



Photo: Björn Oddsson 06.04.2021

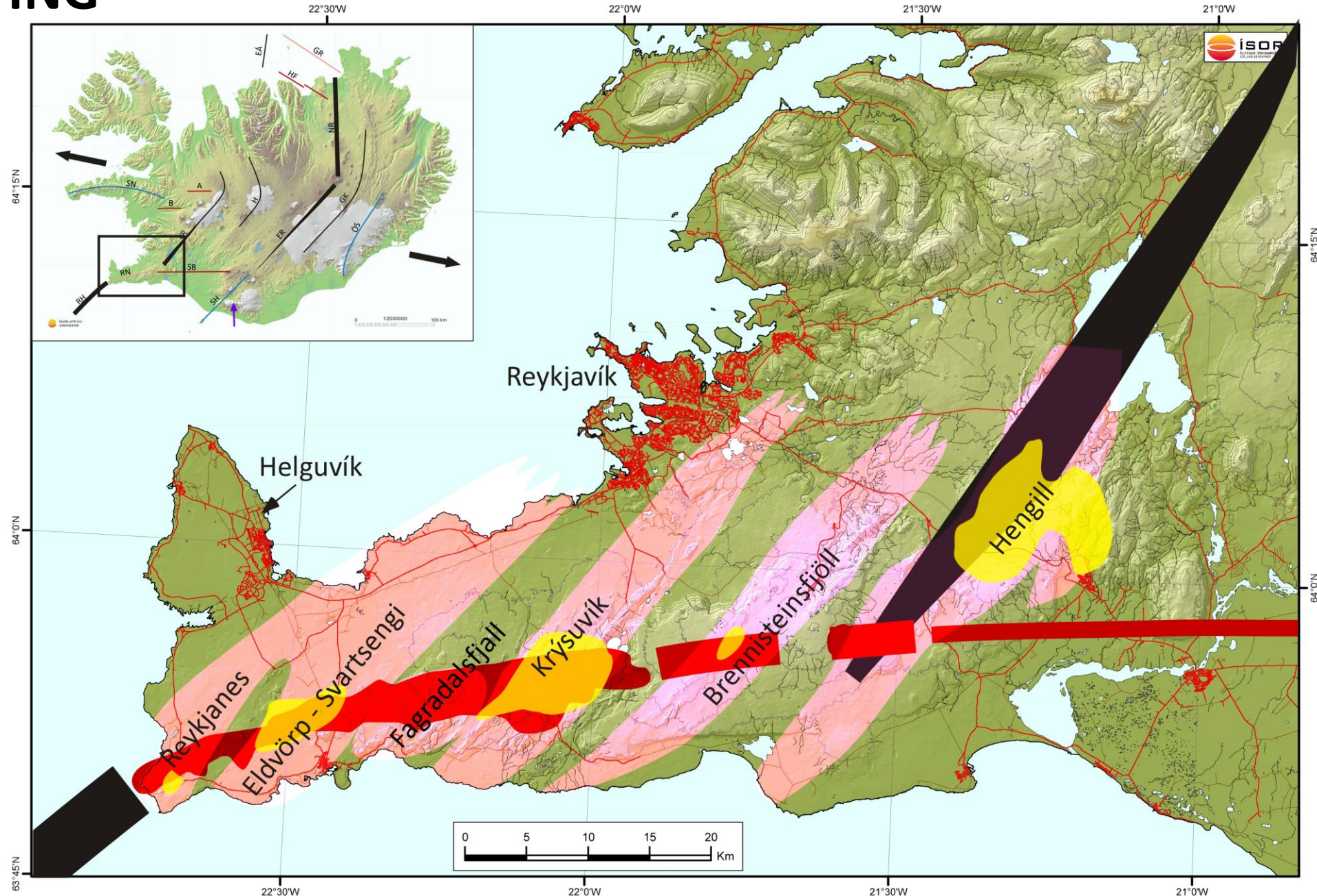
RECENT EARTHQUAKE AND VOLCANIC ACTIVITY IN REYKJANES PENINSULA

Þorbjörg Ágústsdóttir, Egill Árni Guðnason, Gylfi Páll Hersir

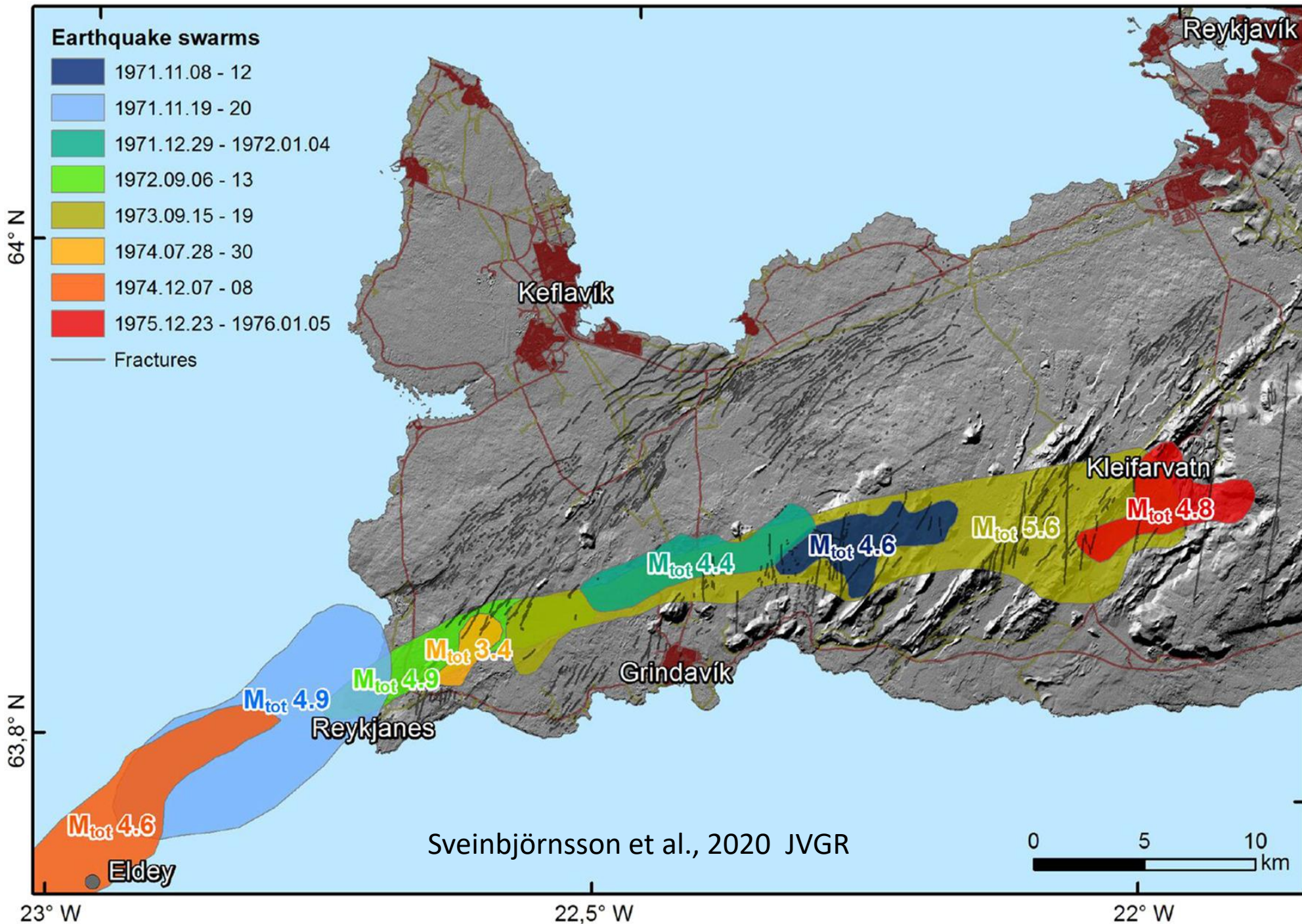
NASPMON kick-off meeting, 9. April 2021

TECTONIC SETTING

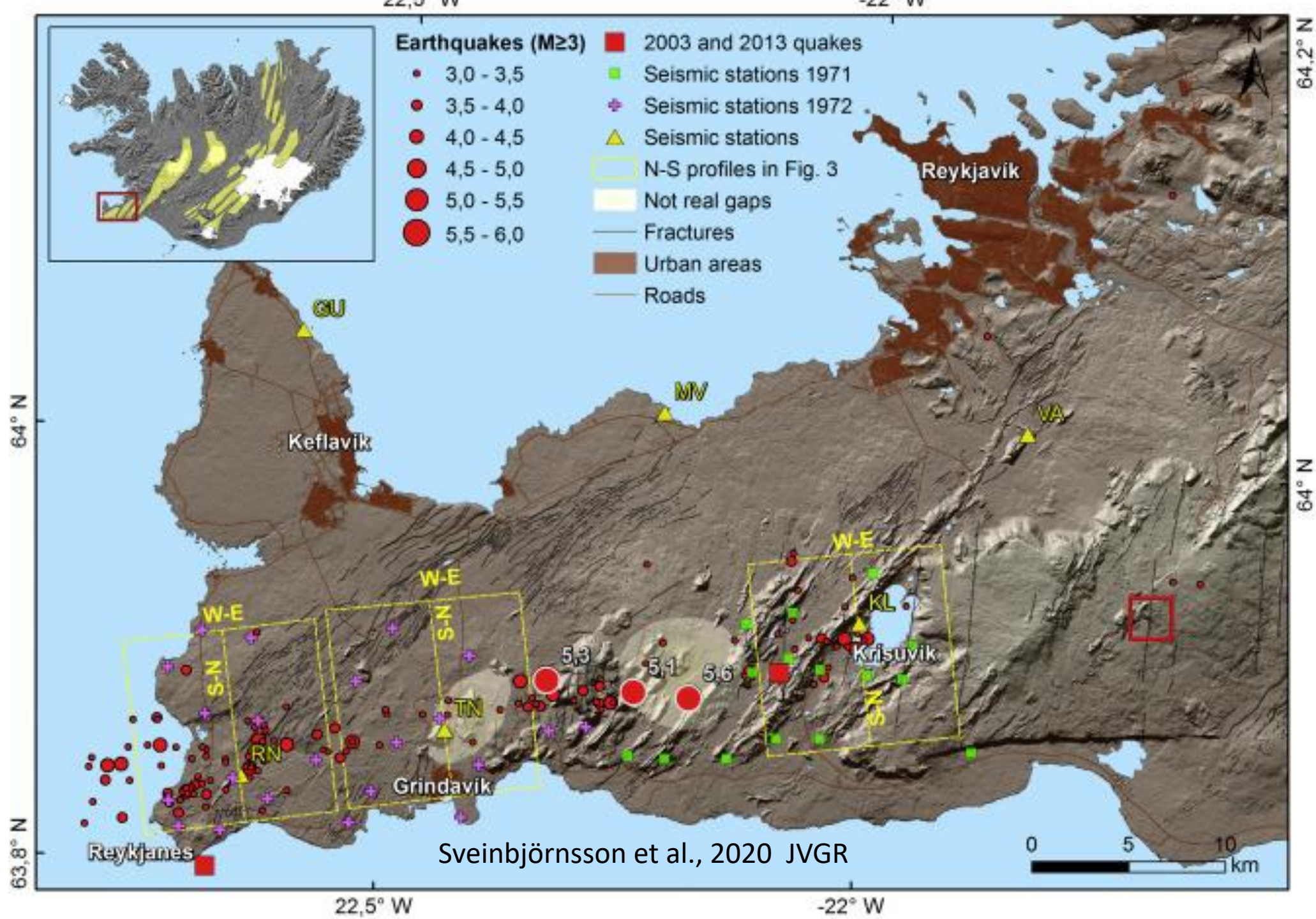
- Historical accounts of earthquakes since 1151
- Last eruption in 1240
- 5. December 1968 largest recorded earthquake in Reykjanes: M6 in Brennisteinsfjöll
- Earthquake history and measurements show largest earthquakes in Reykjanes are around M6



