meaning that roughly 11% of the country is covered by glaciers)
- No limitations are on who travel on glaciers





- Majority of the glacier terrain in Iceland is flat
- Tourism has been on the rise in the last 10 years
- Occasional volcanic eruption change glacier surfaces.

# Glaciers in changing climate



- With warming climate, crevasse areas are more likely to be open and exposed over the year.

Photo: Snævarr Guðmundsson



# Accidents on Icelandic glaciers



- Through the years, accidents on Icelandic glaciers have been common.
- But given the number of people who travel on them all year round, serious or fatal accidents have been seldom.

# Langjökull



- A tragic accident in 2010 caused the initiation of the crevasse mapping project.





# Data gathering and mapping of hazard areas

- Aerial and satellite images.
- Fly over glacier and photos taken
- Known safe driving and hiking routes on the glaciers.
- Lidar digital elevation models.
- Mapping in a Geographical information system.
- 97% of glaciated surface mapped.



# Lidar

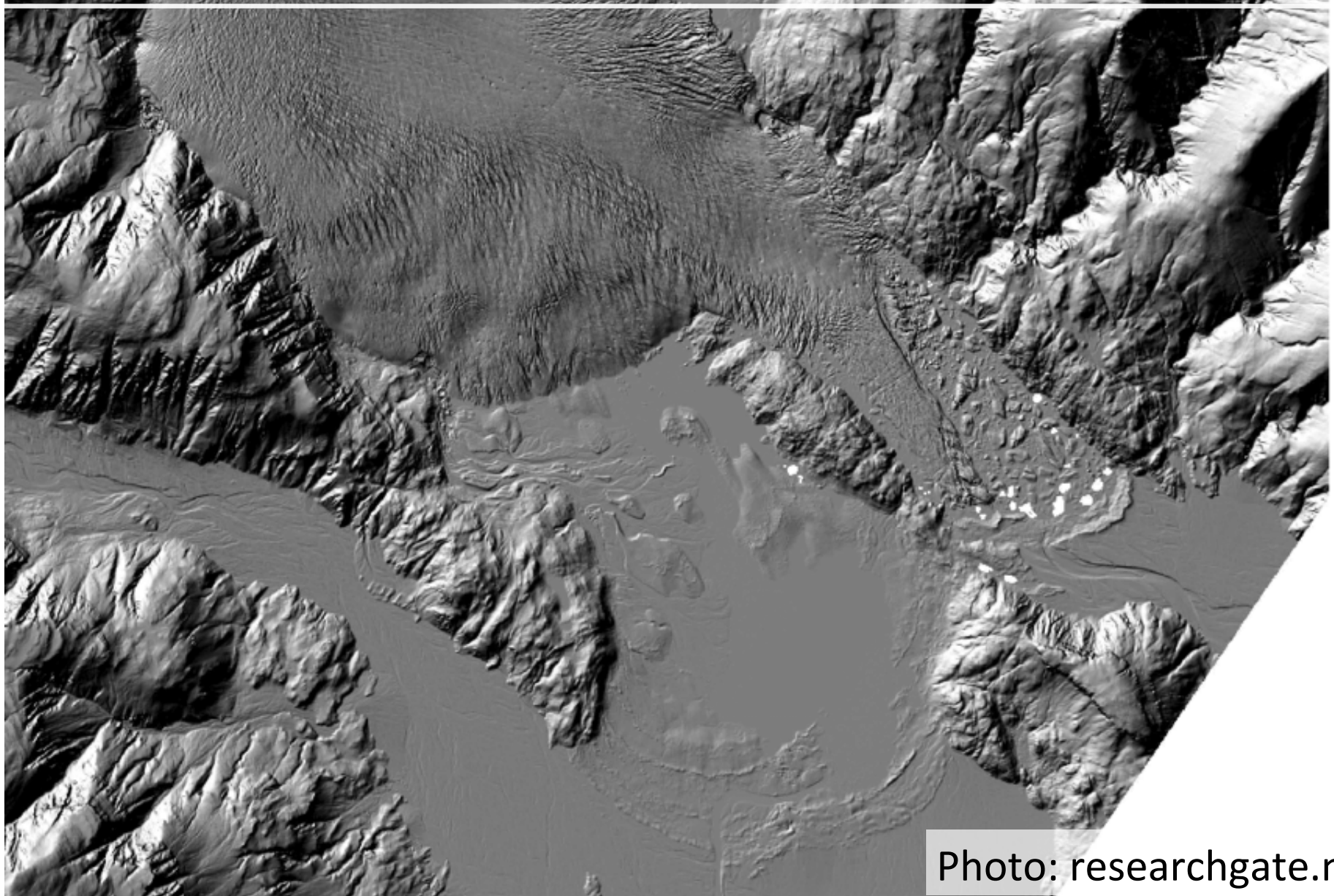
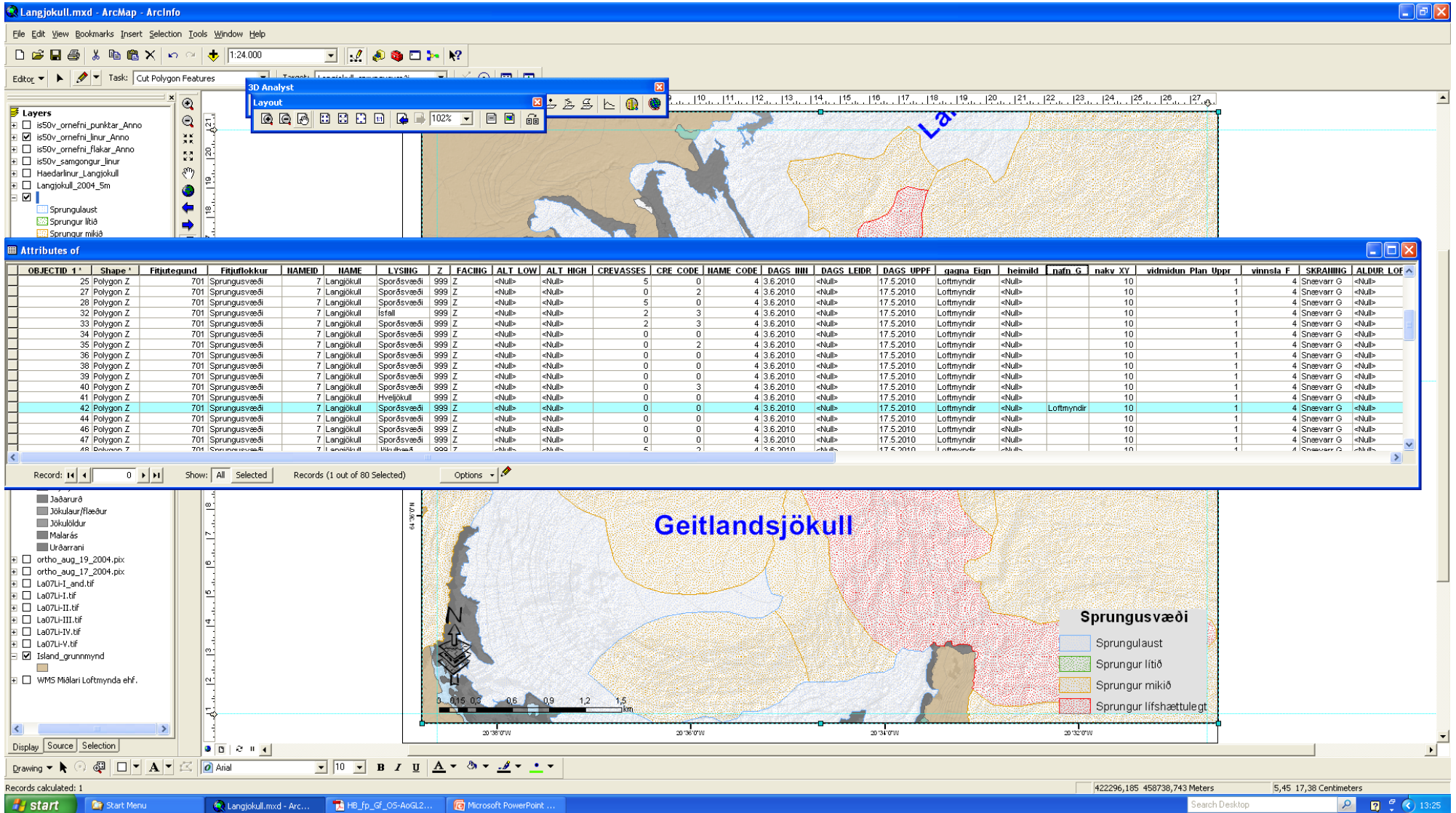


