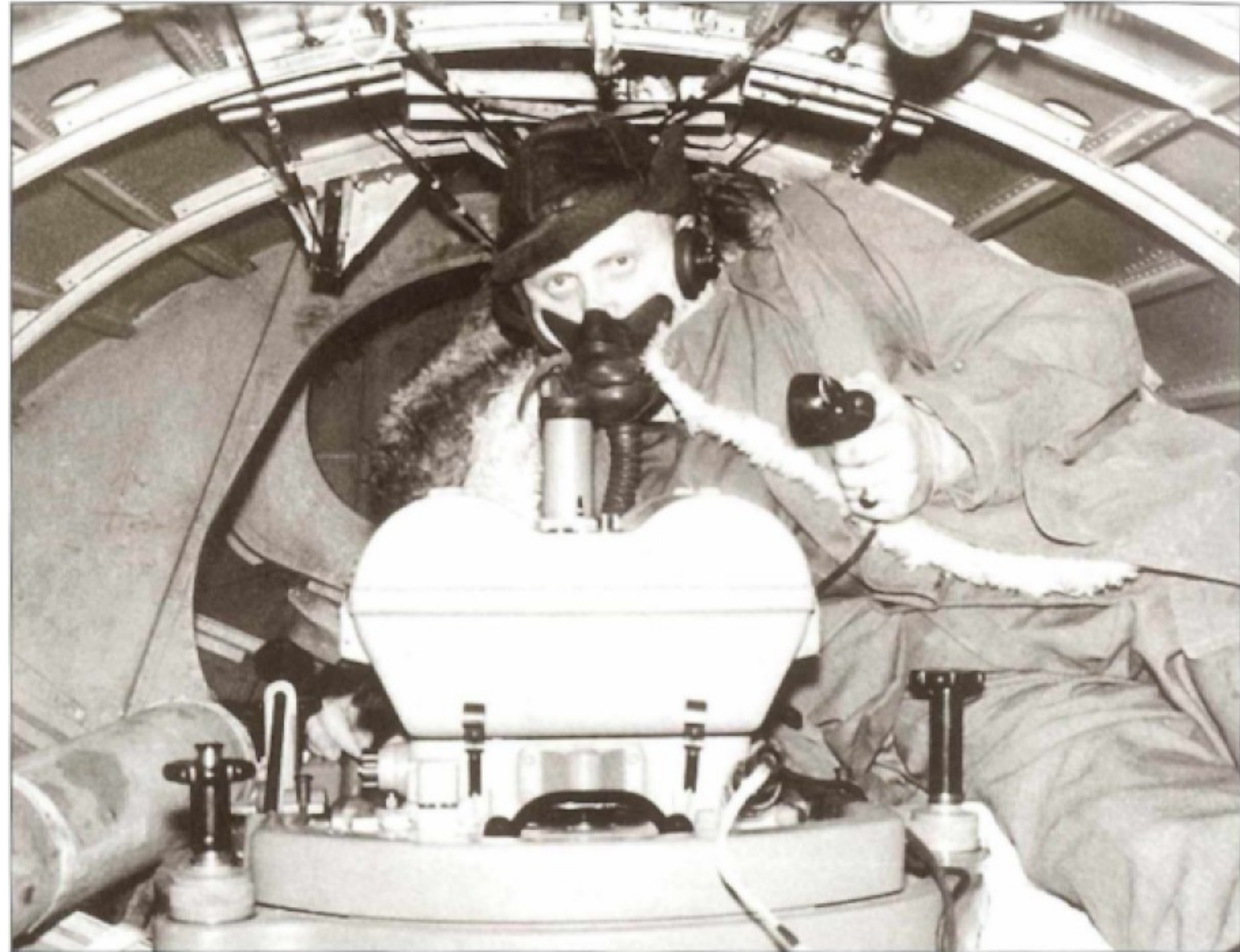


Mapping of Icelandic glaciers (and volcanoes) since 1945



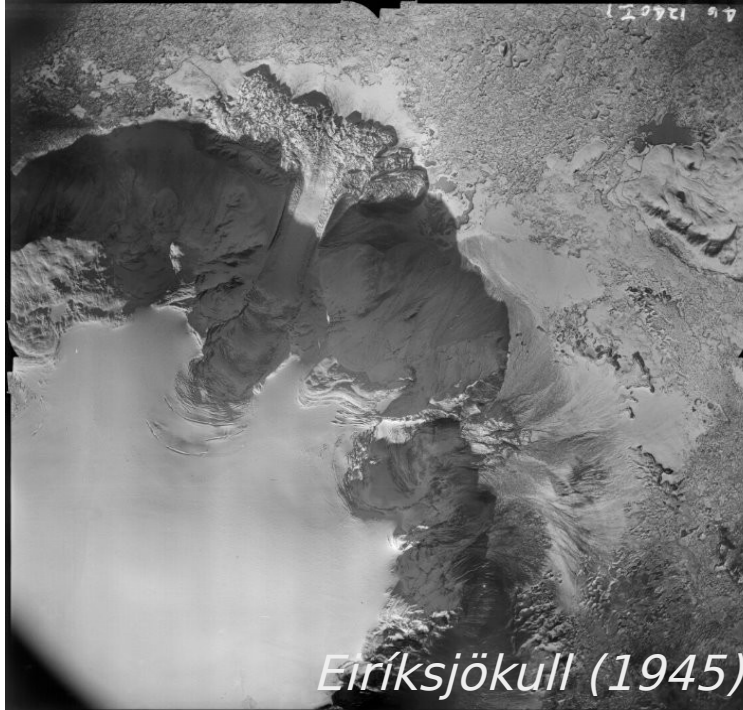
*Joaquín M.C. Belart, National Land Survey of Iceland
Snow and Ice workshop at LEGOS, 26 June 2024*

From 1945 to 2000

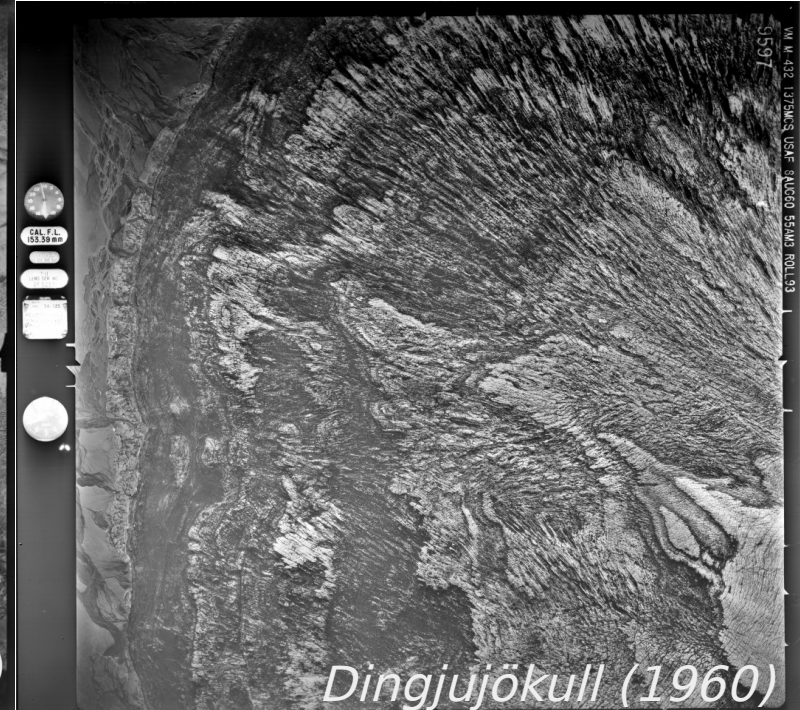
- 140,000 frames (films)
- 12x12 cm, 18x18 cm, 23x23 cm
- 128,735 frames scanned
- 16Tb of raw images