1971-1976

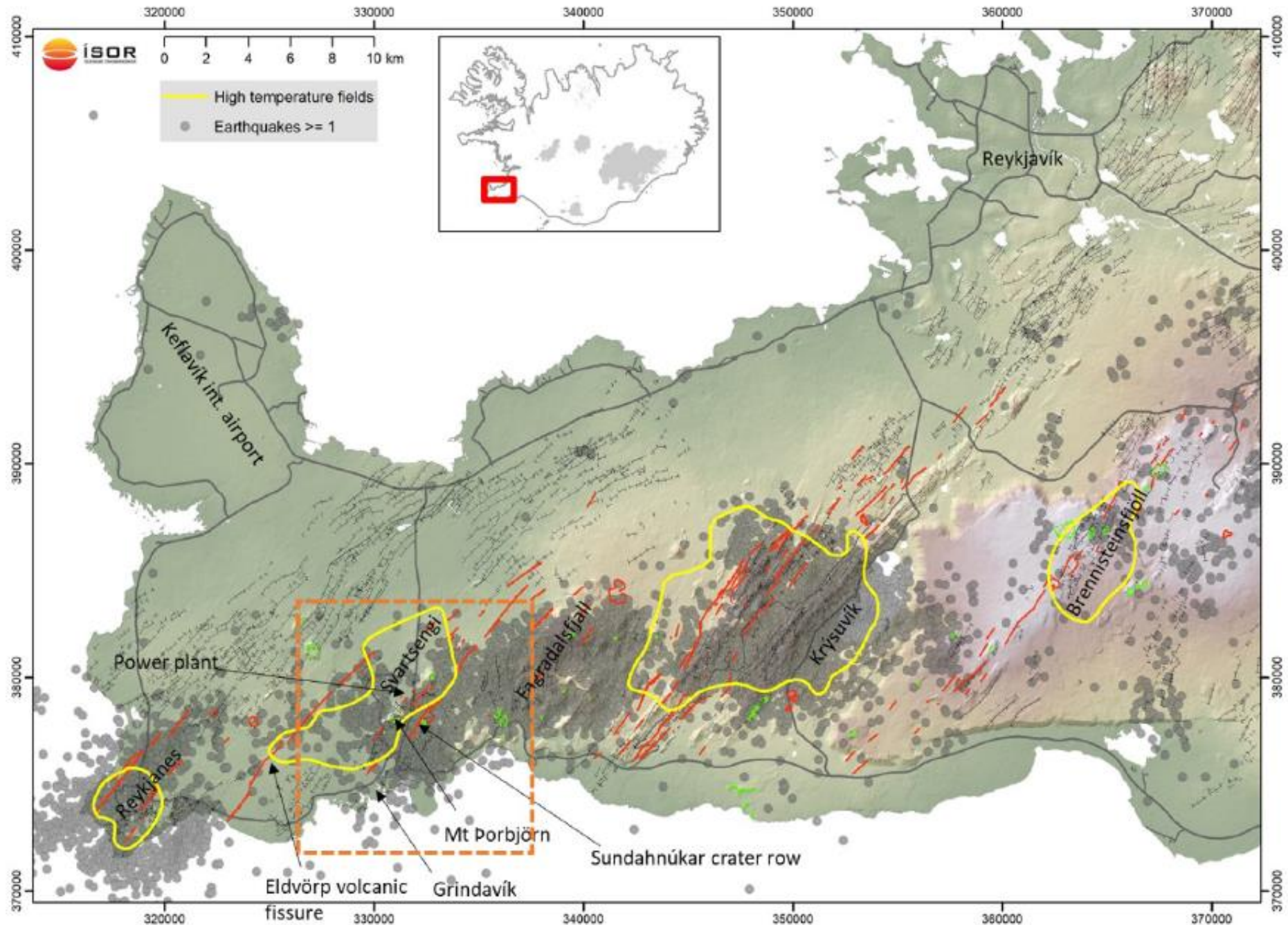


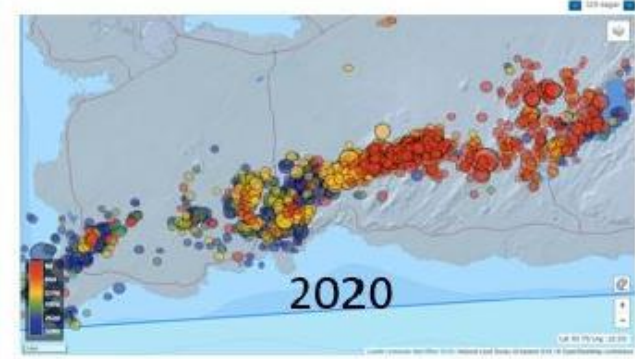
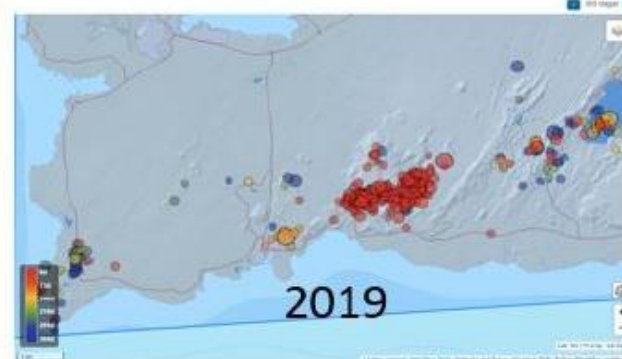
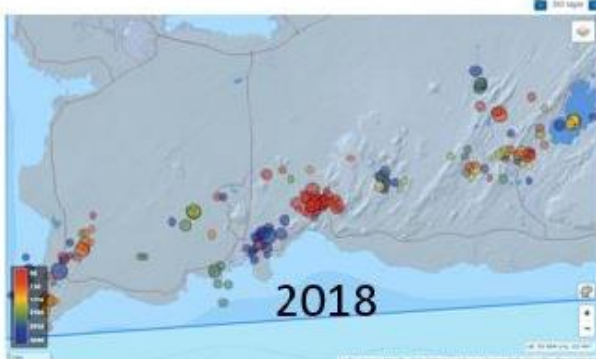
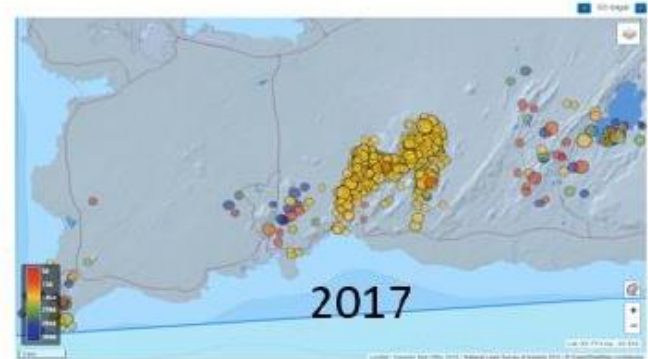
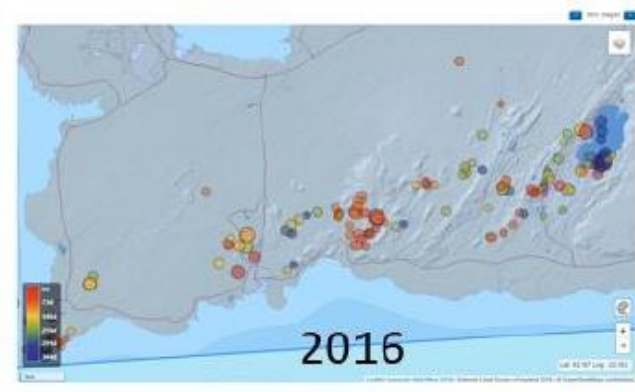
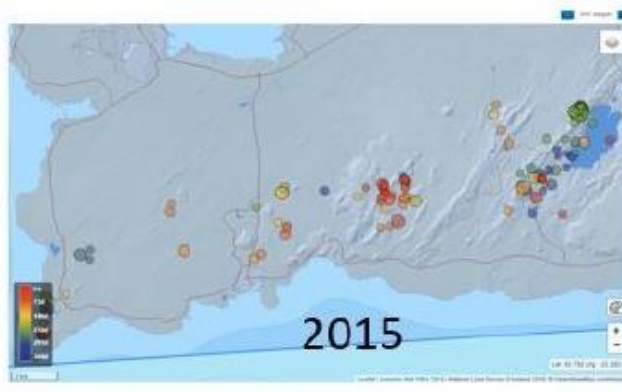
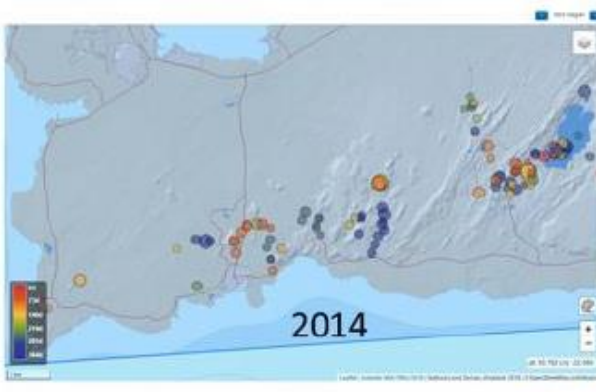
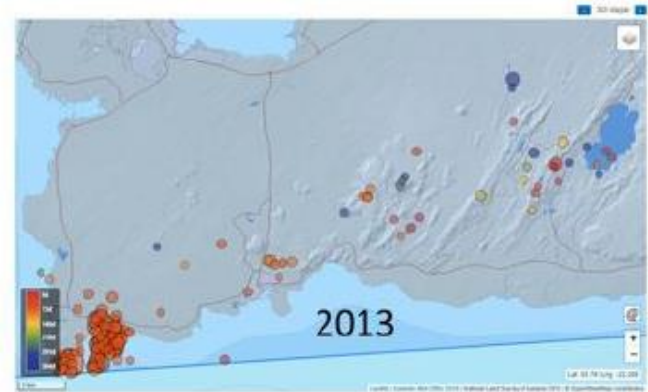
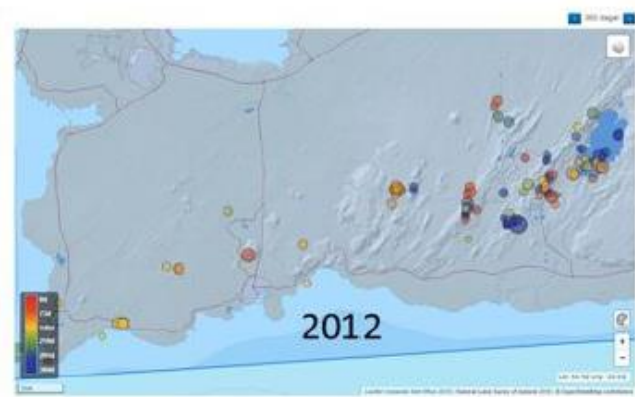
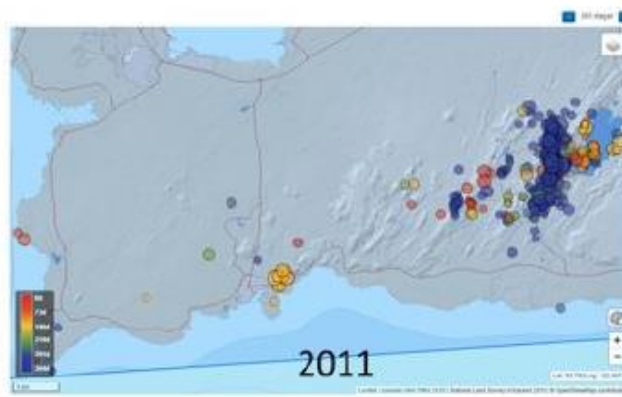
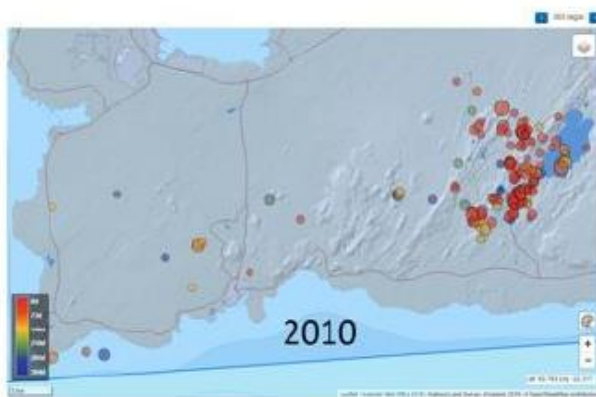
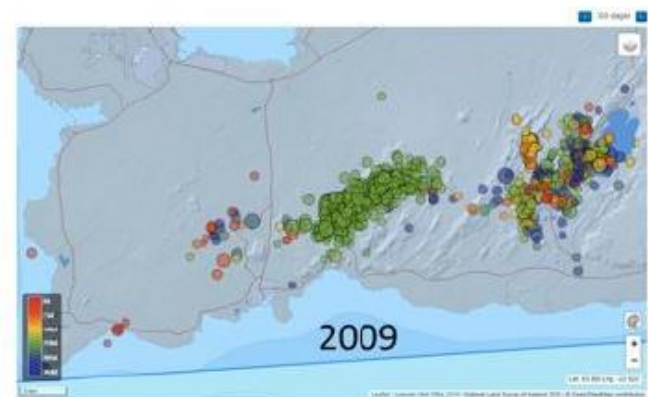
1971-1976



Sveinbjörnsson et al., 2020 JVGR

IMO RECORDED SEISMICITY M>1 1995-2020





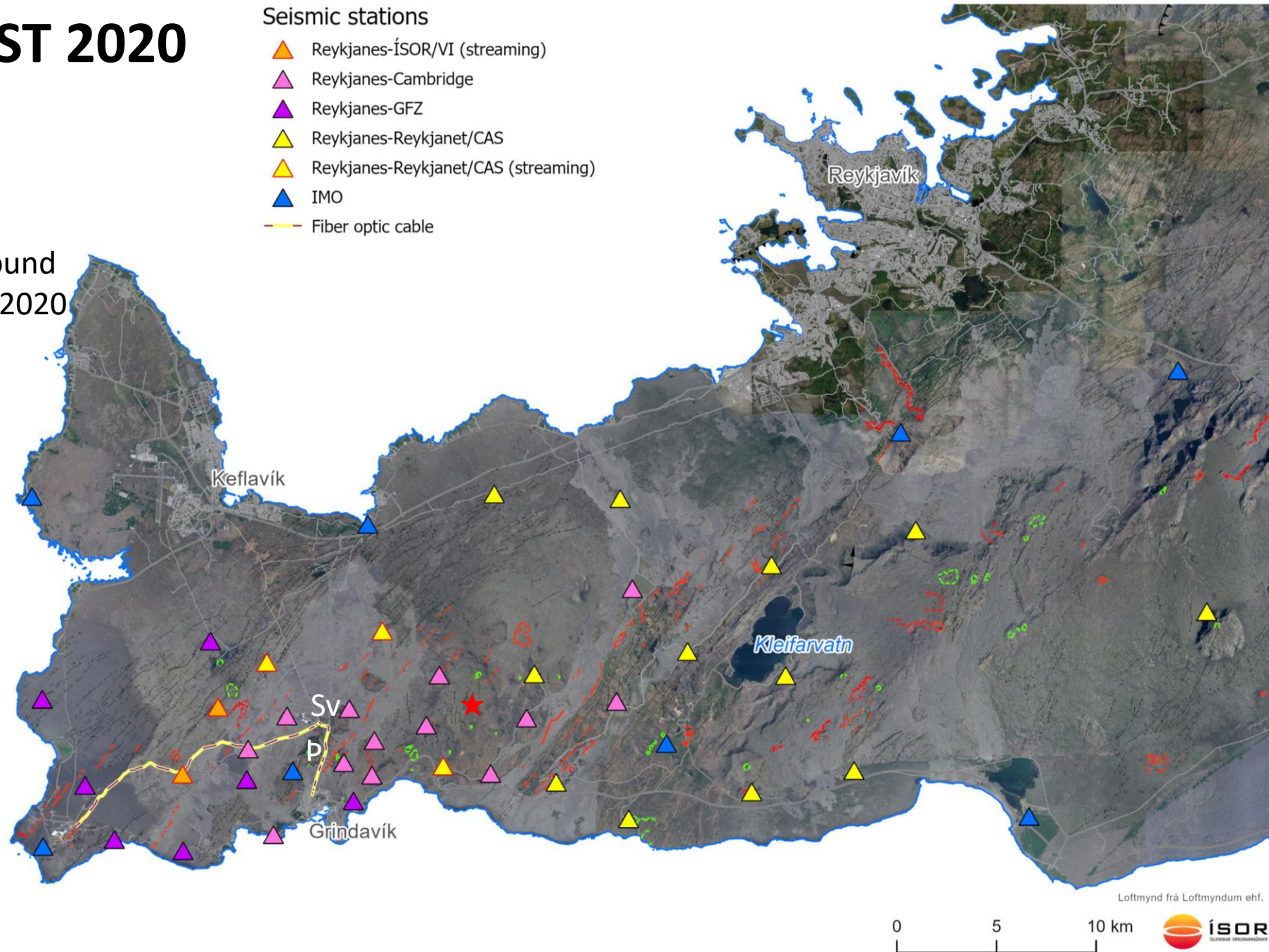
Recourse : <https://skjalftalisa.vedur.is> for IMO $M > 1.5$