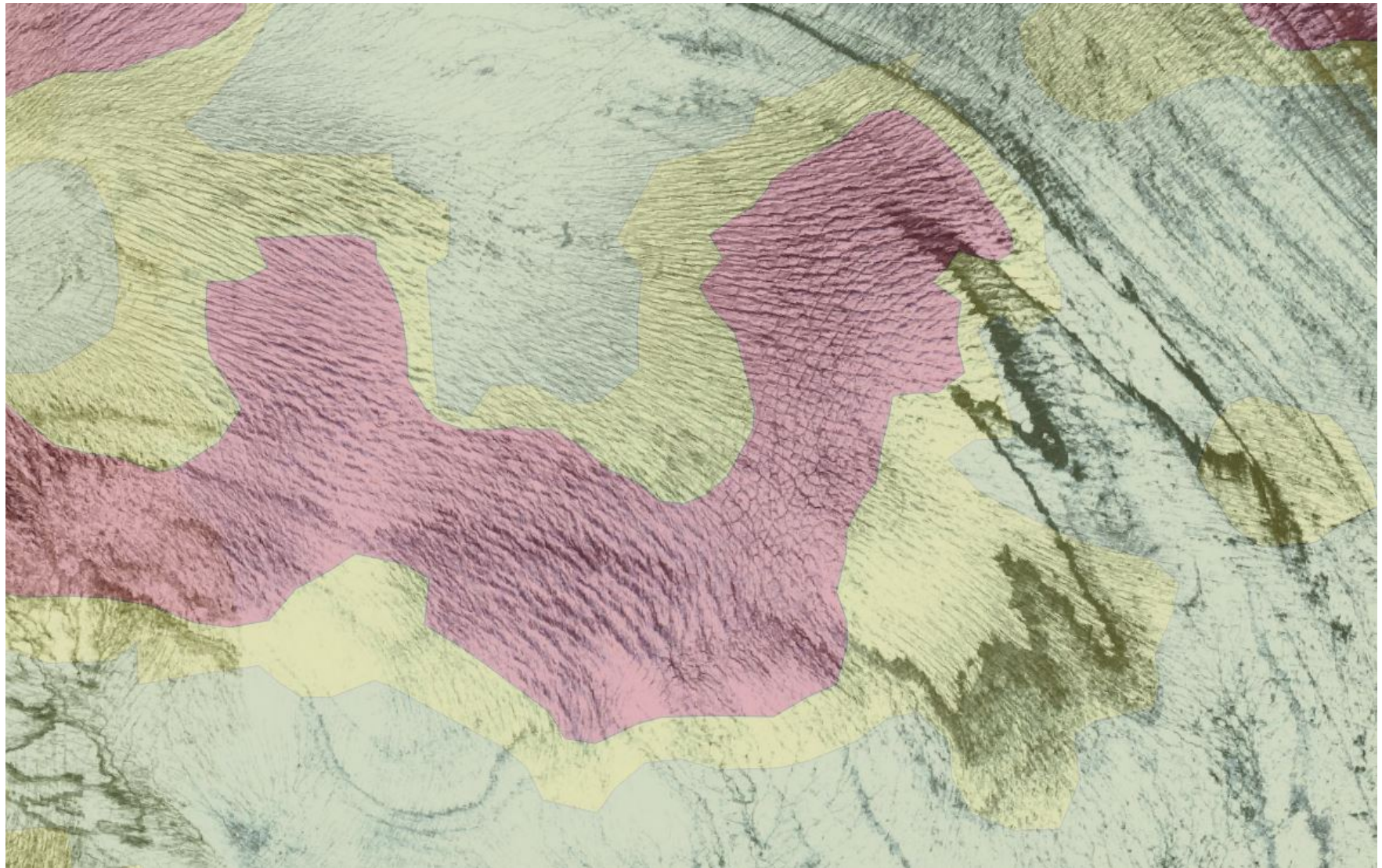
Photo: [researchgate.net](https://www.researchgate.net)