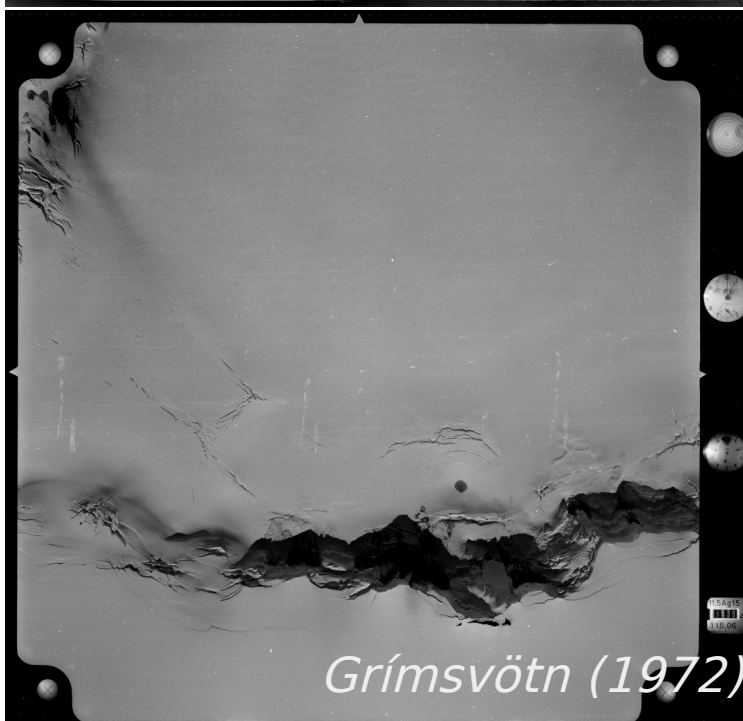
*Flightlines American Surveys
1956-1961*



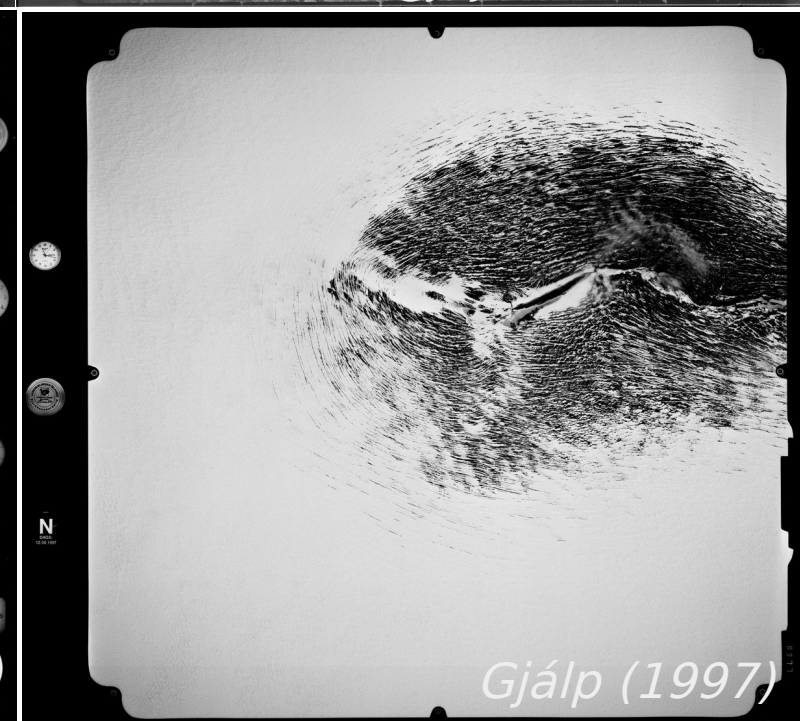
Eiríksjökull (1945)



Dingjujökull (1960)

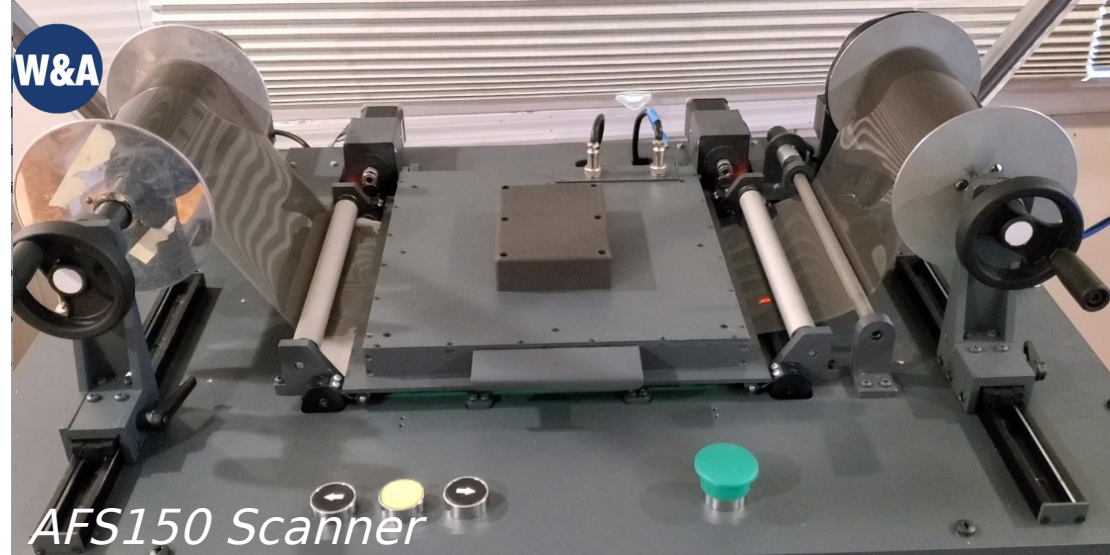


Grímsvötn (1972)



Gjálp (1997)