ÞORBJÖRN UNREST 2020

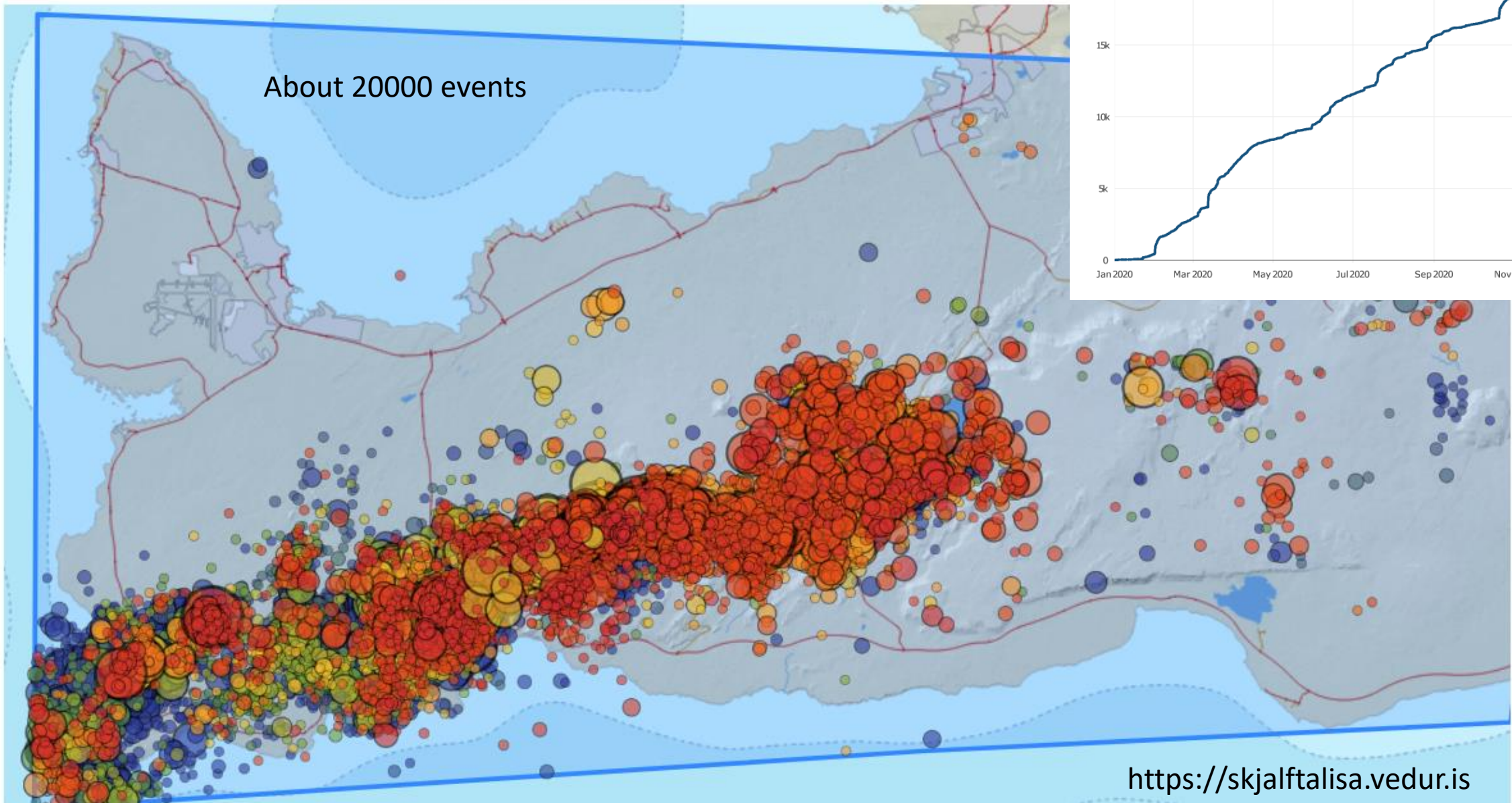
- Episodic elevated seismicity around Mt. Þorbjörn from 22. January. 2020

Seismic stations

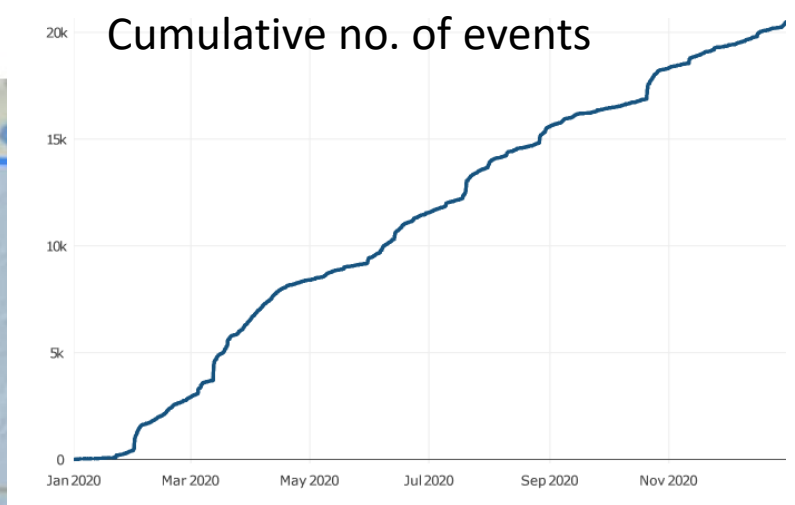
- ▲ Reykjanes-ÍSOR/VI (streaming)
- ▲ Reykjanes-Cambridge
- ▲ Reykjanes-GFZ
- ▲ Reykjanes-Reykjanet/CAS
- ▲ Reykjanes-Reykjanet/CAS (streaming)
- ▲ IMO
- Fiber optic cable