# GIS





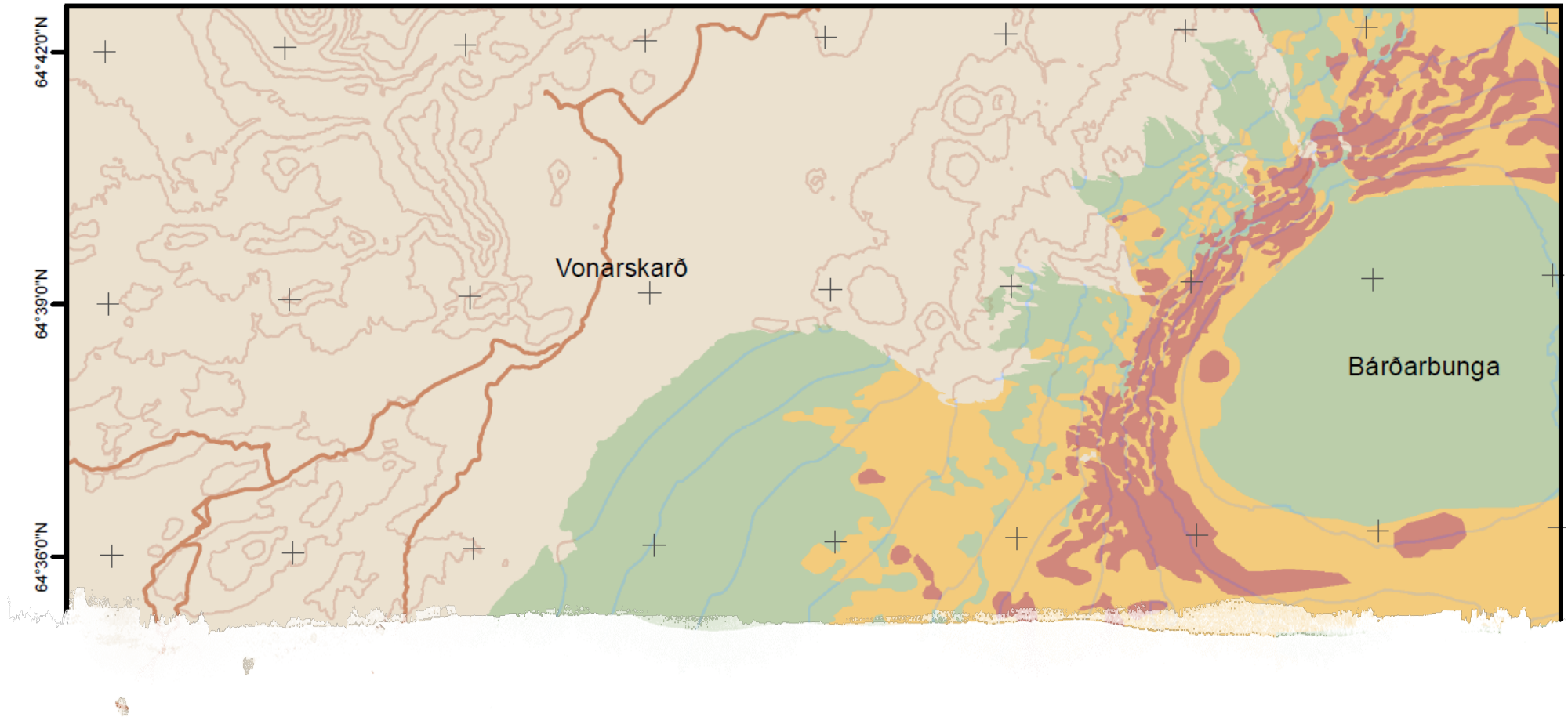
# Mapping the glacier surface



# Maps for everyone

- Free of charge
- Crevasse maps are not an authority
- They do not ban travel on dangerous areas
- They are meant for reference
- Common sense is still needed!



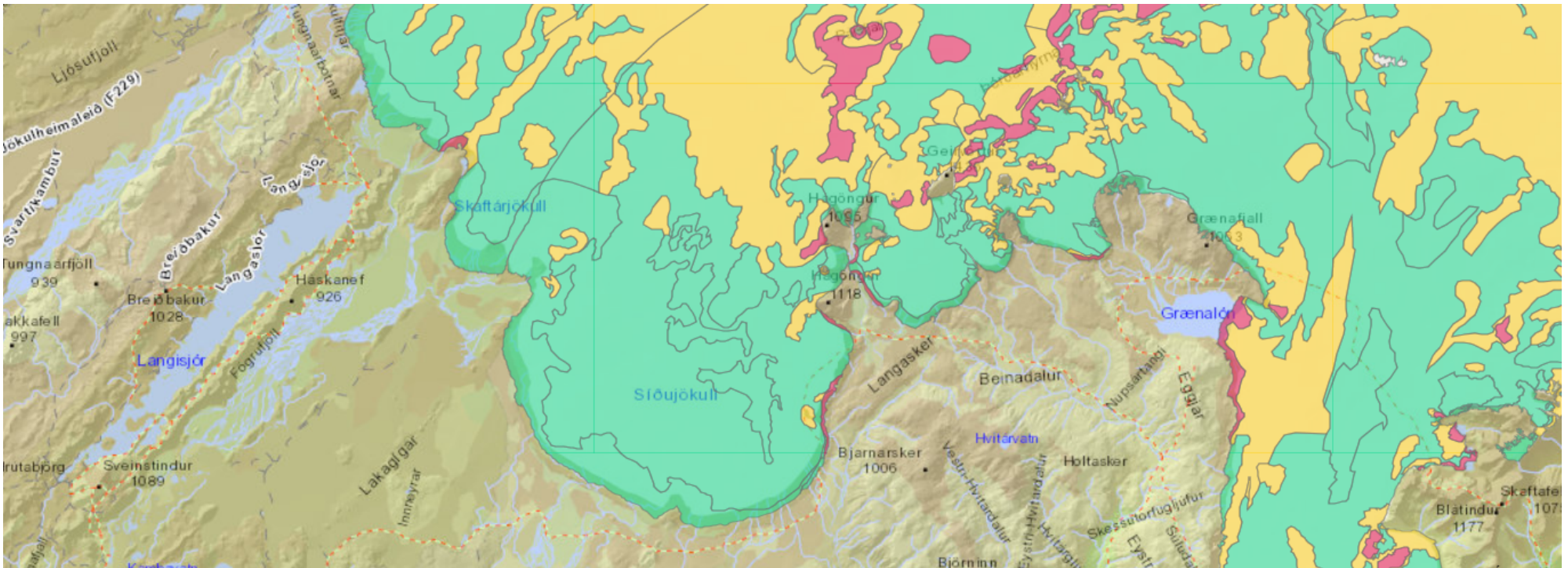


Crevasse  
classification

- Green
- Yellow
- Red

# Green

- Relatively flat and safe glacier surface.
- Safe to travel on regardless of travelling method.
- Only small crevasses in late summer or autumn.