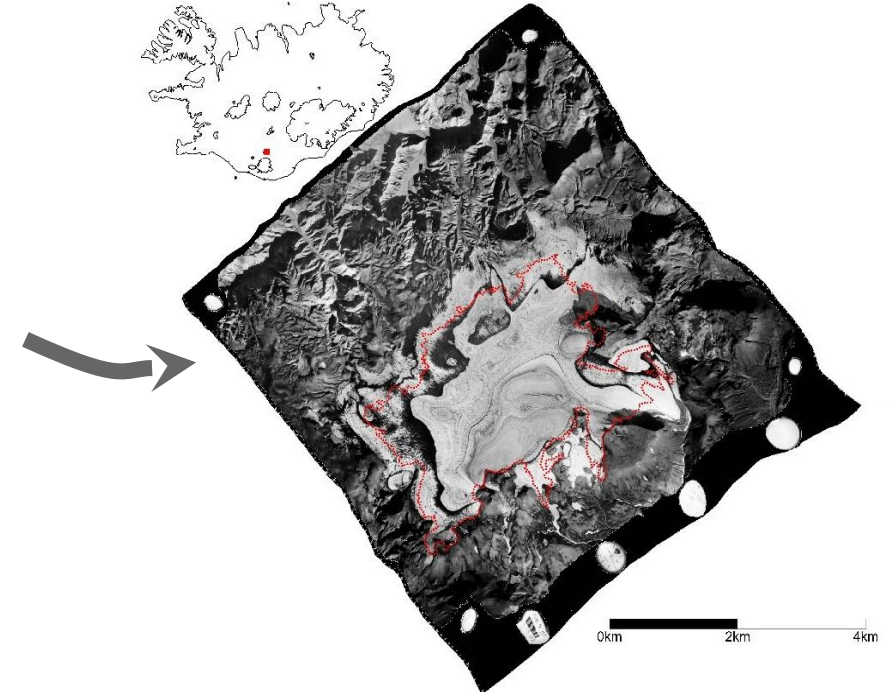
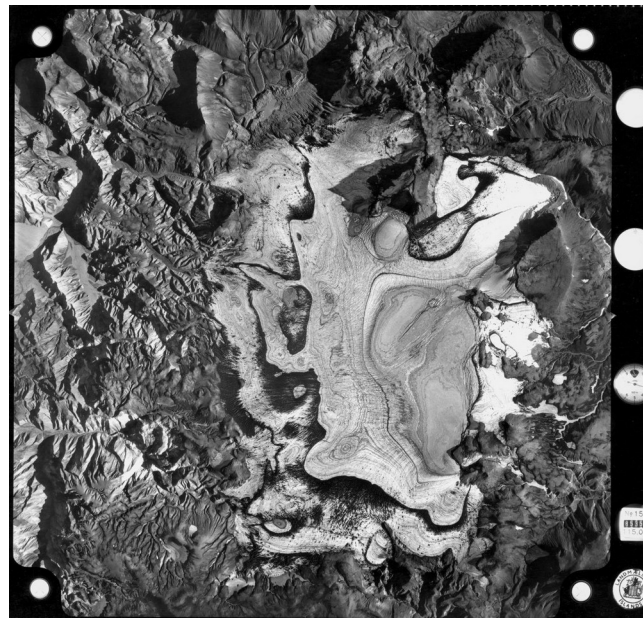
Processing



NeoGeographyToolkit/
StereoPipeline



The NASA Ames Stereo Pipeline is a suite of automated geodesy & stereogrammetry tools designed for processing planetary imagery captured...



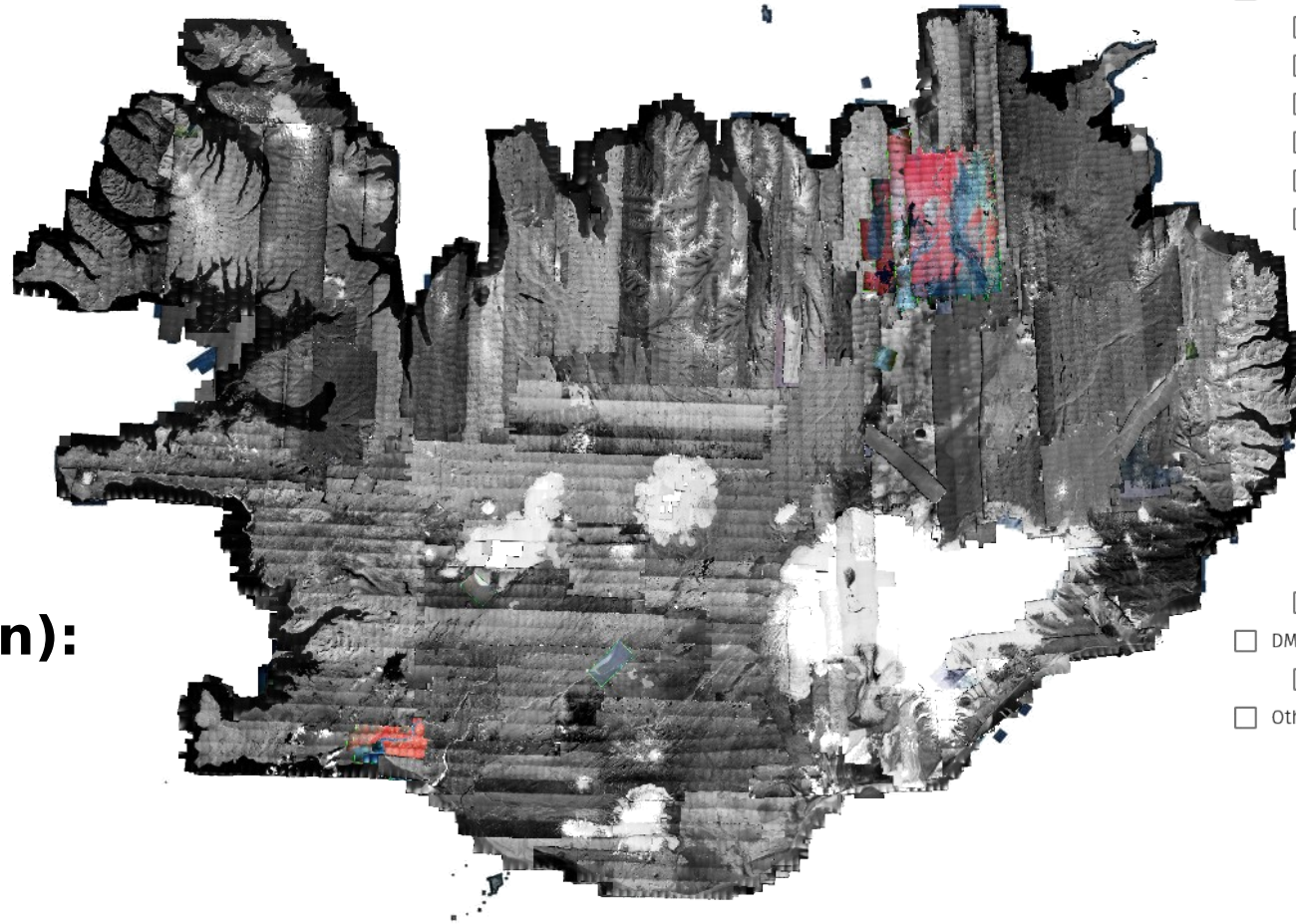
Open access

Status (15% done):

- 1,100 Orthos & DEMs
- 20,000 Oriented images
- 765 Gb of data

Validation (stable terrain):

- Pléiades orthoimages
- Pléiades DEMs
- Lidar DEMs
- Positional accuracy >10 m (XYZ)



Search Data

Overview, all years

Aerial Photography Gallery LMÍ ^

- 1940-1949 v
- 1950-1959 v
- 1960-1969 v
- 1970-1979 v
- 1980-1989 v
- 1990-1999 ^