2020 IMO LOCATIONS

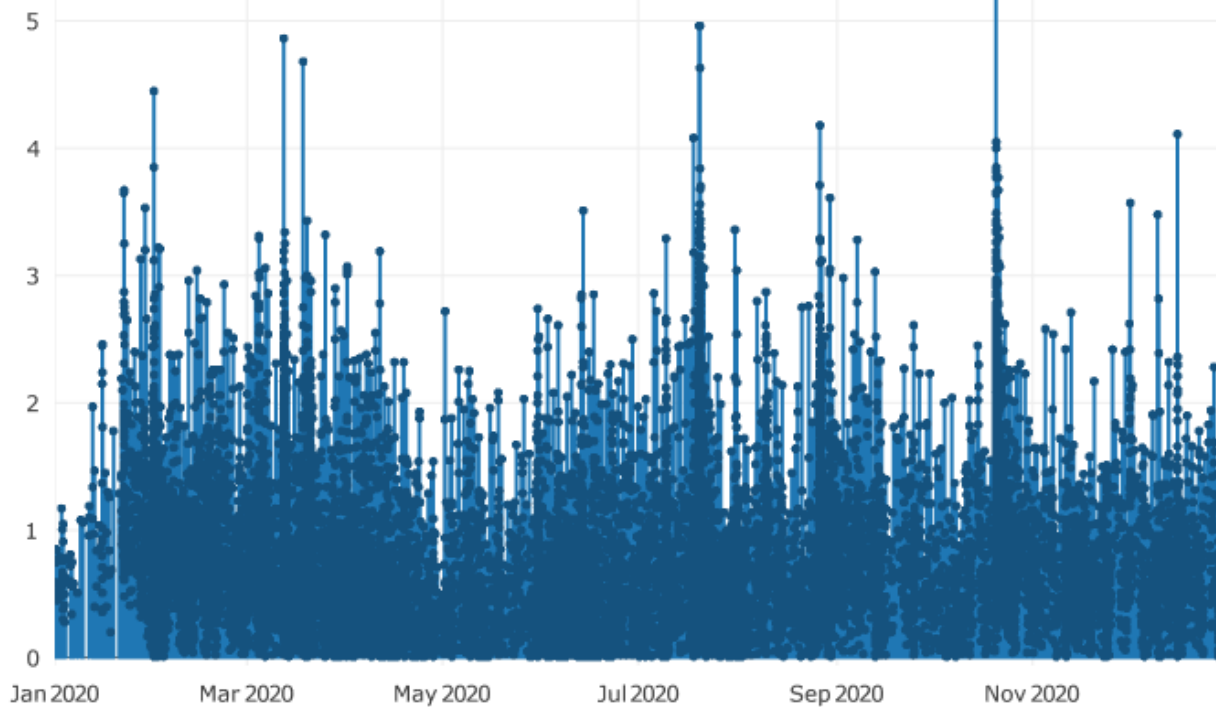


About 20000 events

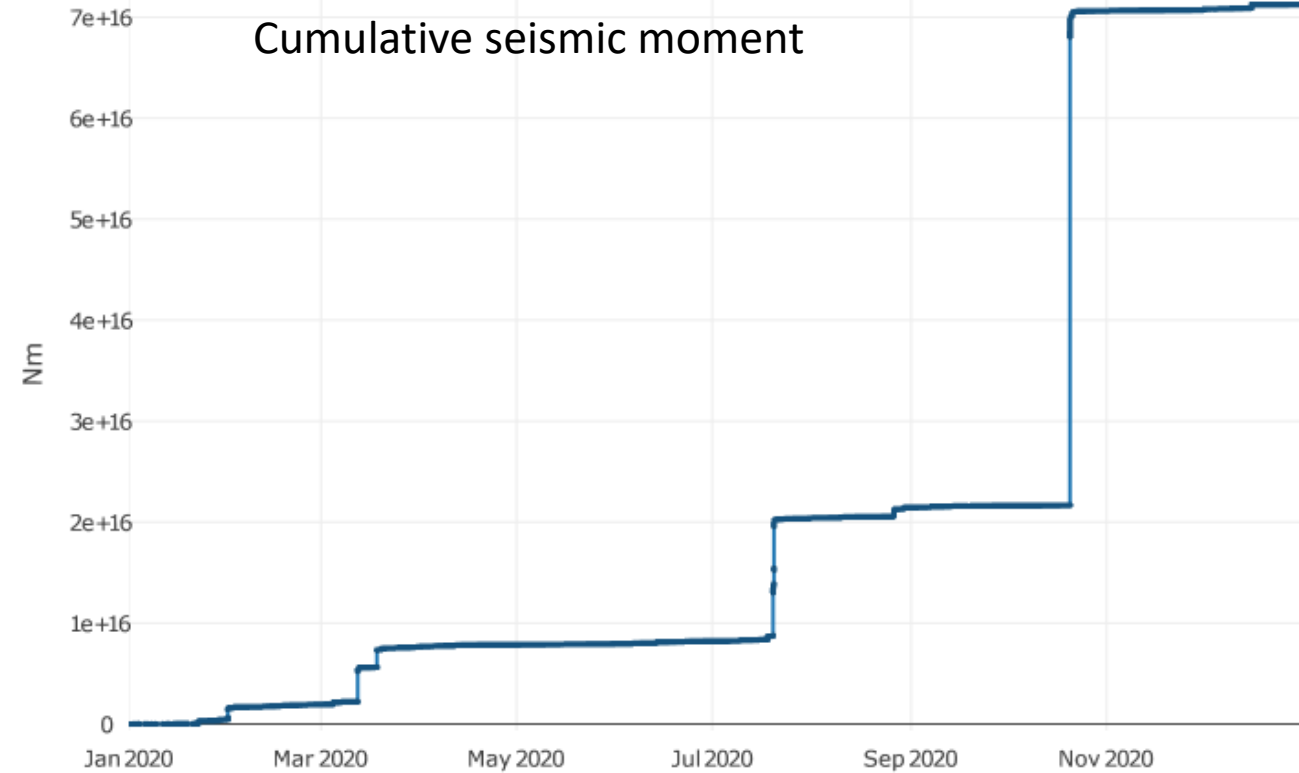


2020 IMO LOCATIONS

Earthquake magnitude vs time

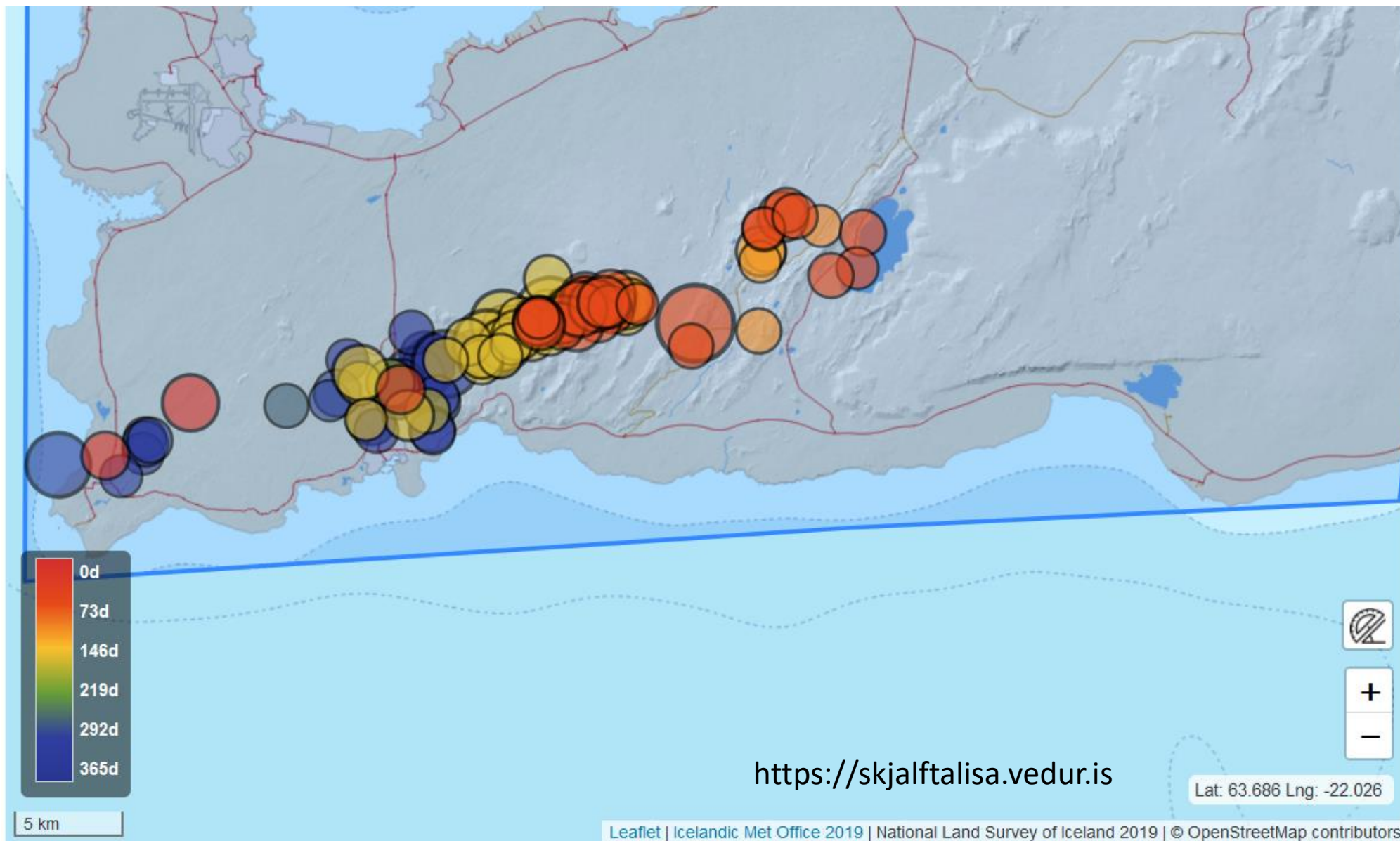


Cumulative seismic moment



<https://skjalftalisa.vedur.is>

2020 M > 3 IMO LOCATIONS



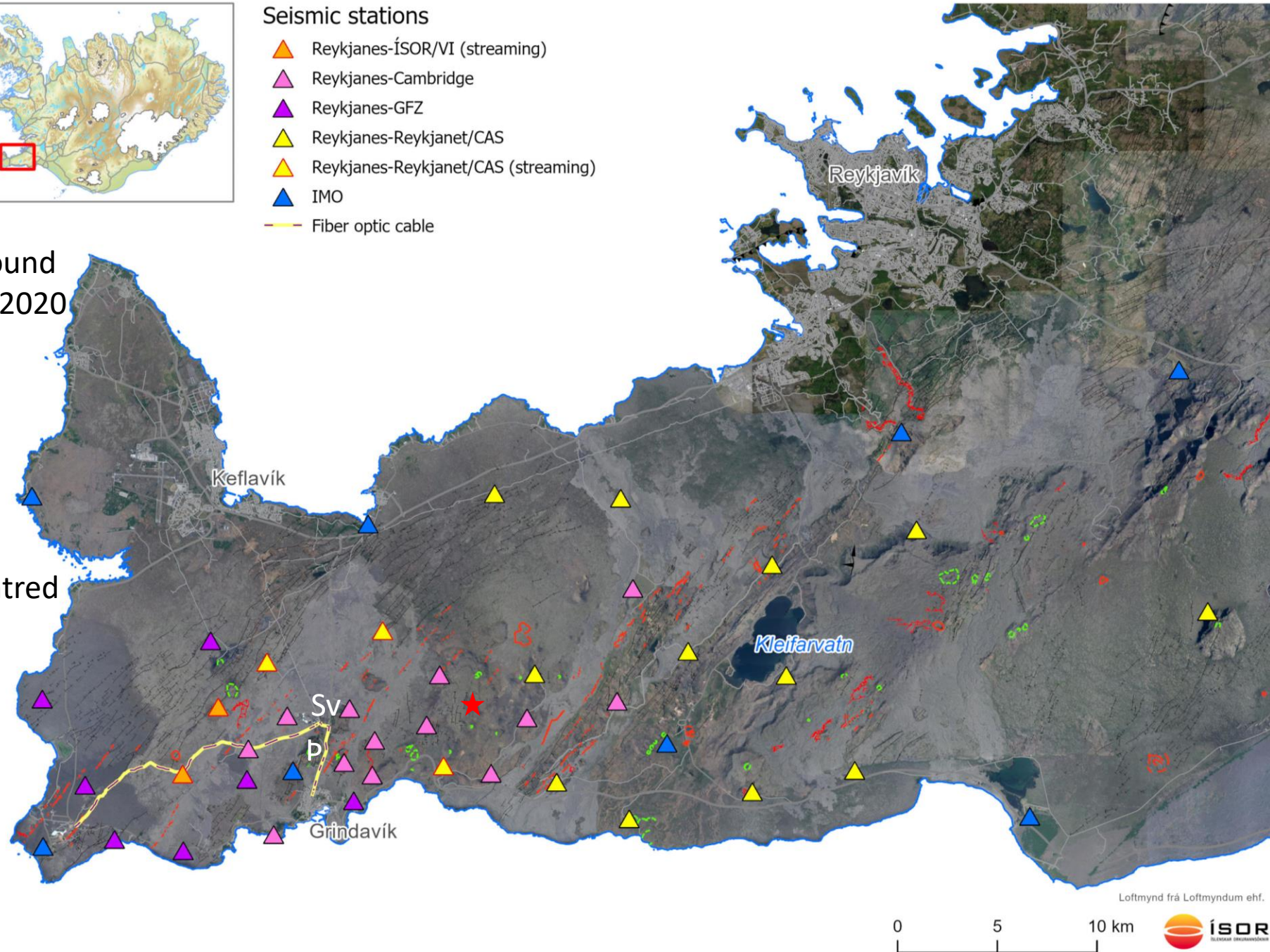
ÞORBJÖRN



Seismic stations

- ▲ Reykjanes-ÍSOR/VI (streaming)
- ▲ Reykjanes-Cambridge
- ▲ Reykjanes-GFZ
- ▲ Reykjanes-Reykjanet/CAS
- ▲ Reykjanes-Reykjanet/CAS (streaming)
- ▲ IMO
- Fiber optic cable

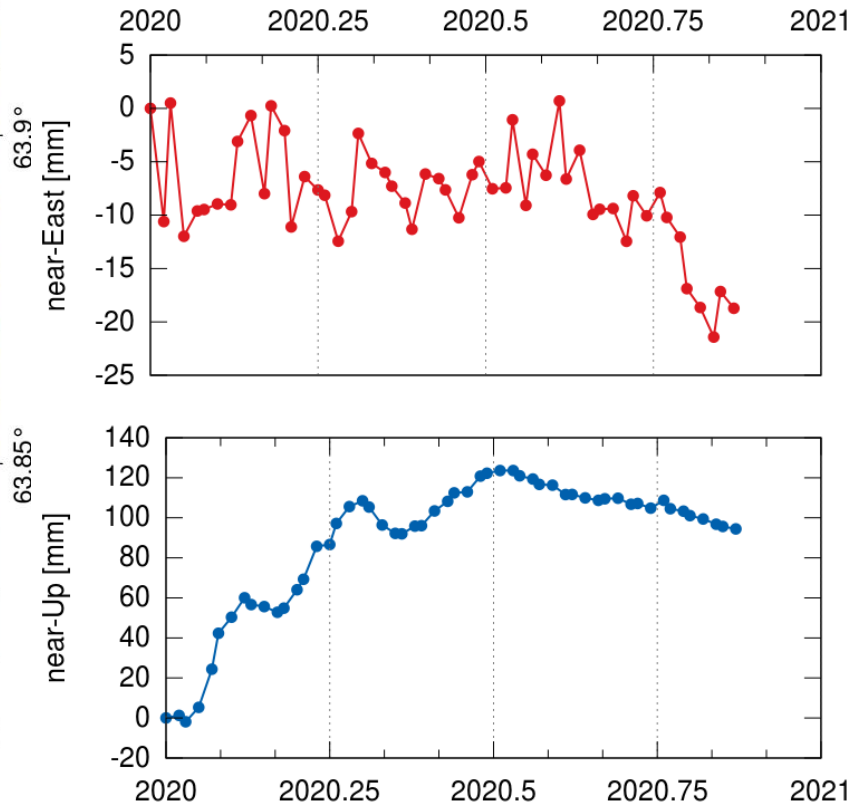
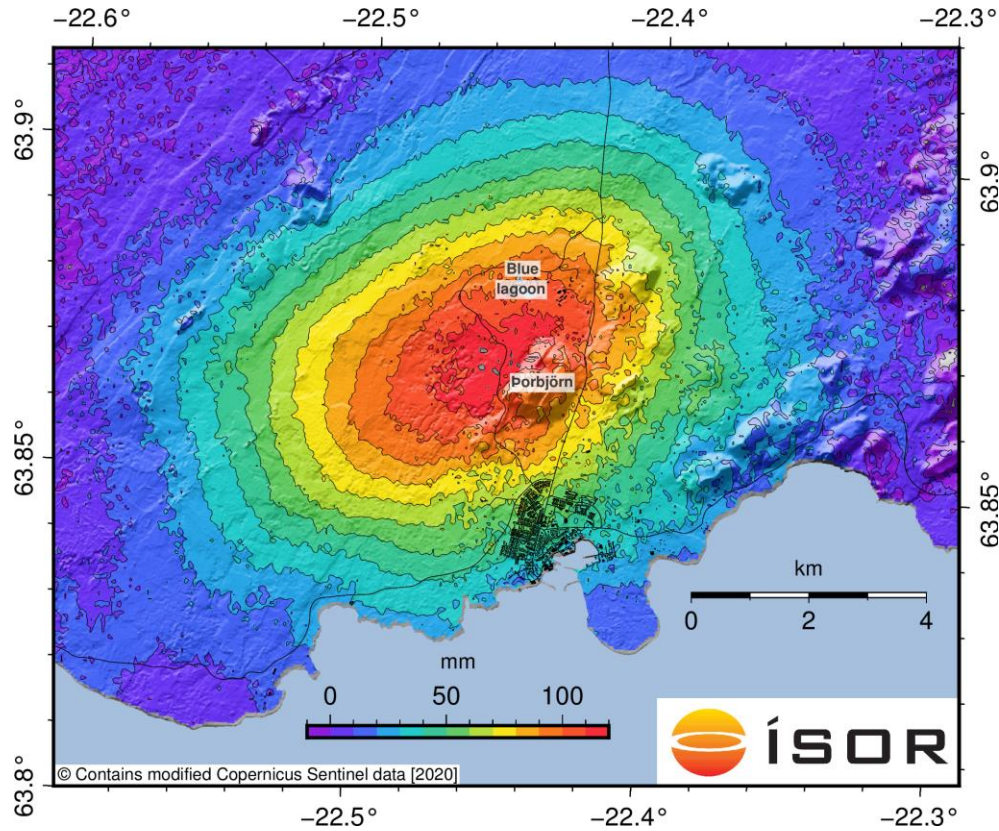
- Episodic elevated seismicity around Mt. Þorbjörn from 22. January, 2020
- Simultaneously, a rapid uplift started in the middle of the Svartsengi geothermal field centred close to the re-injection wells.