Green



Photo: Snævarr Guðmundsson



Green



Photo: Snævarr Guðmundsson



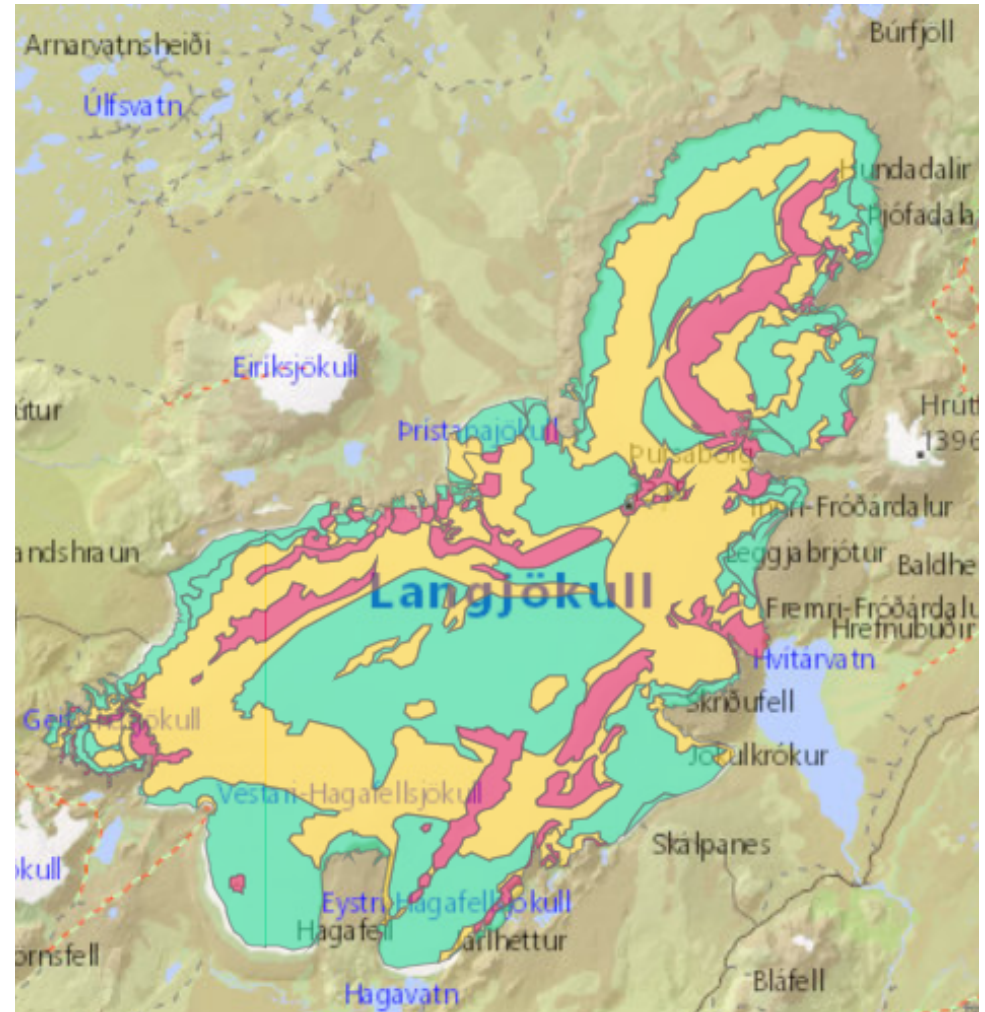
Green



Photo: Snævarr Guðmundsson

# Yellow

- Safe to travel during winter, more hazardous during summer time.
- Big crevasses under winter snow.