- 1990 i
- 1991 v
- 1992 v
- 1993 v
- 1994 v
- 1995 i
- 1996 i
- 1997 i
- 1998 v

2000-2010 v

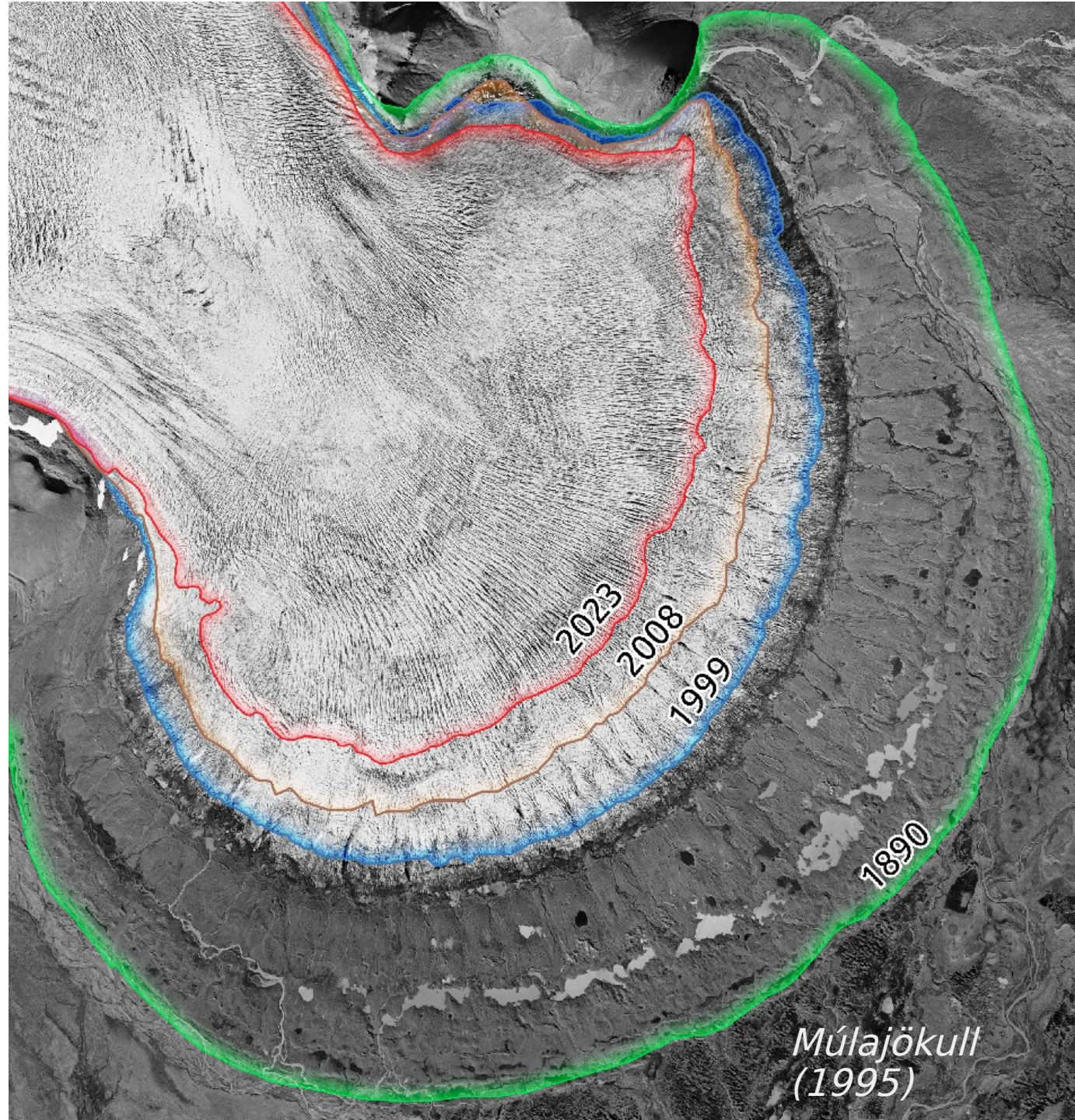
DMA images ^

- DMA images, 1956-1961 i

Other data v

loftmyndasja.lmi.is

Glacier changes



Other applications in geosciences

Volcanology

(e.g. Askja eruption, 1961)

Coastal erosion

(e.g. Surtsey, 1964-2000)

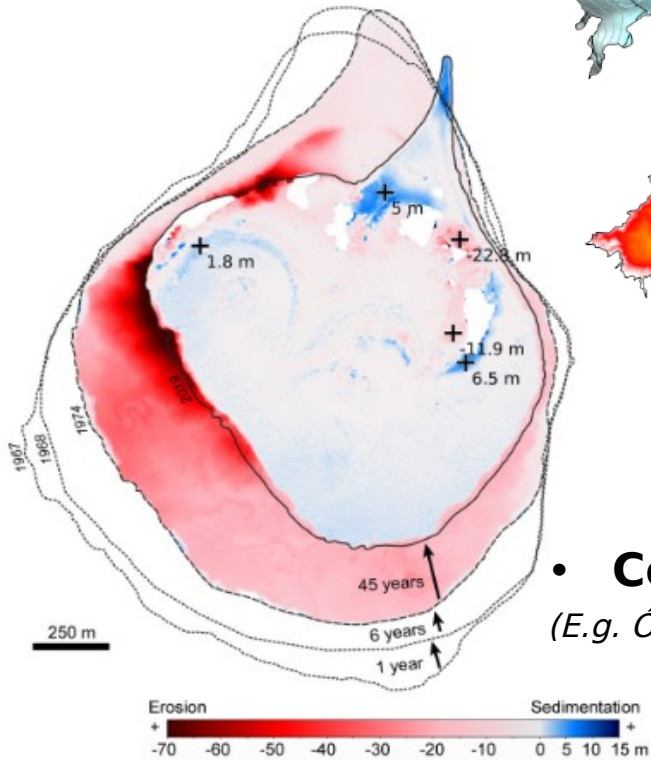
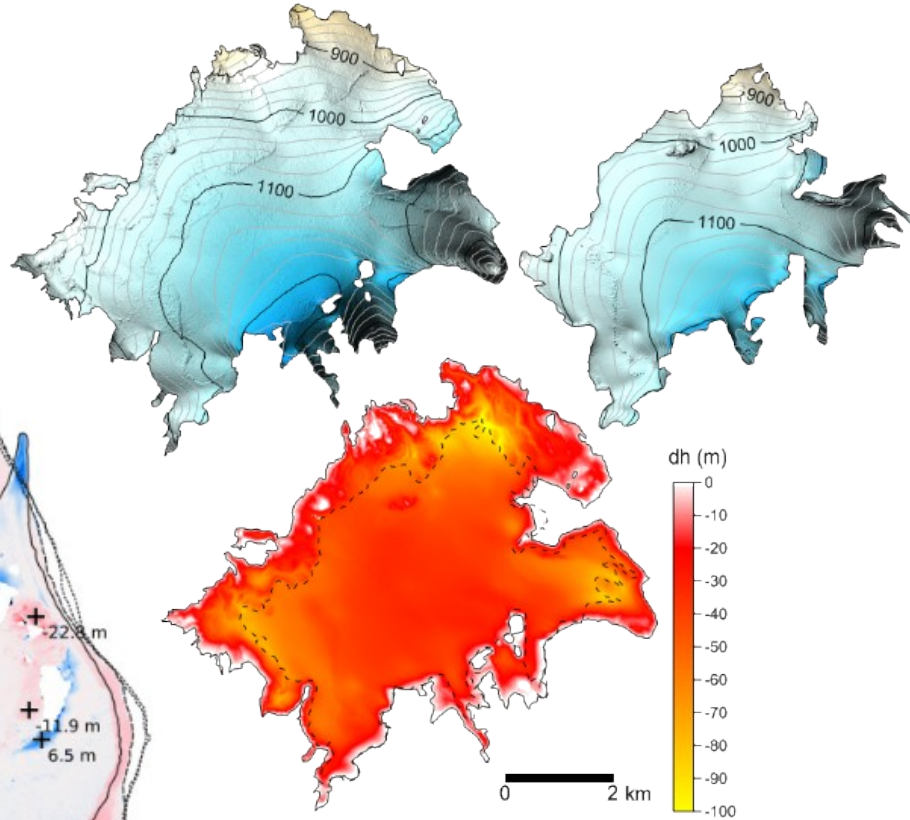
Tectonics

(e.g. Krafla fires, 1975-1984)