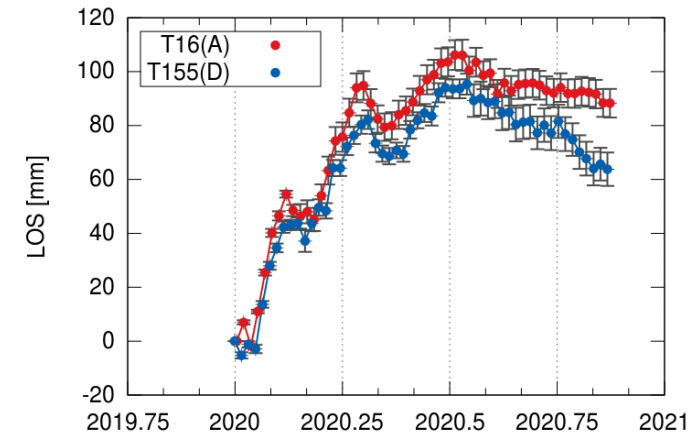
UPLIFT AROUND MT. ÞORBJÖRN: INSAR

DEFORMATION BETWEEN 19 JAN – 11 JUL 2020

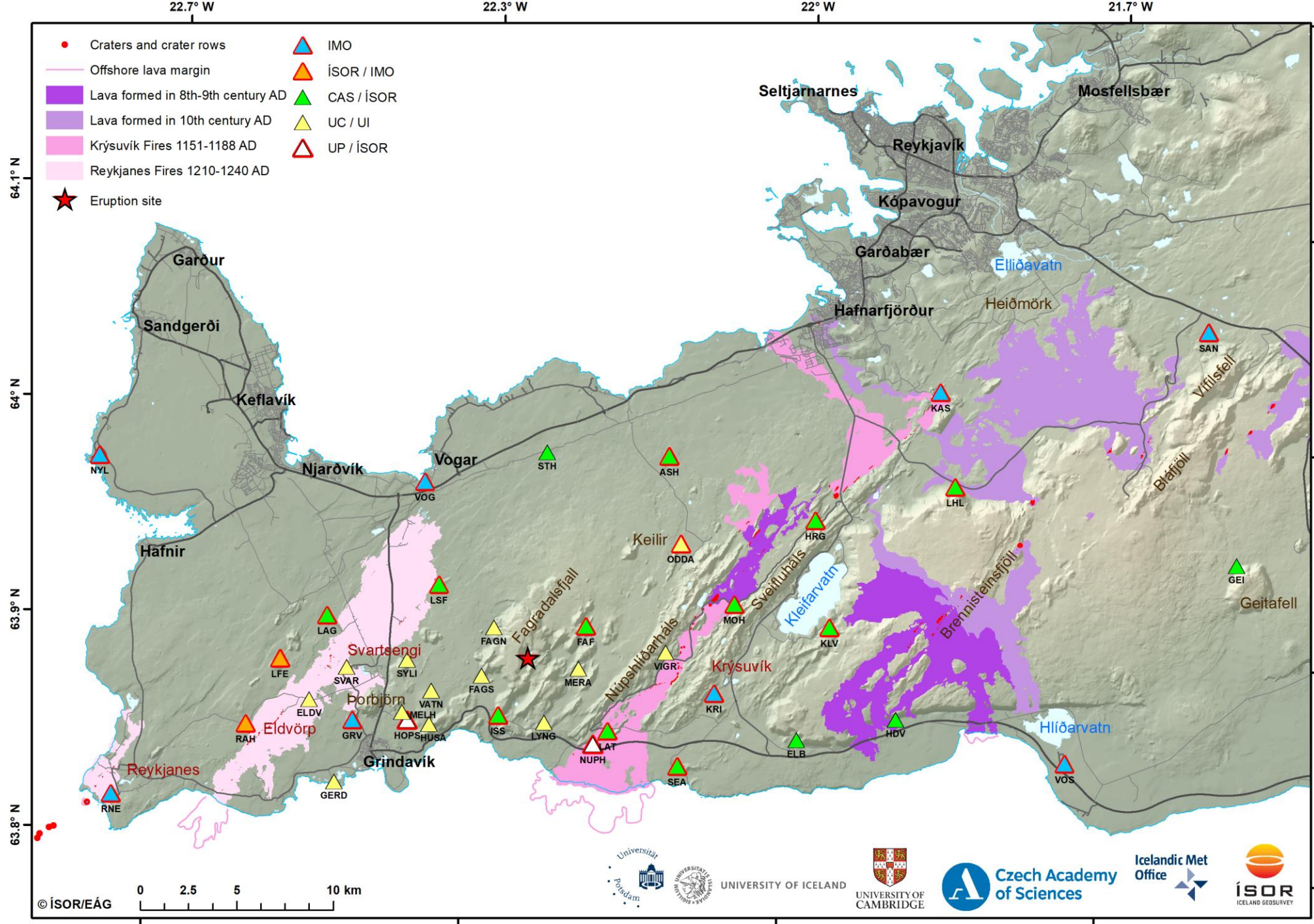
Work by: Vincent Drouin



Sentinel-1 data



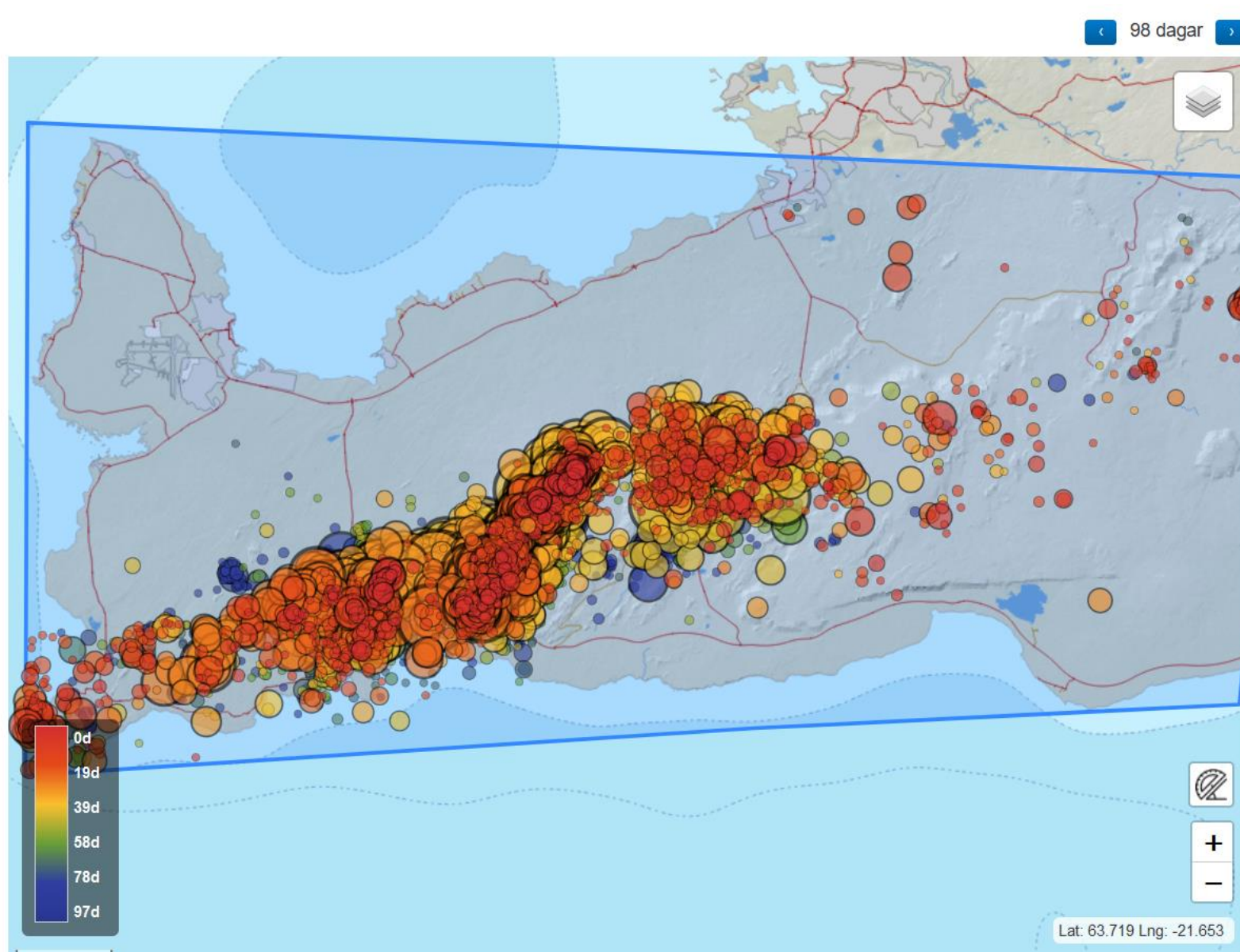
2021



TIMELINE: 2021 ACTIVITY

- 24. February: Elevated seismicity
- 01. March: Dyke propagation confirmed
- 18. March: Seismicity quiets down..
- 19. March: Eruption confirmed at 20:45 – 500m long fissure
- 5. April: Two new fissures open at 12:00, North of eruption site – in total 200 m long
- 7. April: Third fissure opened at 00:00, between the 19. March and the 5. April fissures - 100 m long

2021 IMO LOCATIONS



Tímabil

Frá 2021-01-01 00:00

Til 2021-04-08 09:30

Dýpi
(km)

Min 0

Max 25

Stærð
(M)

Min 0

Max 7

Svæði

Reykjaneskagi - Ví

Birta valið svæði

Skjálftar
11802

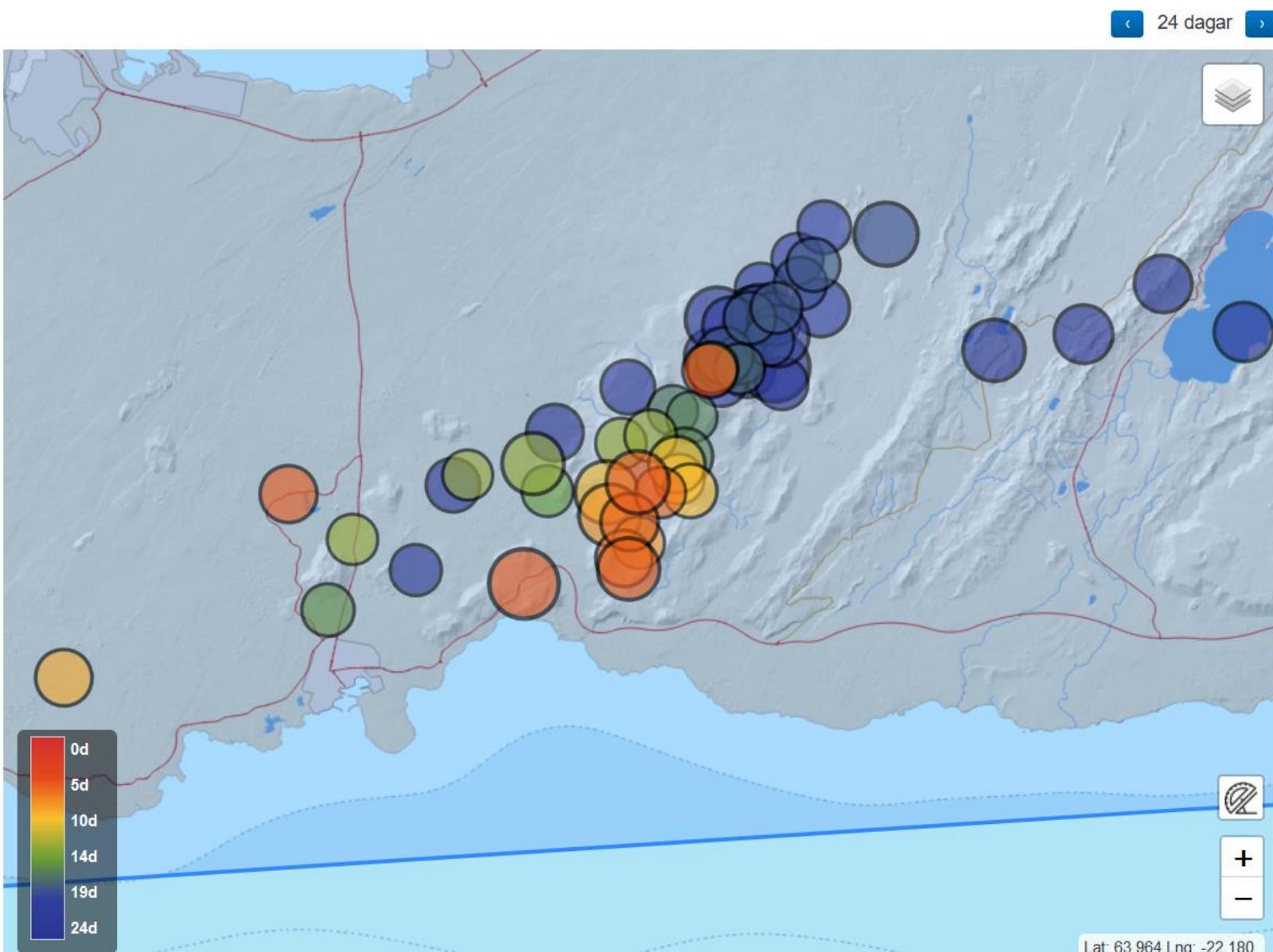
Mikill fjöldi skjálfta valinn
Búast má við lengri fyrirspurnar og teikni tíma

Teikna

Endurstilla

<https://skjalftalisa.vedur.is>

2021 M>4 IMO LOCATIONS



Tímabil

Frá 2021-02-24 00:00

Til 2021-03-20 00:00

Dýpi
(km)

Min 0

Max 25

Stærð
(M)