Yellow

Photo: Snævarr Guðmundsson



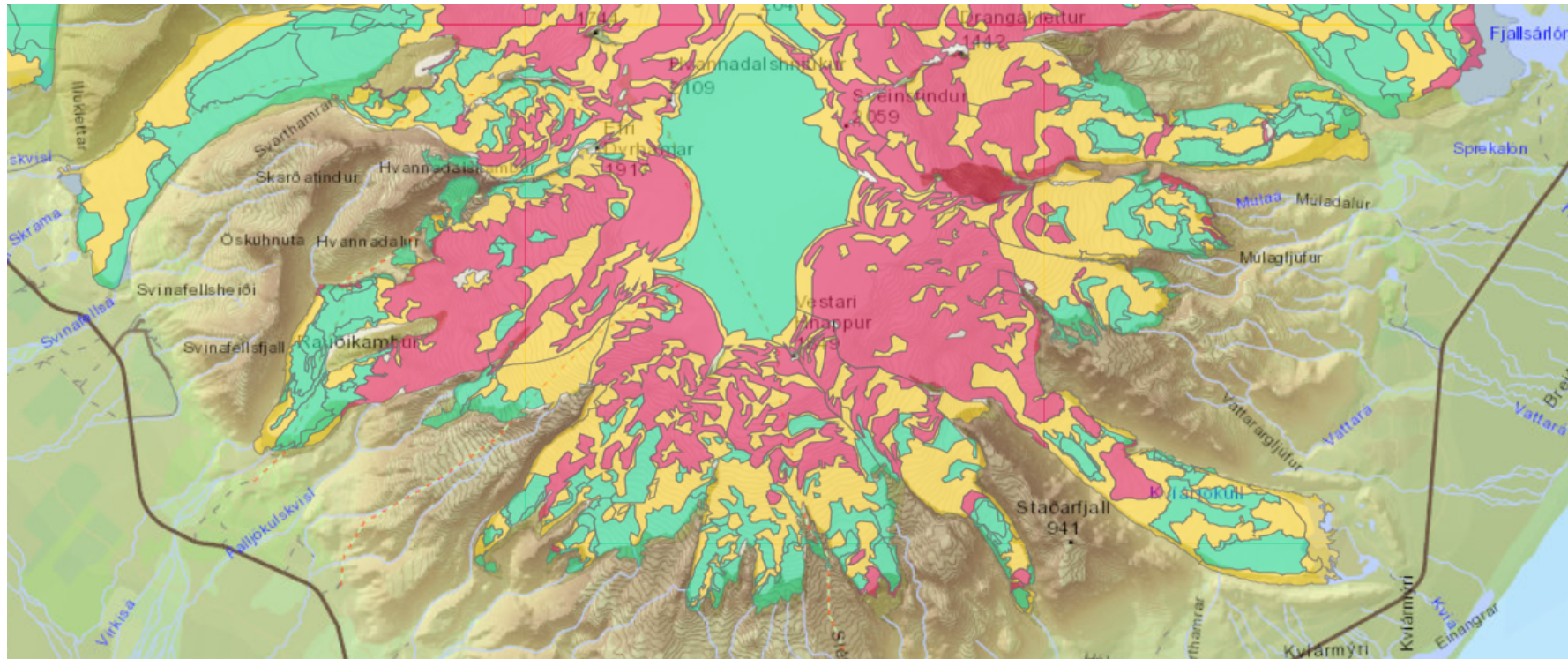
Yellow

Photo: Snævarr Guðmundsson



Red

- Big crevasses and dangerous for travel all year.
- Steep icefalls or around subglacial geothermal areas.





Red

Photo: Snævarr Guðmundsson



Red

Photo: Snævarr Guðmundsson

Red



Photo: Oddur Sigurðsson

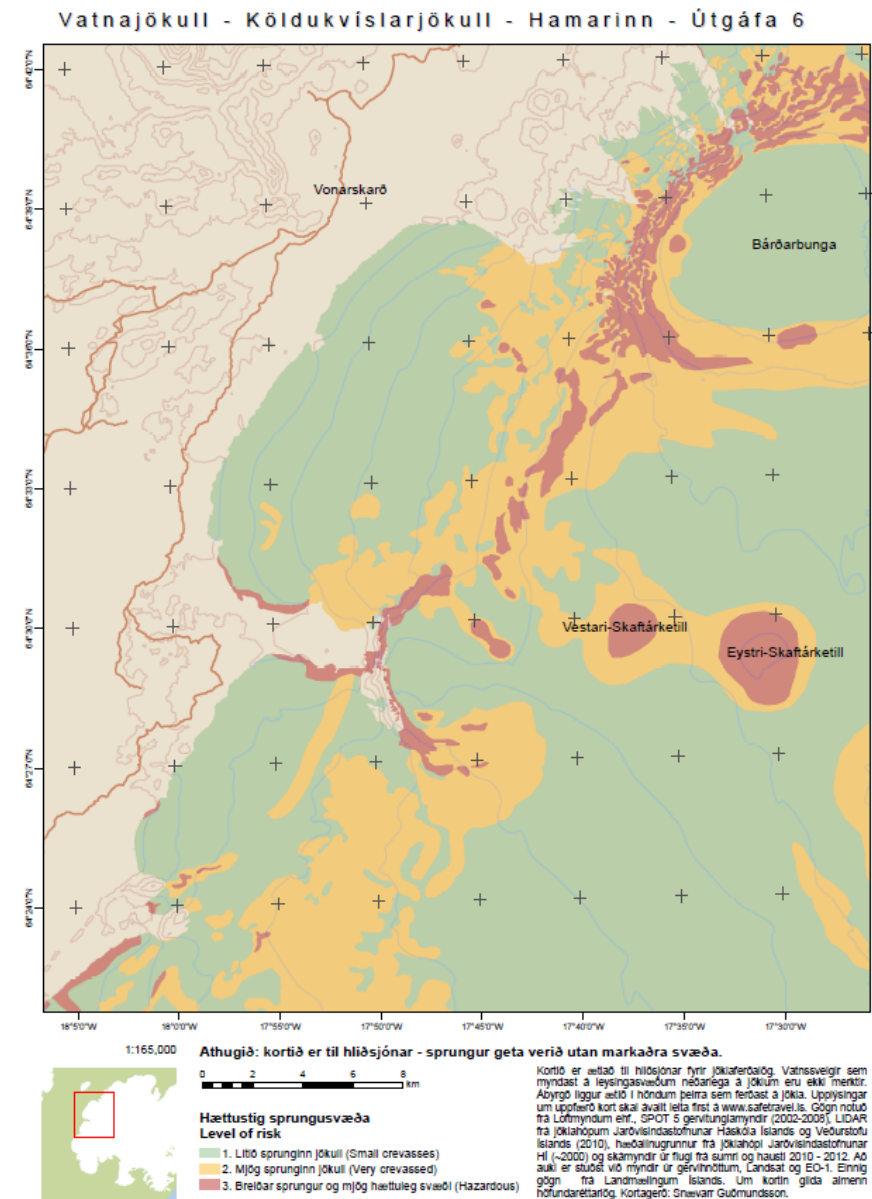


## Application

- PDF files in computers or on paper
- GPS
- Web based

# PDF maps

- PDF map can be viewed on a phone, tablet or in a computer.
- Map scan be printed out and brought in the field.