Elevation changes and volume changes from DEMs

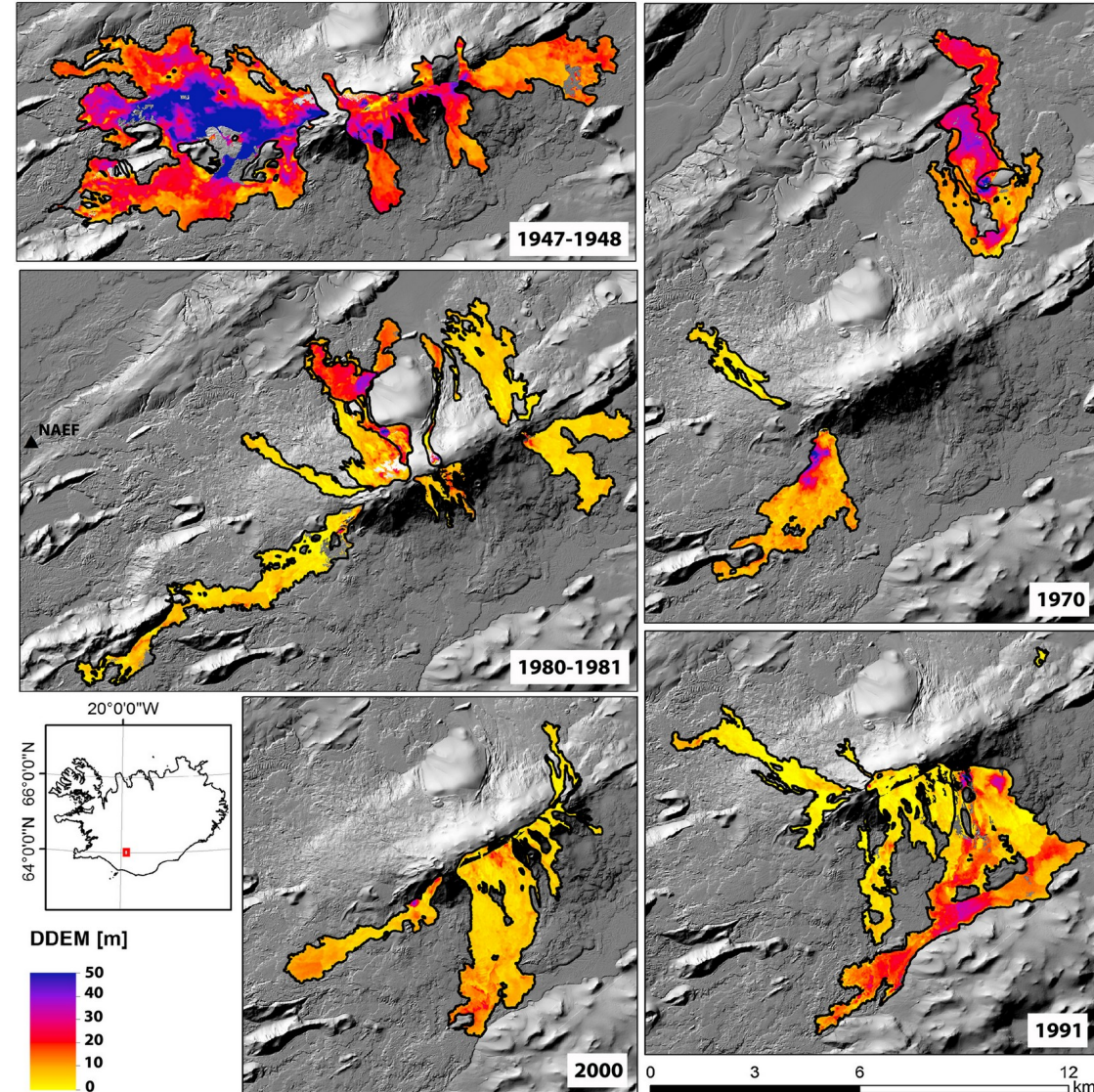
- **Glacier Volume Change & Geodetic Mass Balance**



- **Coastal erosion**
(E.g. Óskarsson et al., 2020, Surtsey Res.)

- **Lava volumes & Mean Output Rate**

(E.g. Pedersen et al., 2018, GRL)



Aerial photography nowadays

In-house surveys:

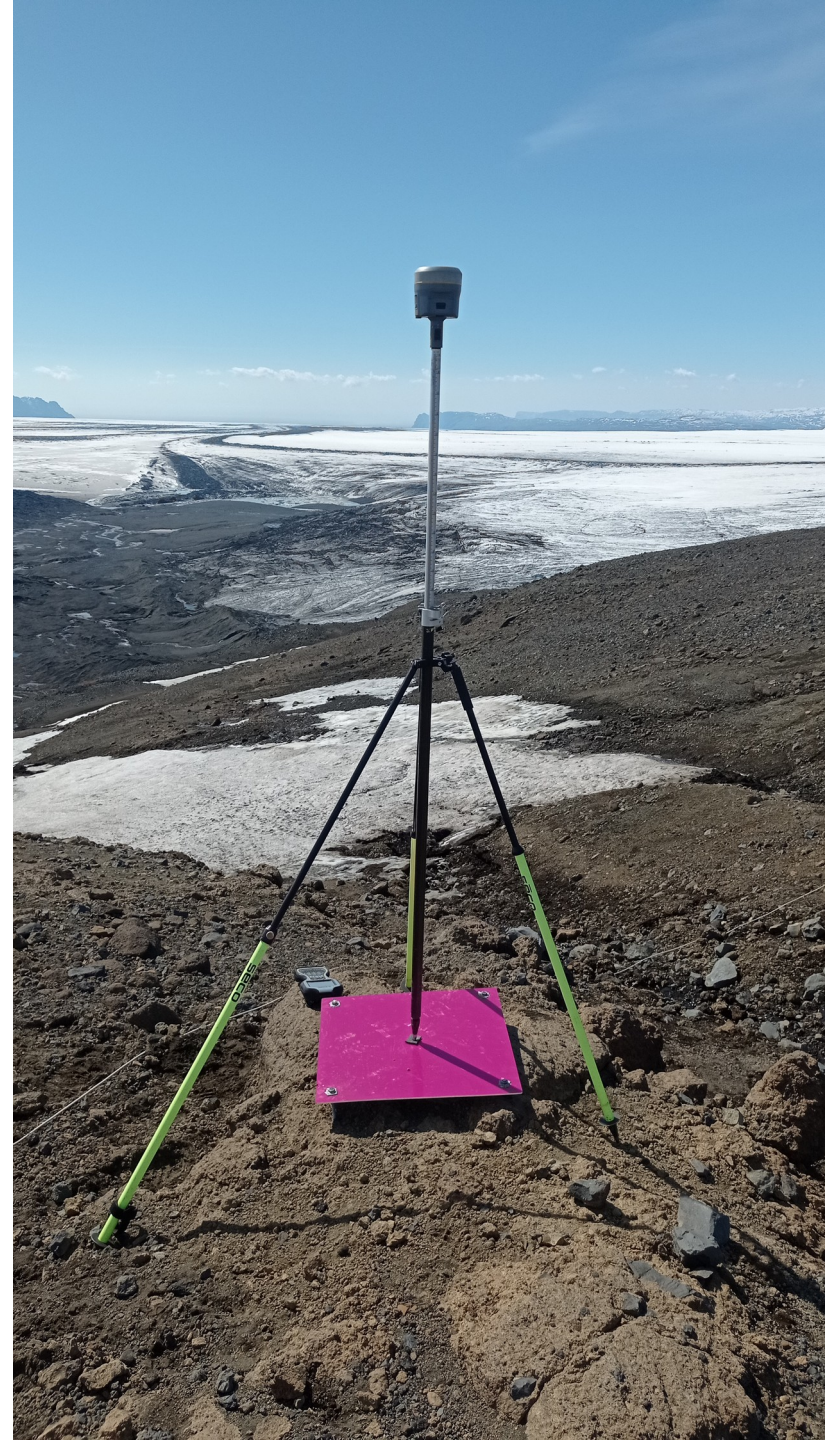
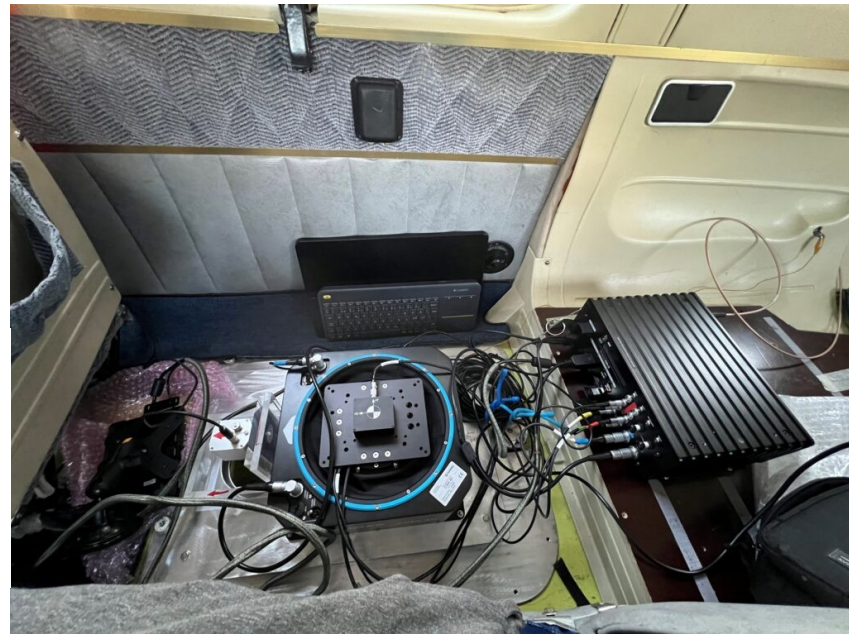
- Snow monitoring
- Reykjanes Eruptions