Min 4

Max 7

Svæði

Reykjaneskagi - Ví

Birta valið svæði

Skjálftar
61

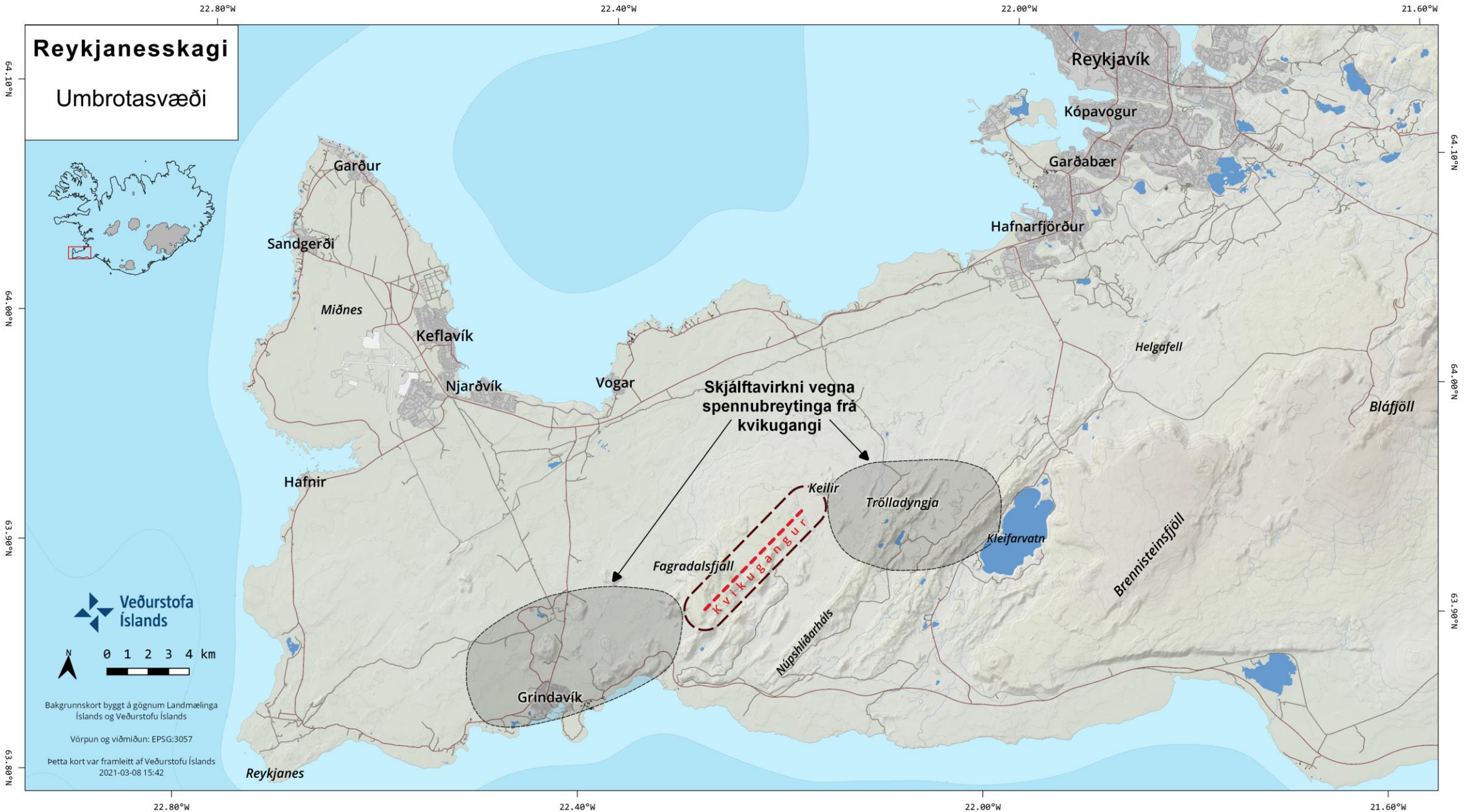
Teikna

Endurstilla

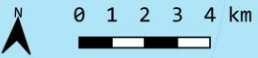
<https://skjalftalisa.vedur.is>

Reykjaneskagi

Umbrotasvæði



 Veðurstofa Íslands



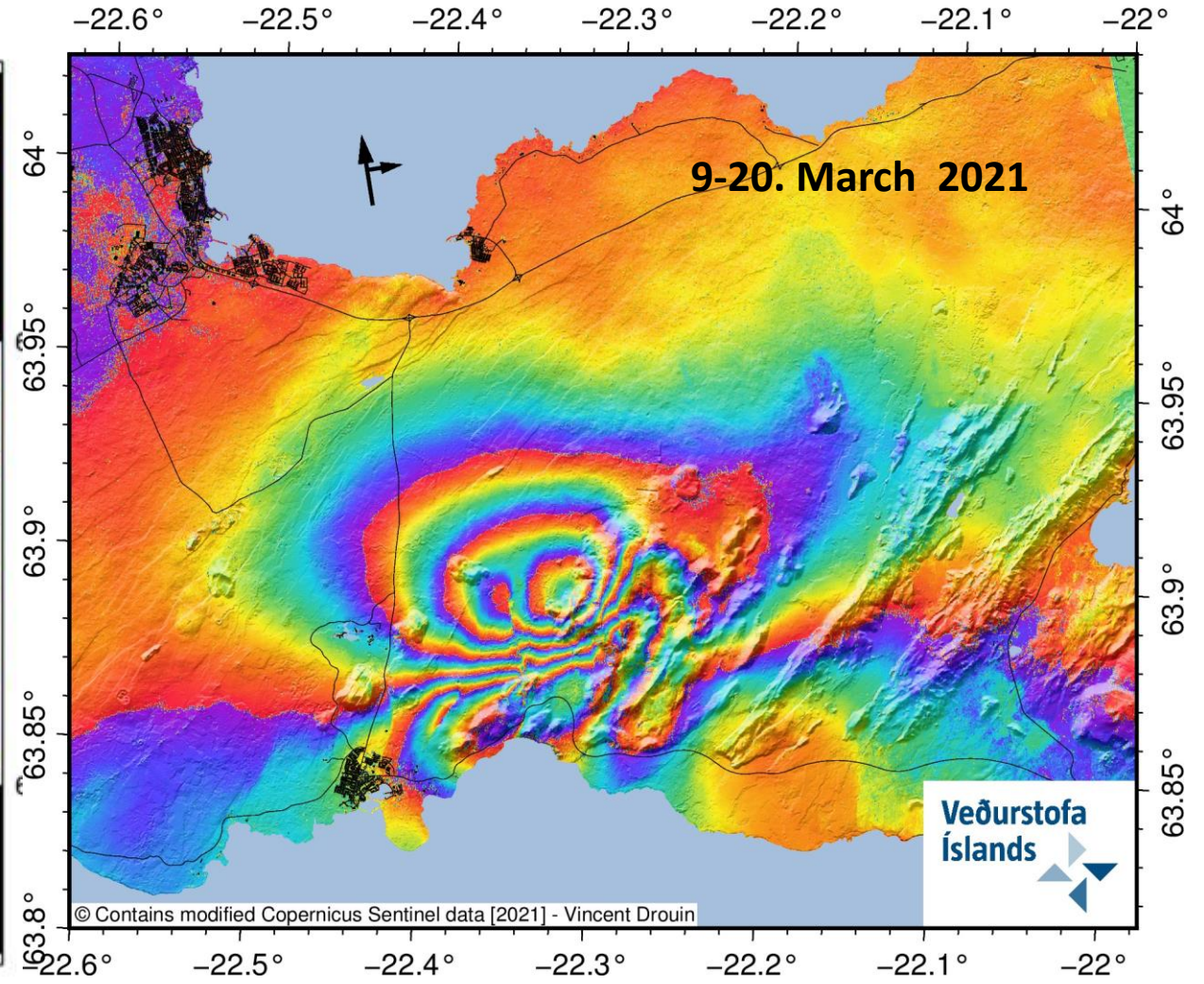
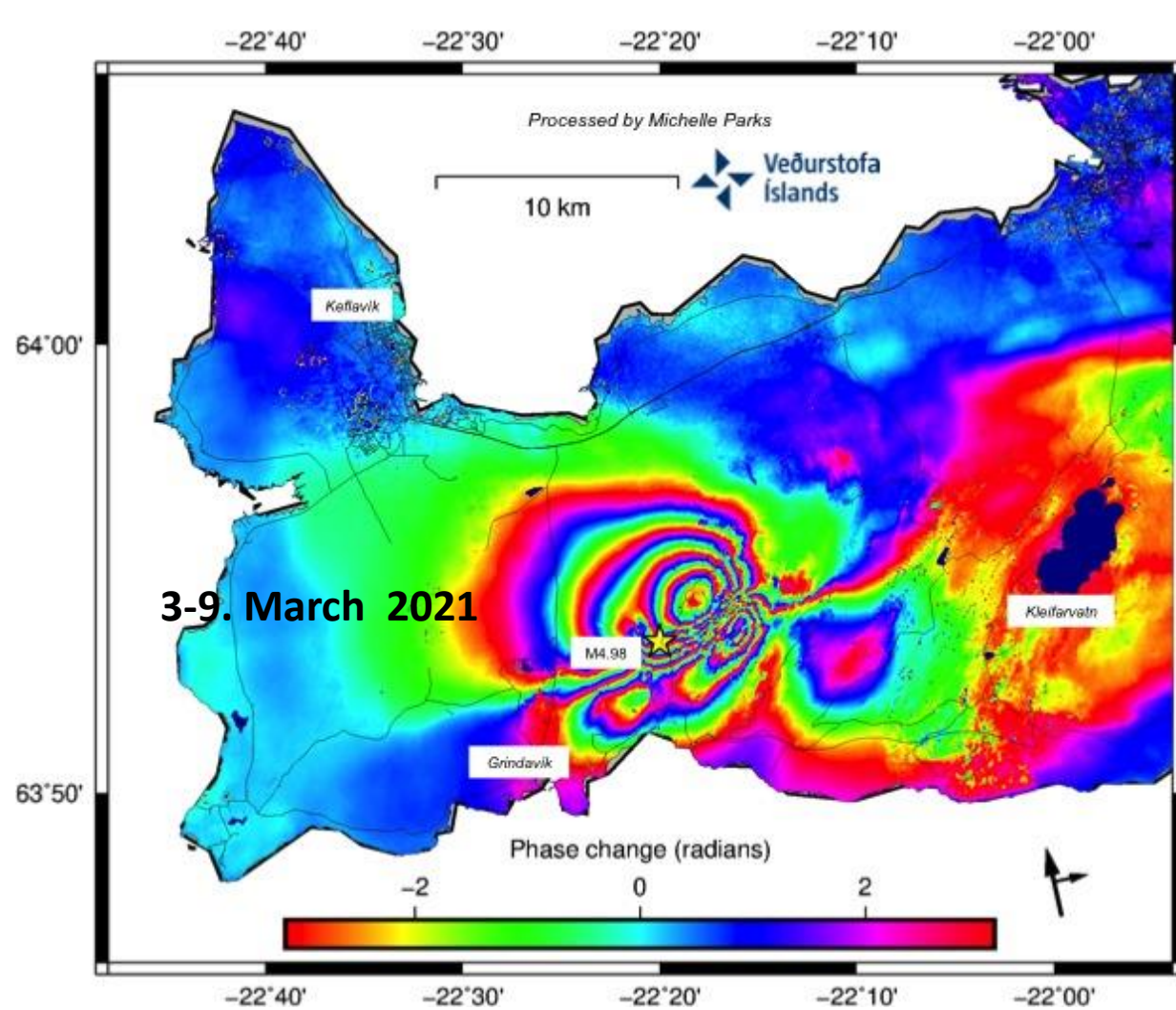
Bakgrunnskort byggt á gögnum Landmælinga Íslands og Veðurstofu Íslands

Vörpun og viðmiðun: EPSG:3057

Þetta kort var framleitt af Veðurstofu Íslands 2021-03-08 15:42

Reykjanes

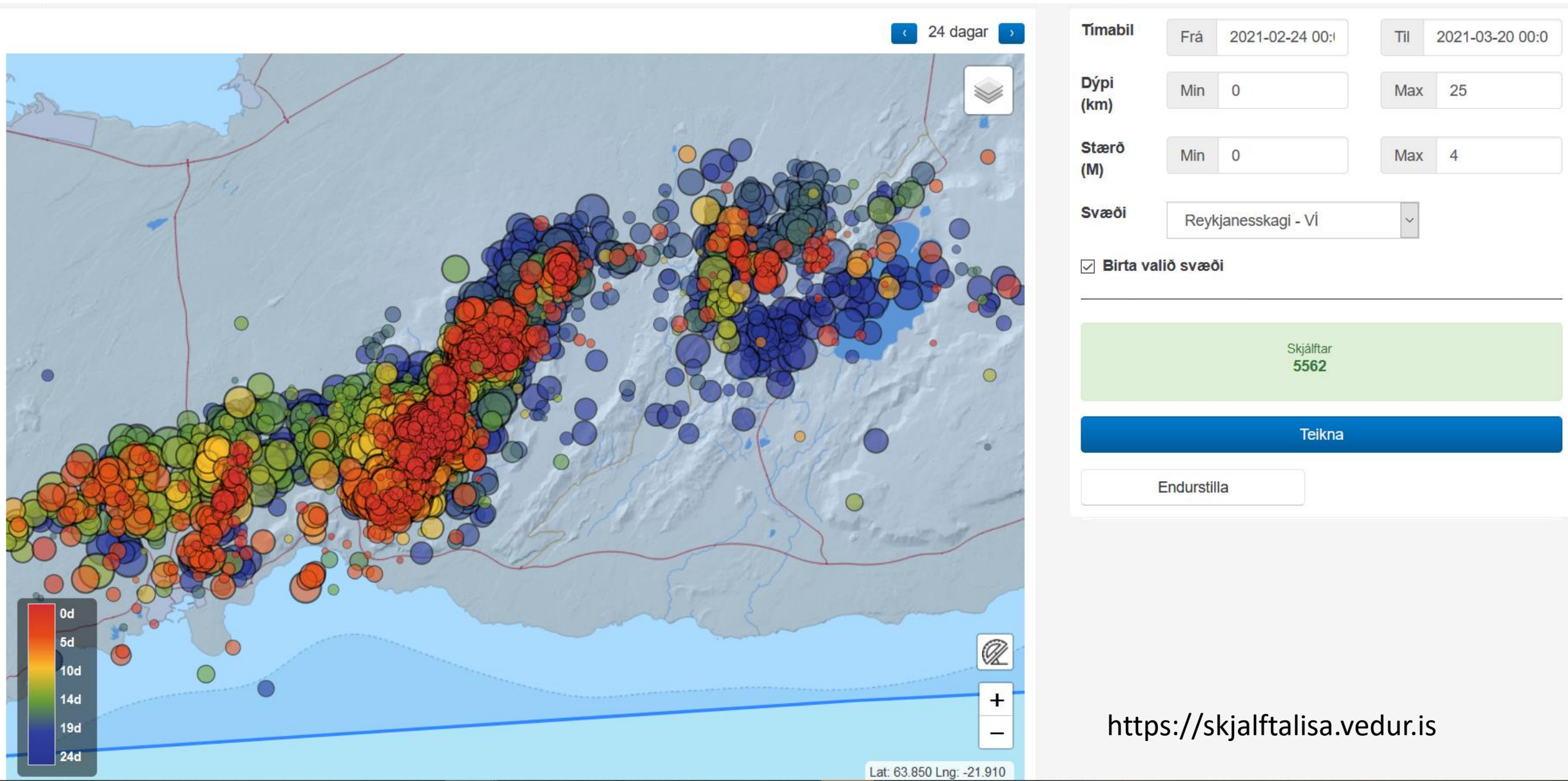
InSAR



TIMELINE: 2021 ACTIVITY

- 24. February: Elevated seismicity
- 01. March: Dyke propagation confirmed
- 18. March: Seismicity quiets down..
- 19. March: Eruption confirmed at 20:45 – 500m long fissure
- 5. April: Two new fissures open at 12:00, North of eruption site – in total 200 m long
- 7. April: Third fissure opened at 00:00, between the 19. March and the 5. April fissures - 100 m long