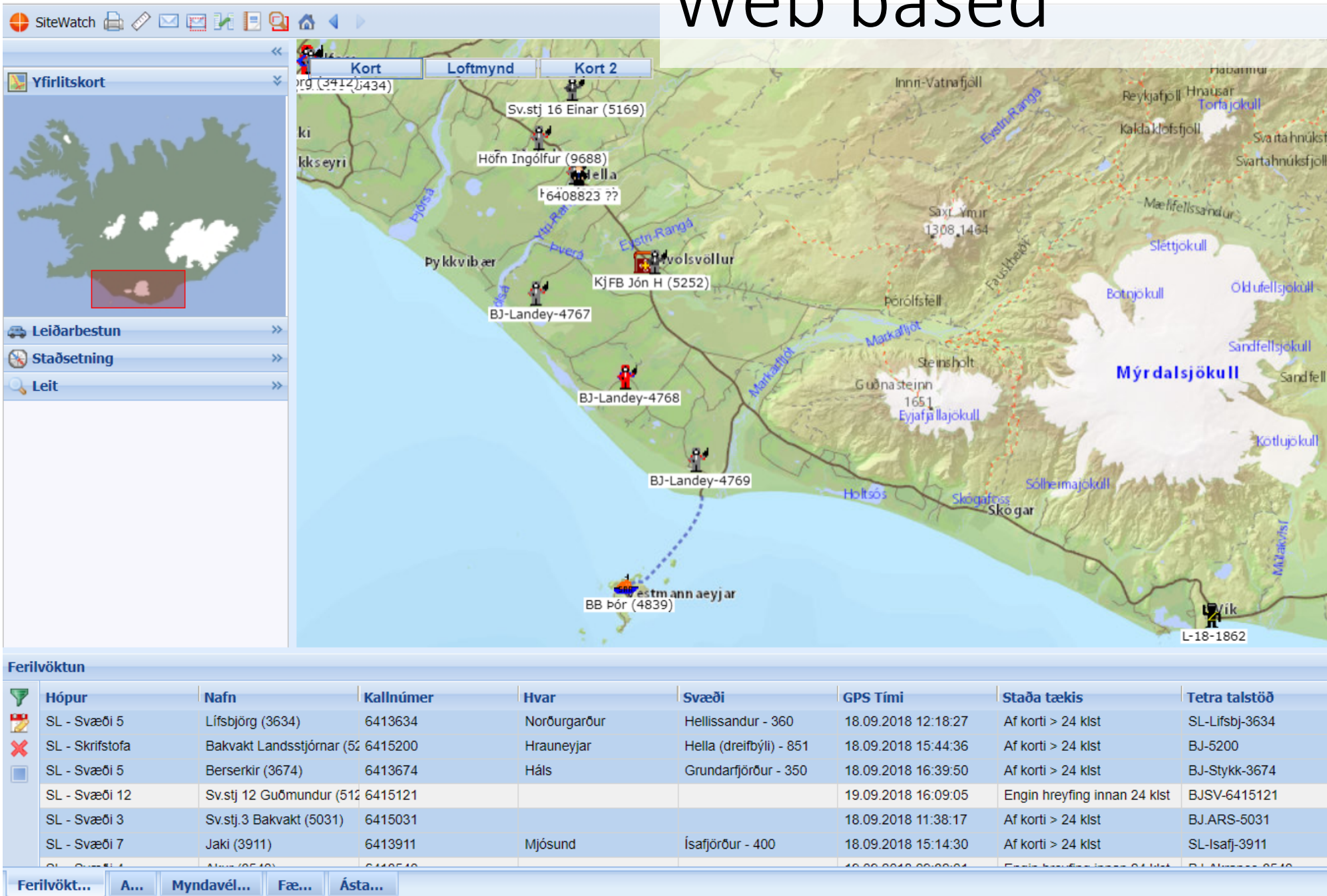


# GPS

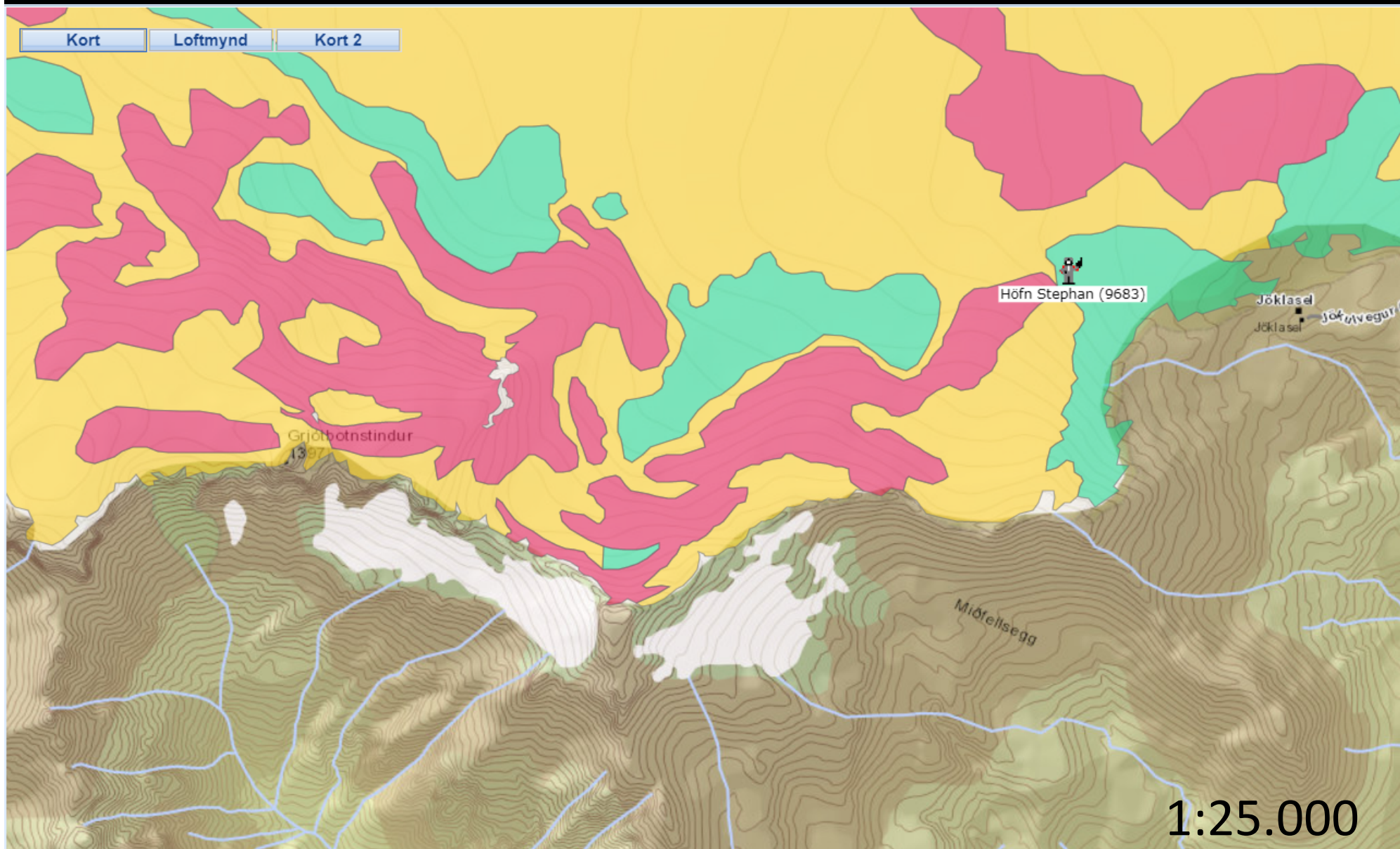


Maps can be used as a layer in handheld GPS devices and smart phones

# Web based

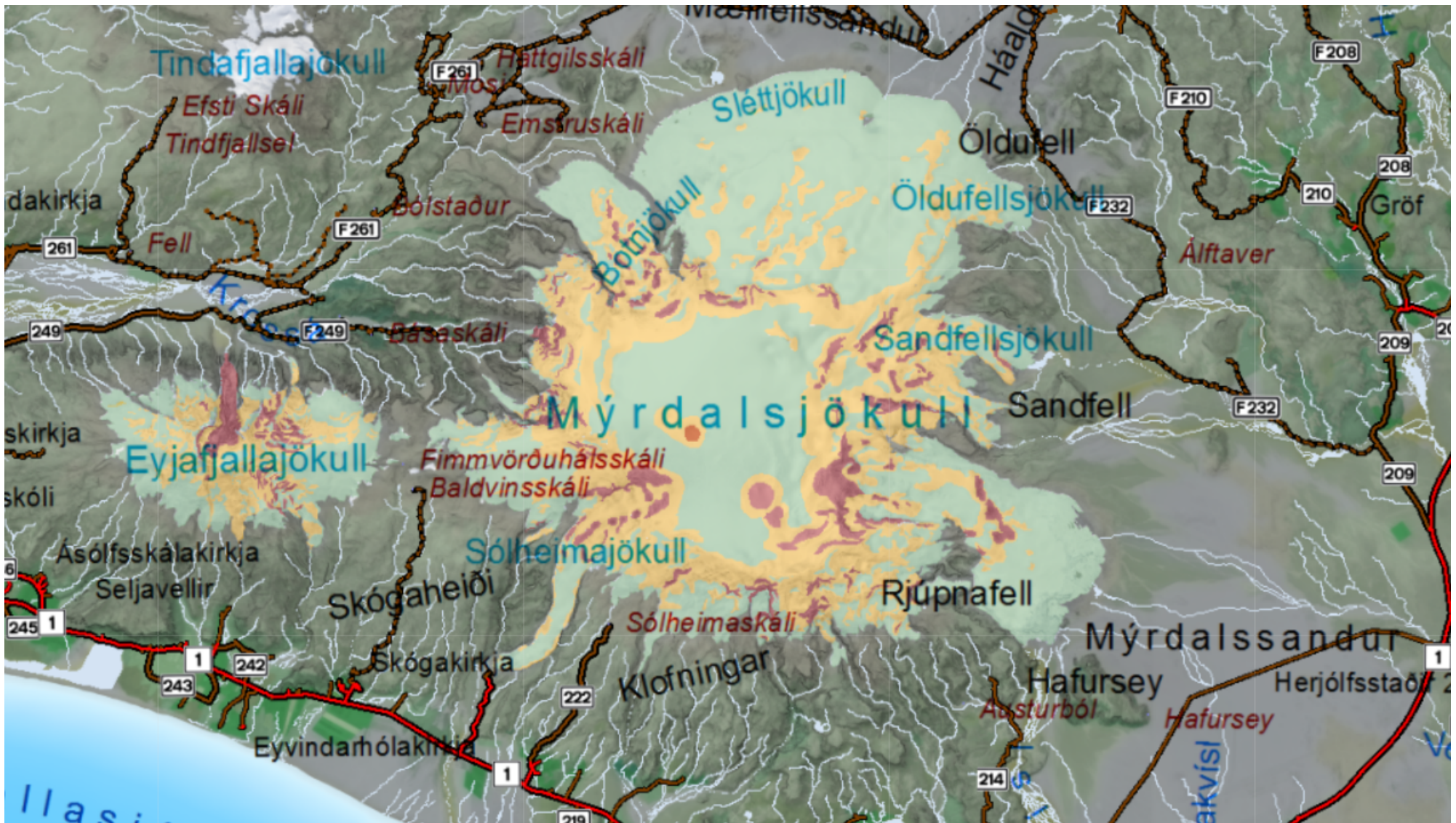




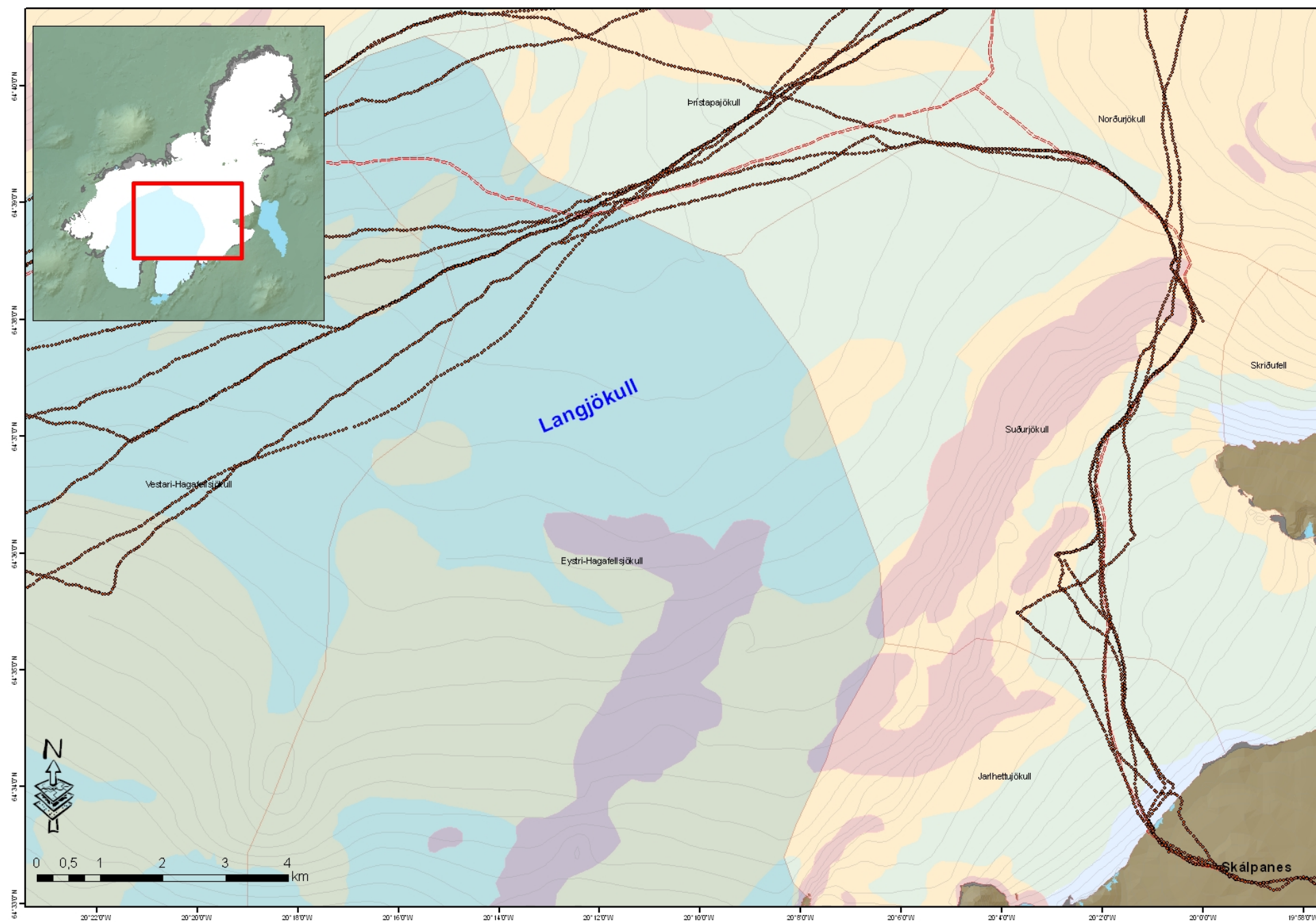