Tendered surveys:

- Country-wide survey Iceland
- Summers 2024-2026
- GSD25 (GSD10 urban)

Ground Control Points

- 600 GCPs country-wide
- Accuracy >5 cm XYZ

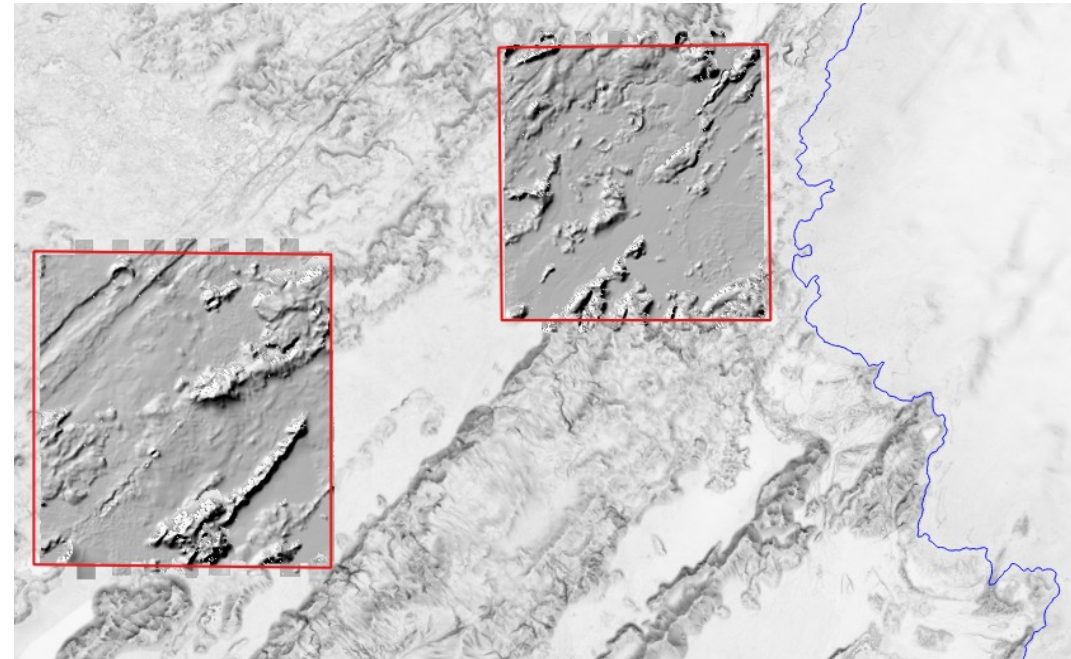
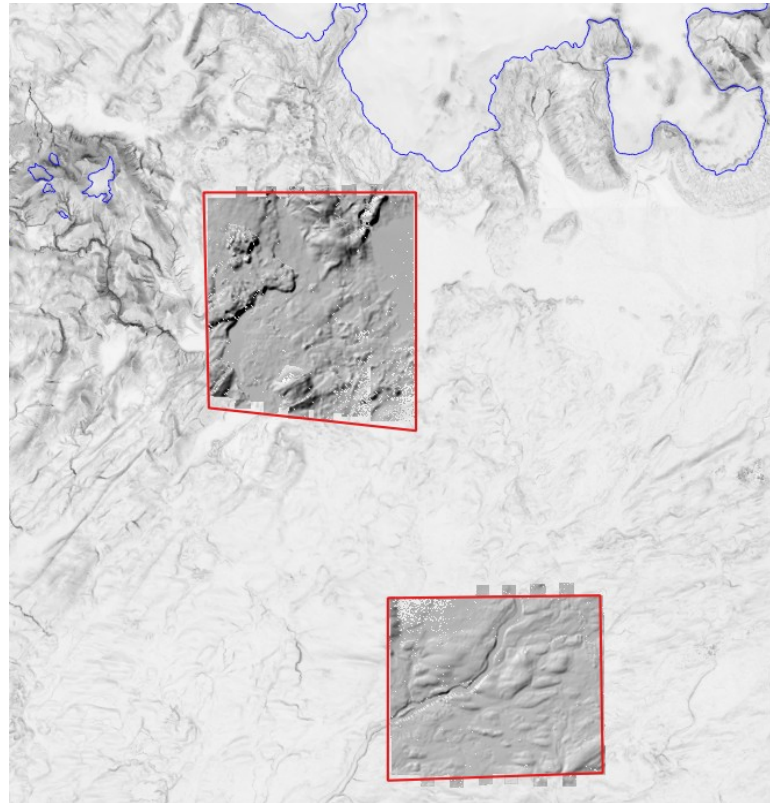