2021 IMO LOCATIONS: DYKE ONSET TO ERUPTION

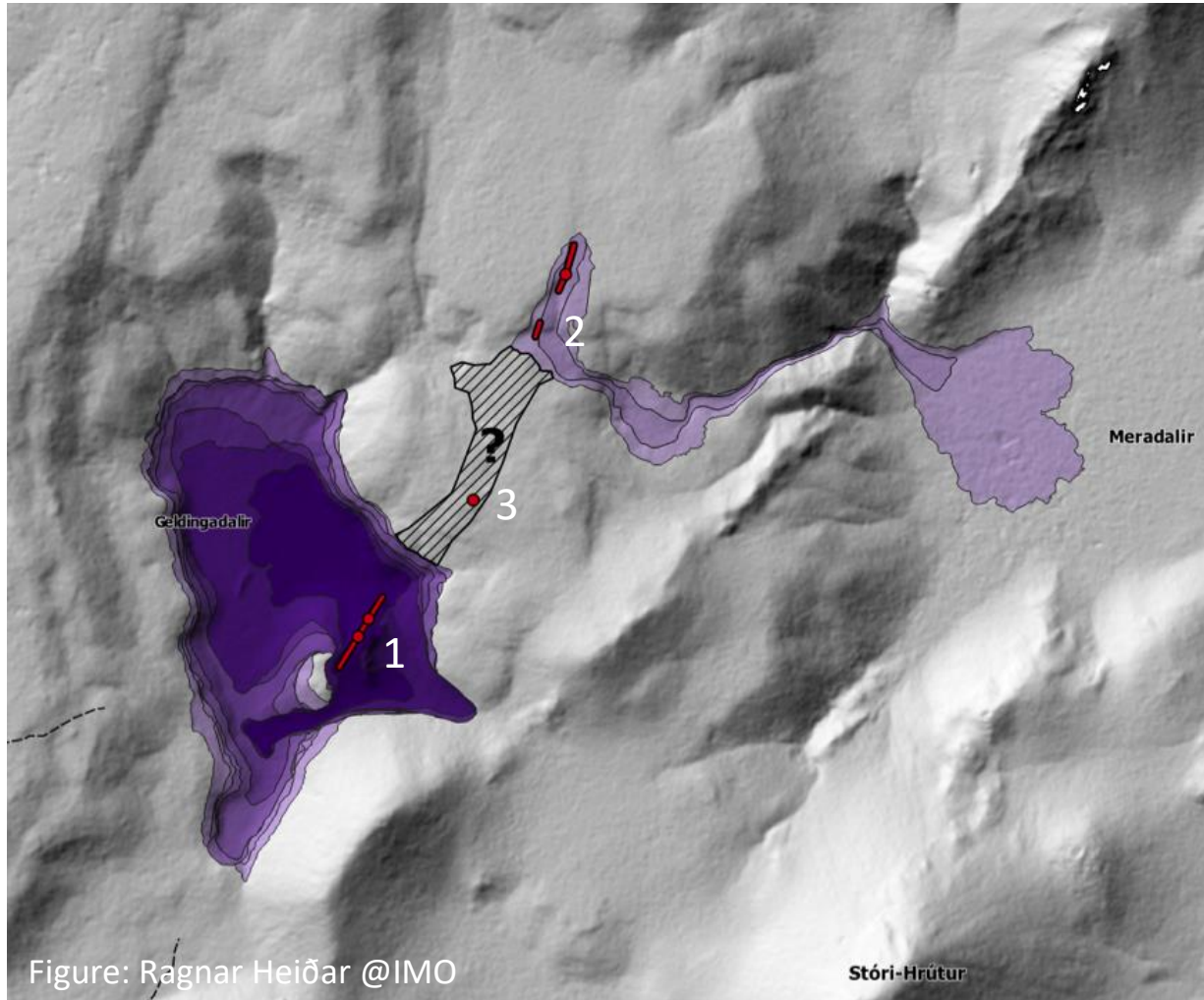


<https://skjalftalisa.vedur.is>

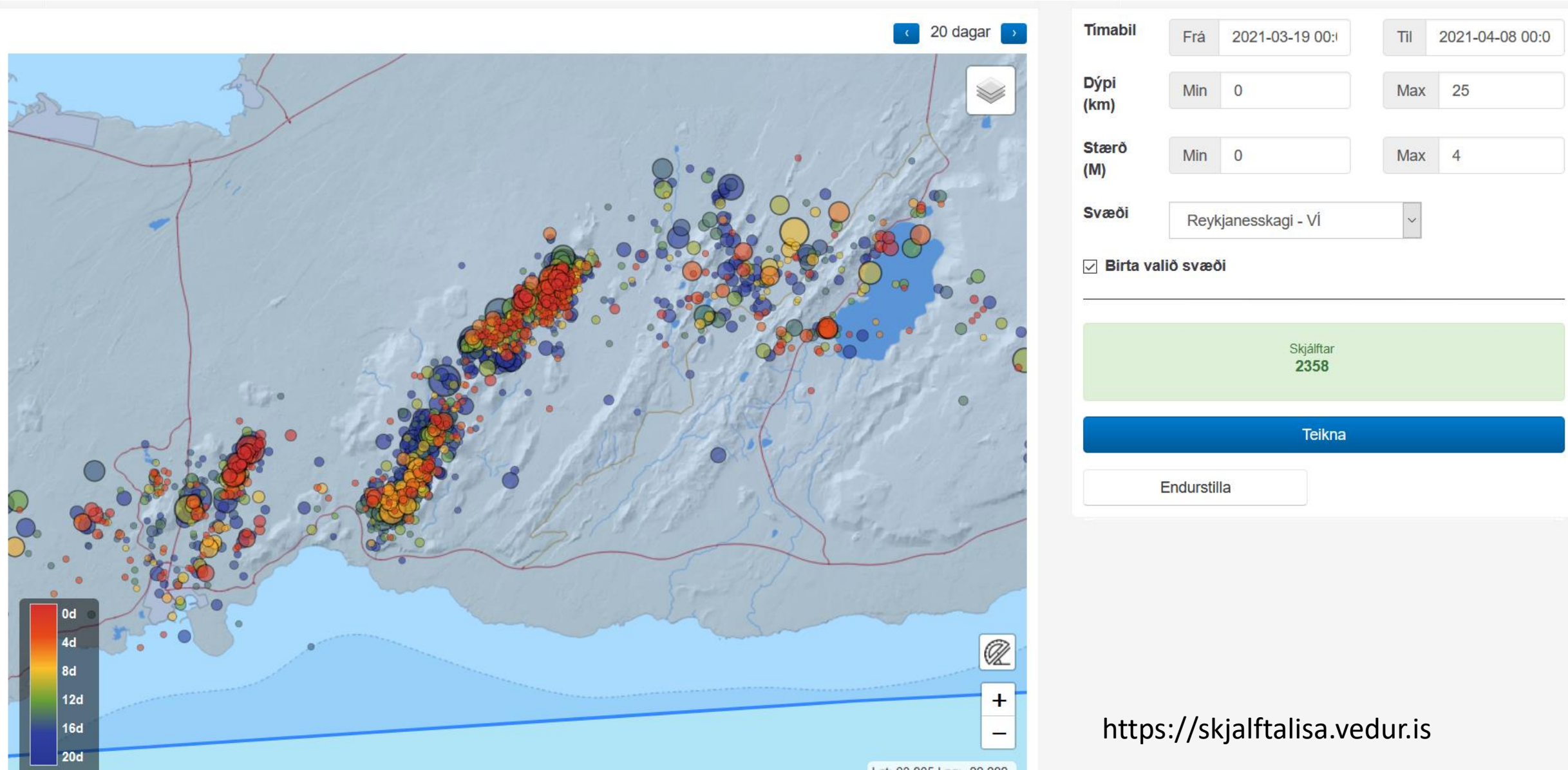


First photo of the eruption: 19. March Civil
Protection/Björn Oddsson

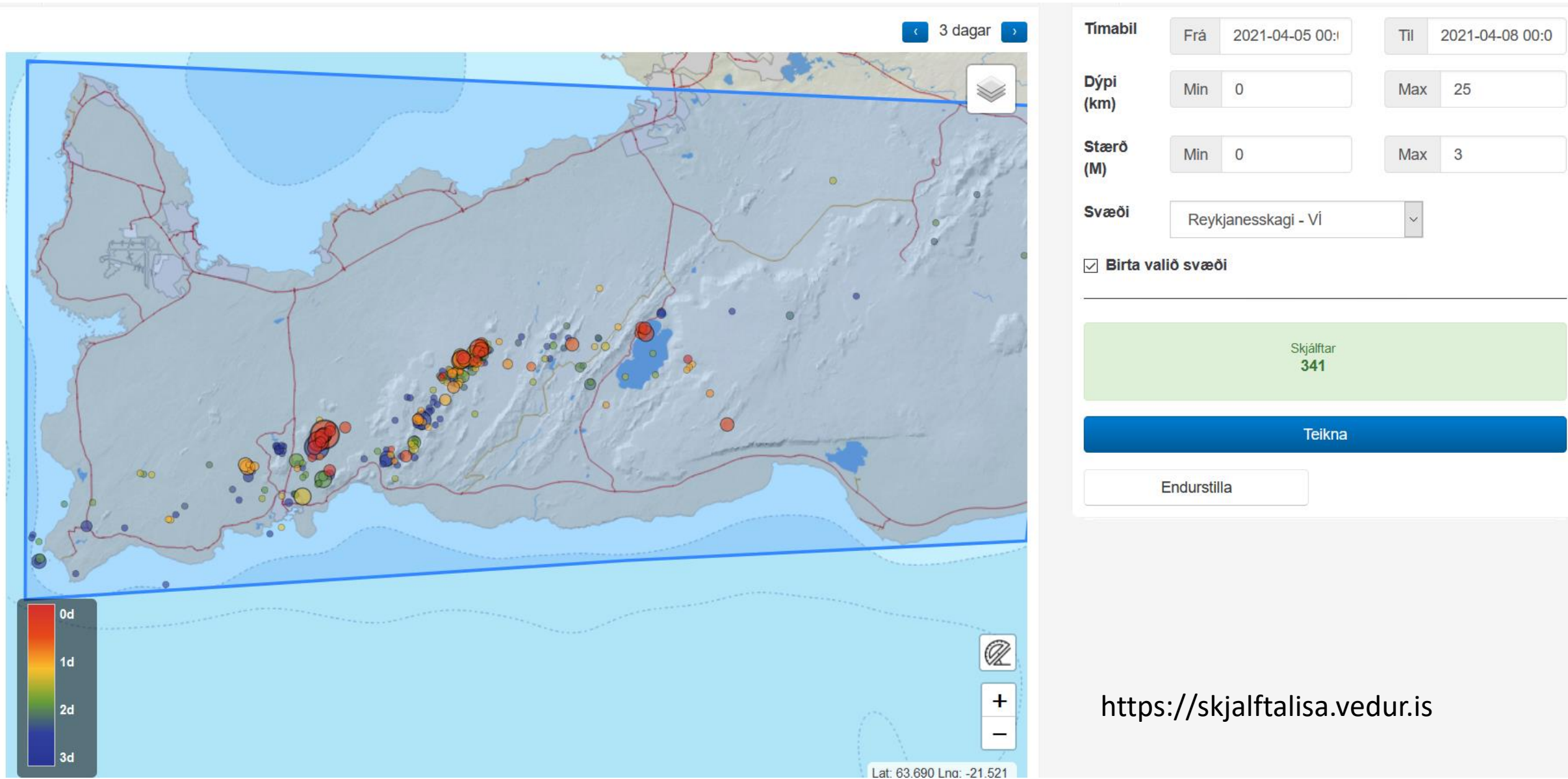
ERUPTION TIMELINE



2021 M<4 IMO LOCATIONS: ERUPTION TO PRESENT DAY

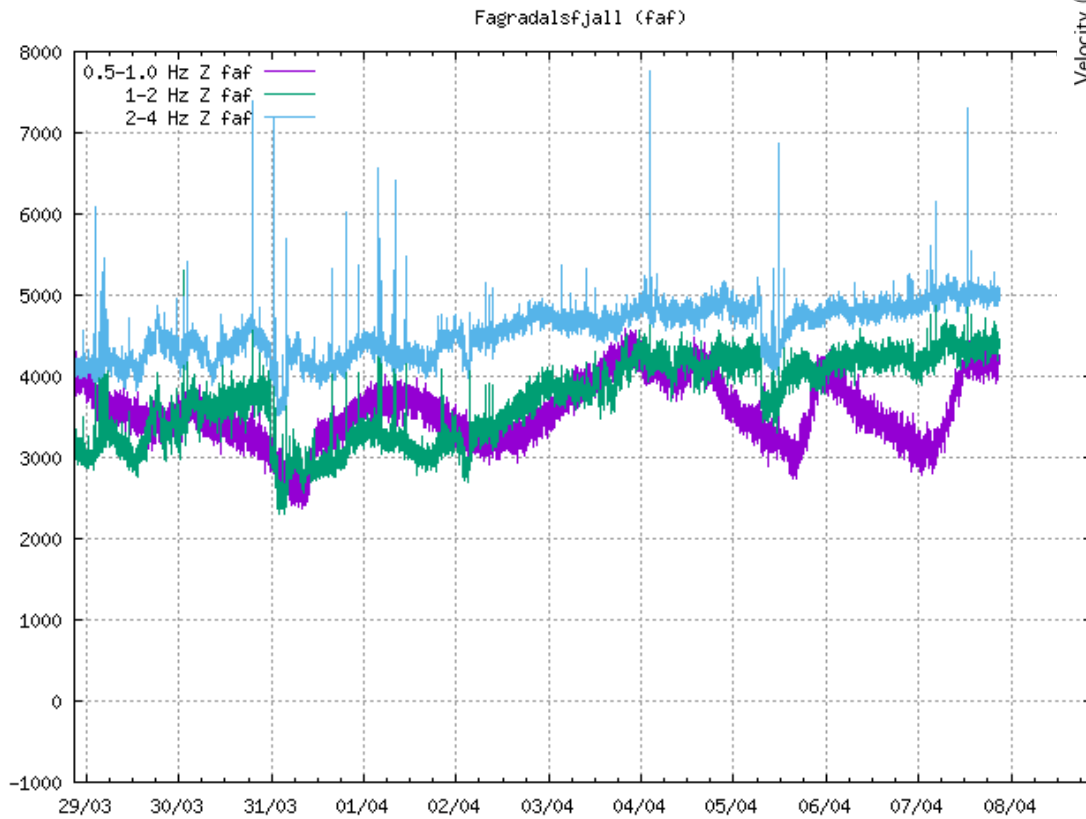


2021 M<3 IMO LOCATIONS: FISSURE OPENING 2 AND 3