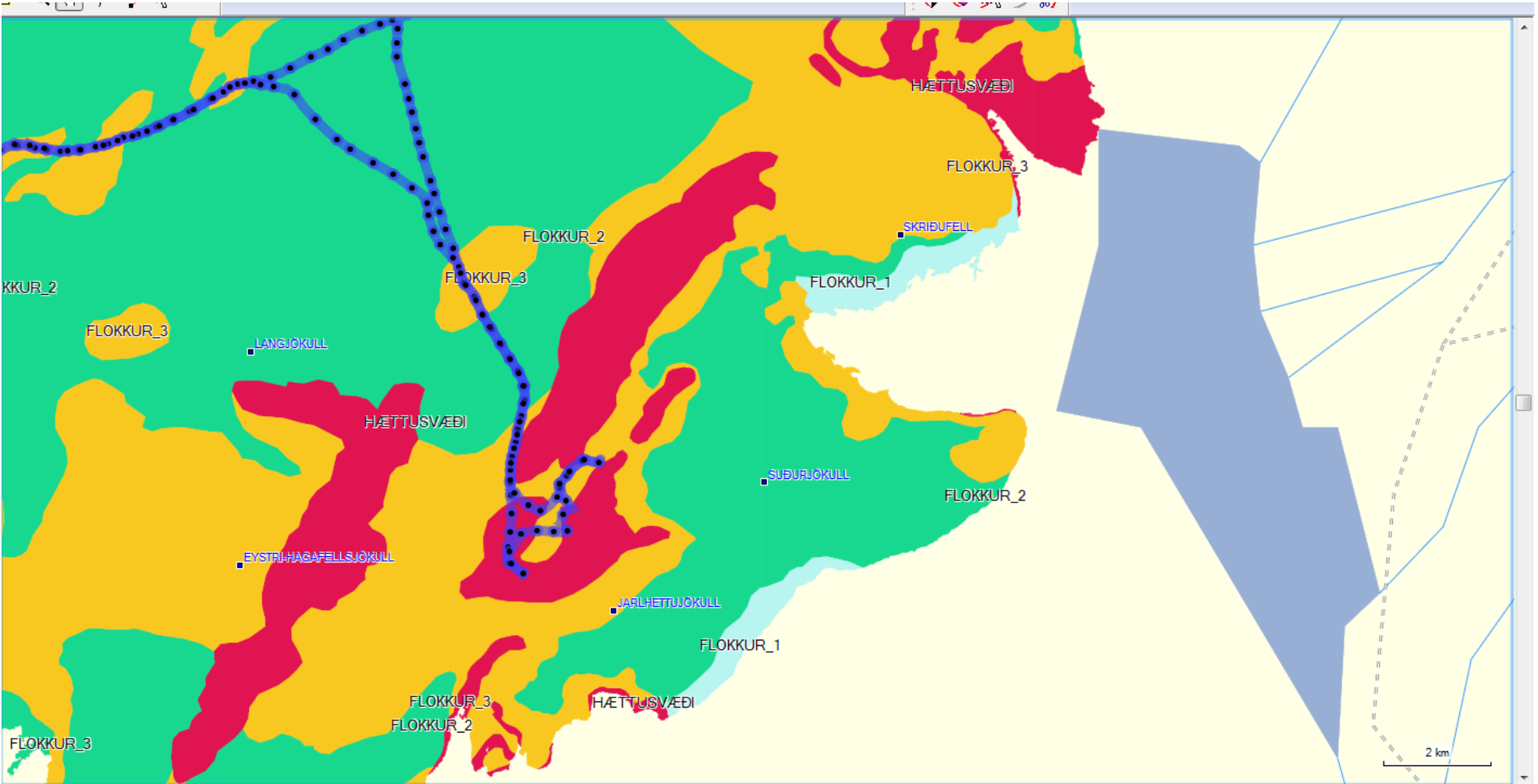
[www.vefsja.iskort.is](http://www.vefsja.iskort.is)







## Travellers not using the crevasse maps





# Conclusion

For further information:

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agustth@gmail.com

[www.safetravel.is](http://www.safetravel.is)



- The maps have been proven very useful for glacier travel in Iceland.
- The multiple platforms is a key for the distribution of the maps to as many users as possible.