Snow mapping in Iceland

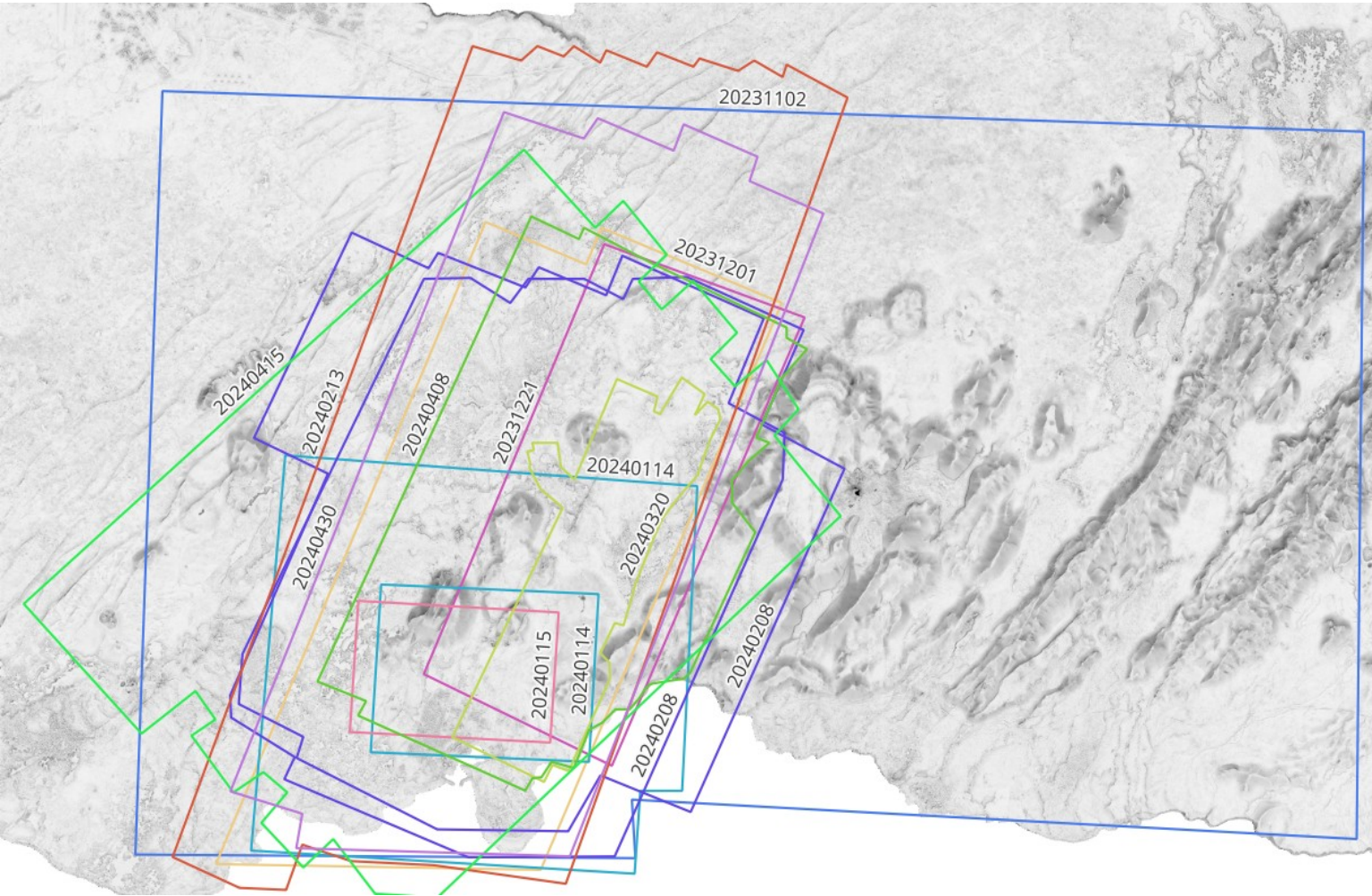


Two surveys throughout winter:

- 14.2.2024
- 15.4.2024
- 8 flying hr
- 572 km², GSD15



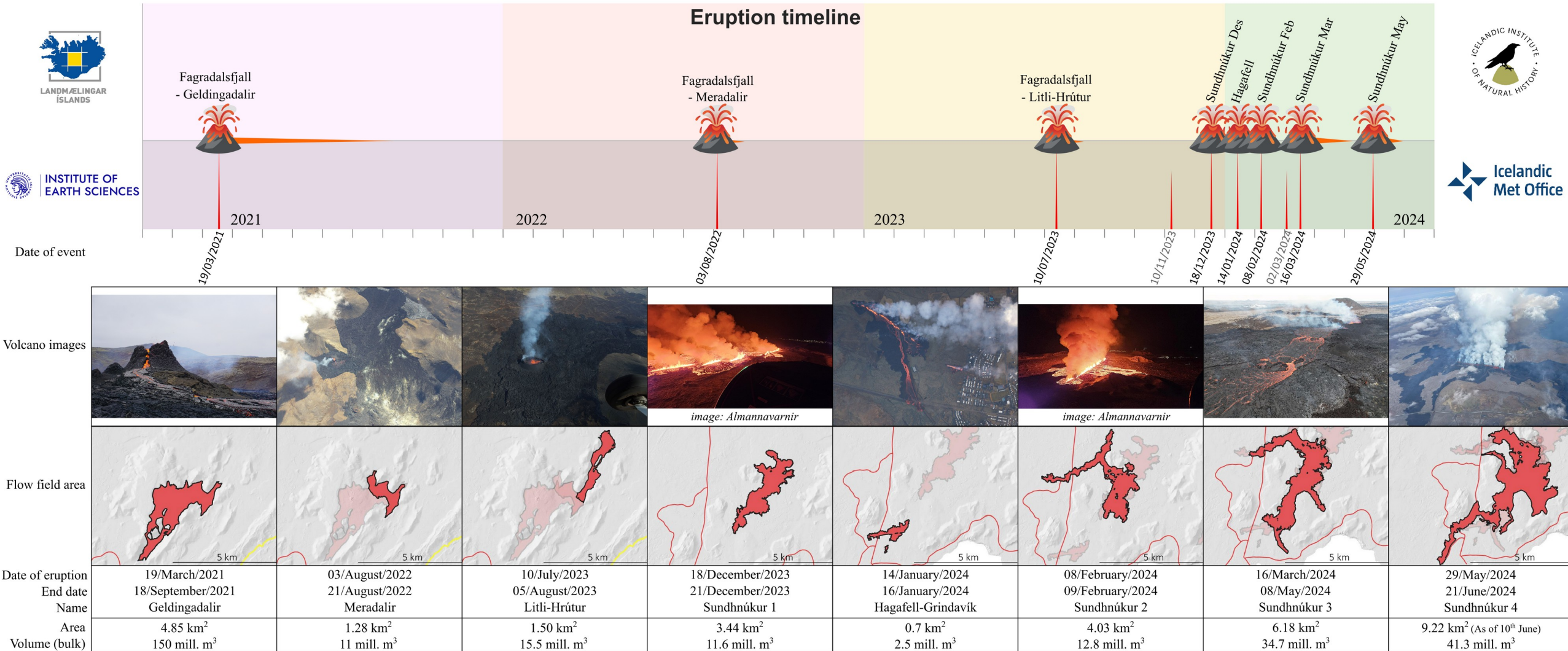
Volcano monitoring



- 13 surveys between Nov 2023 and May 2024
- 15 flying hr (1300 km², GSD10 to GSD30)

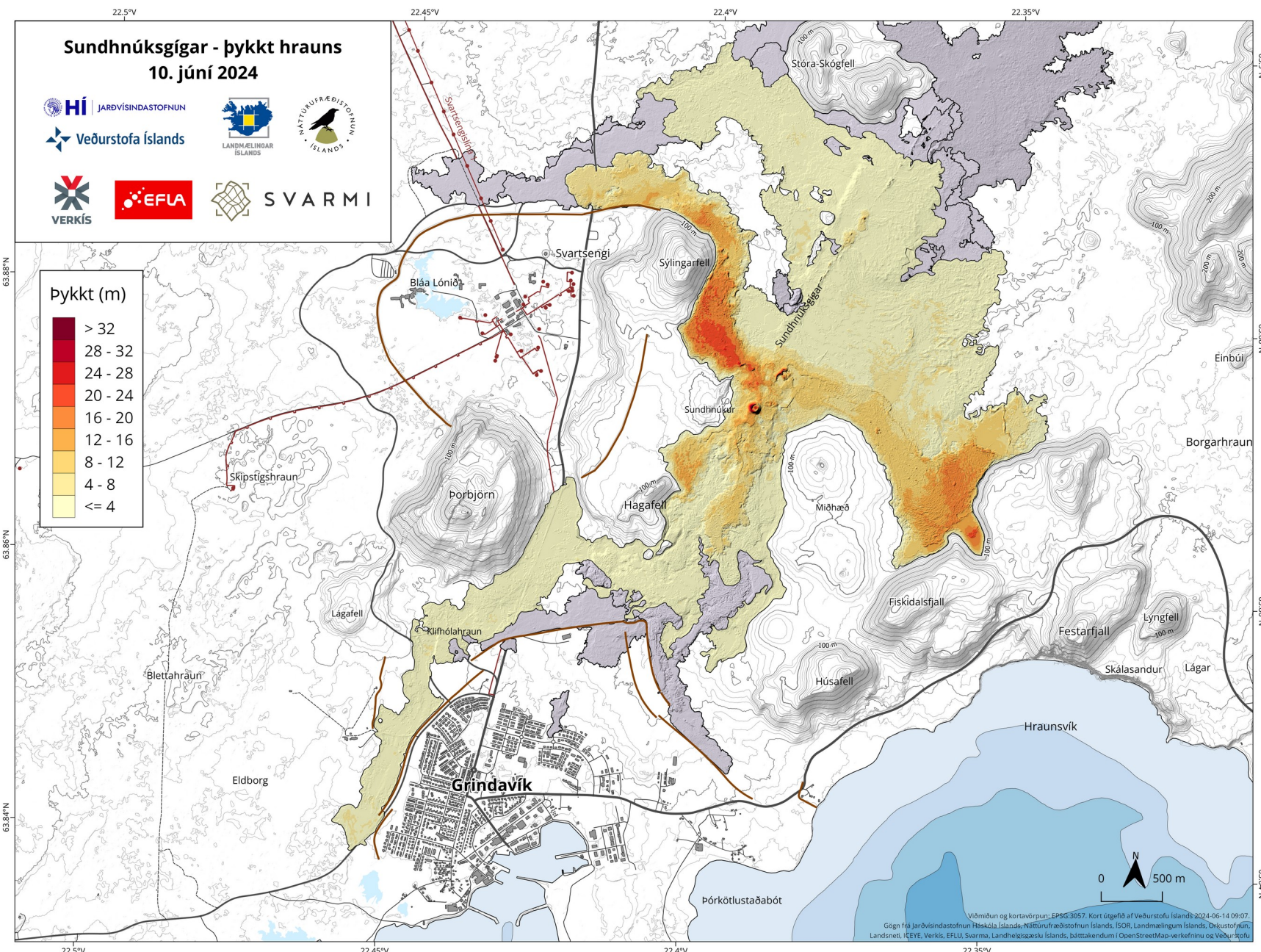


Reykjanes fires: Eight eruptions in three years



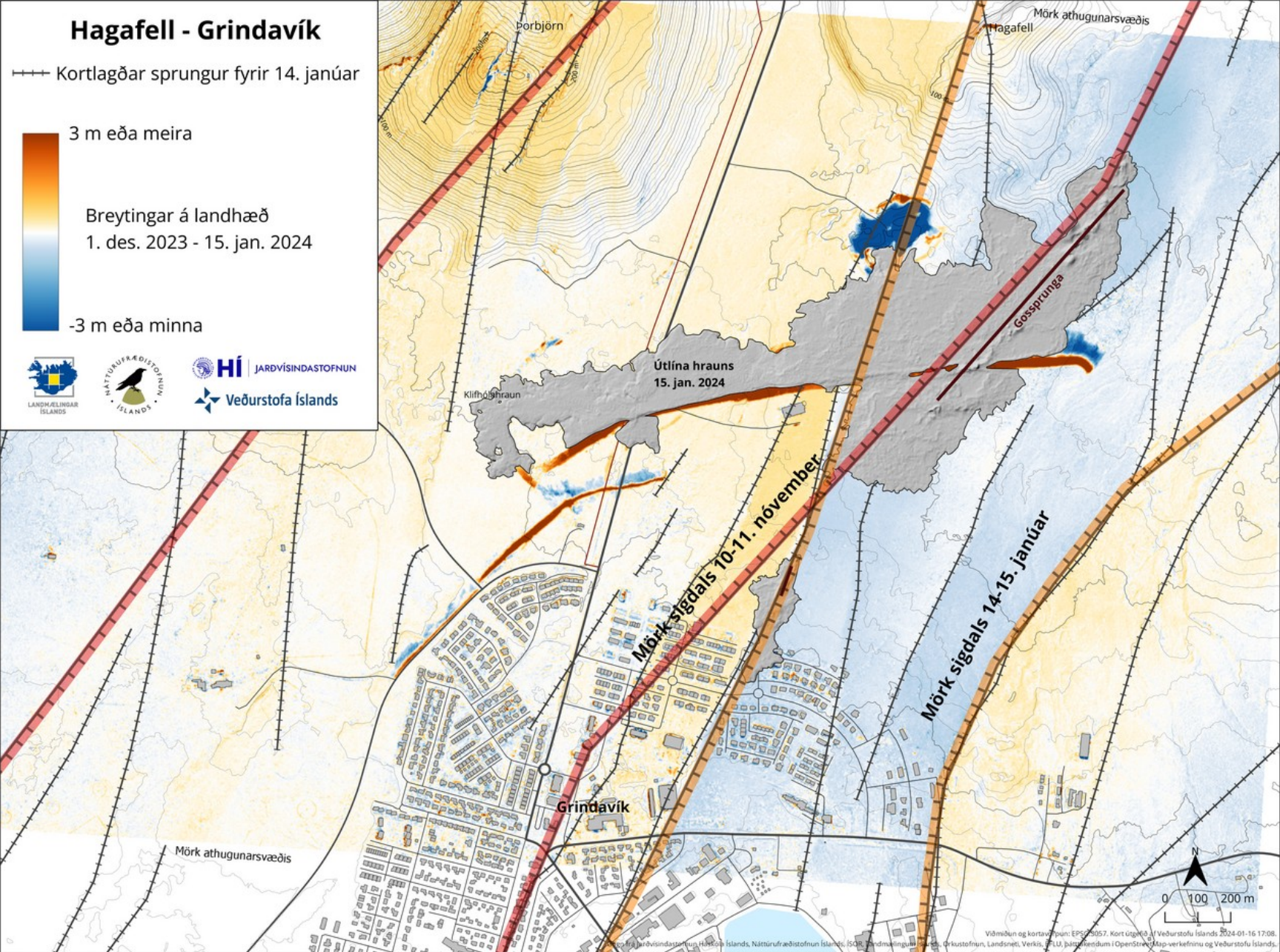
@Rob Askew (IINH)

Mapping from DEMs



@Ragnar Prastarson (IMO)

Mapping from DEMs



@Ragnar Prastarson (IMO)

Feature-tracking