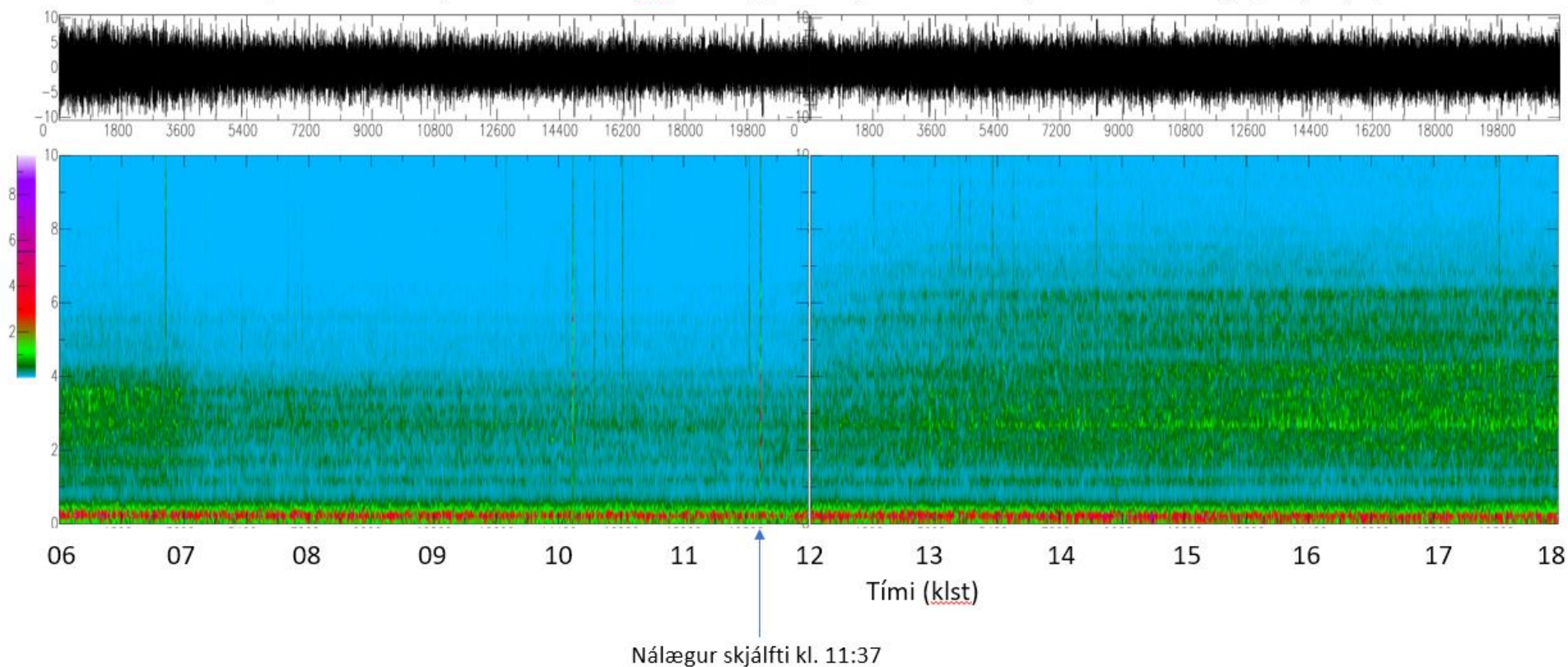
<https://skjalftalisa.vedur.is>

TREMOR ON FAF



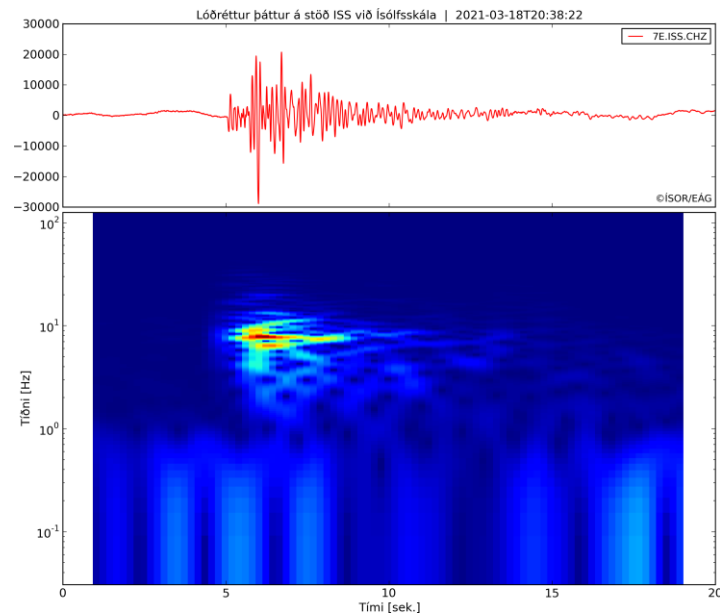
TREMOR ON FAF

5 apríl 2021 – Skjálftamælistöð faf við Fagradalsfjall – Norður þáttur – ósíuð gögn (um/s)

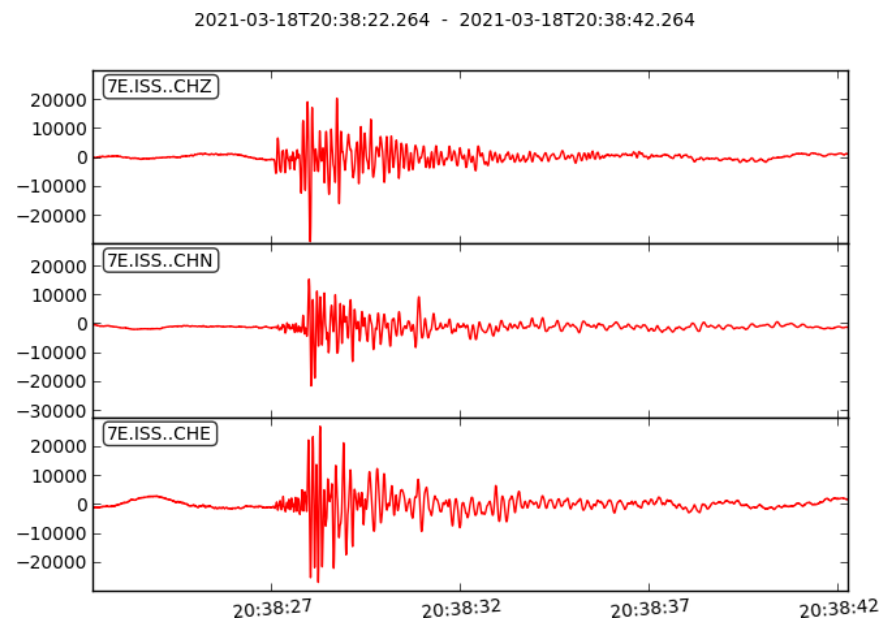


LF EVENTS ON ON ISS

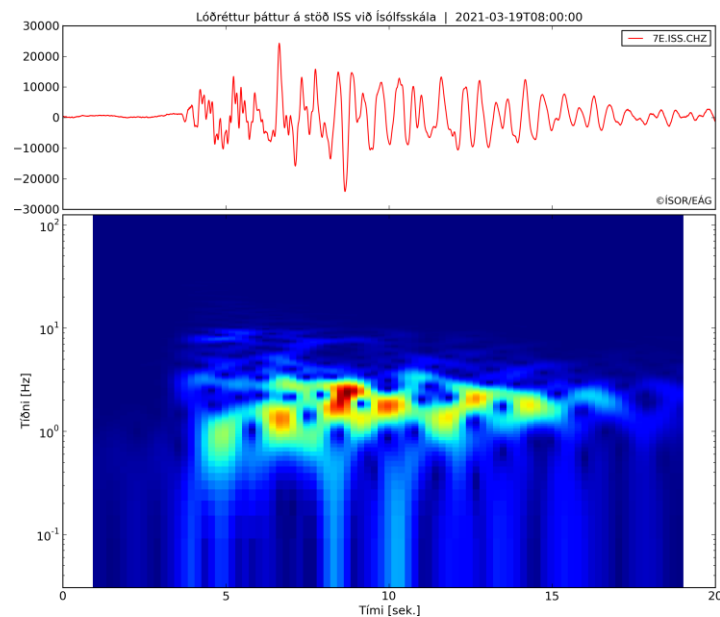
HF



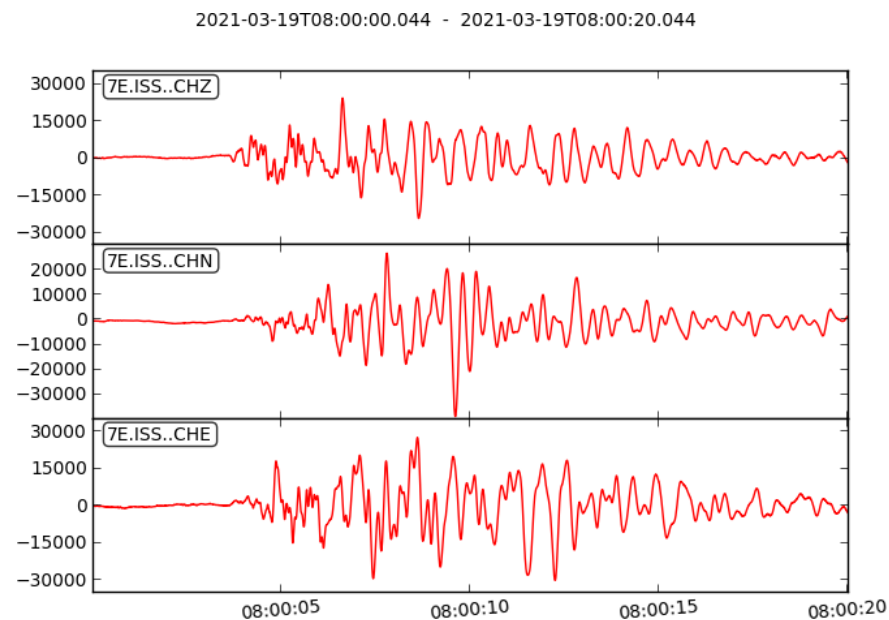
2021-03-18T20:38:22



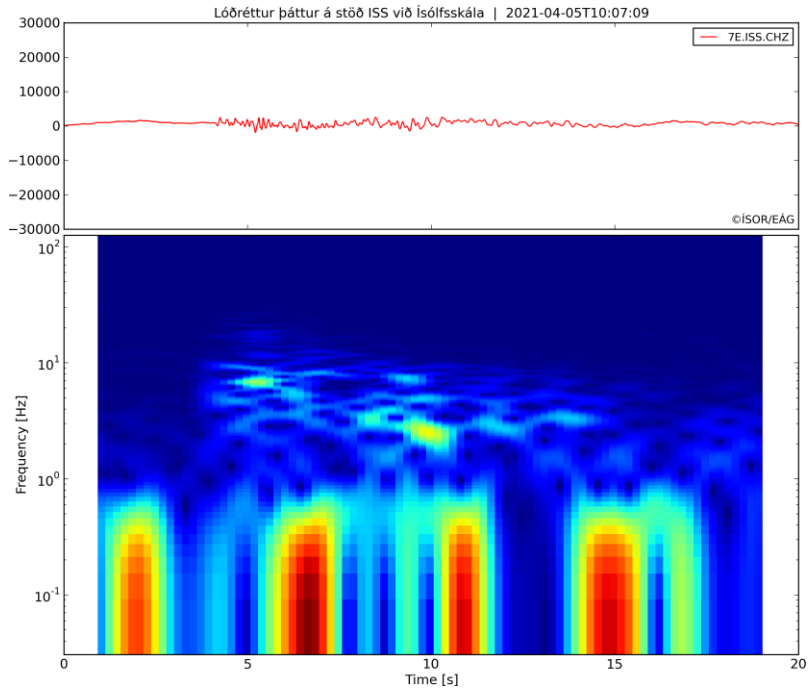
LF



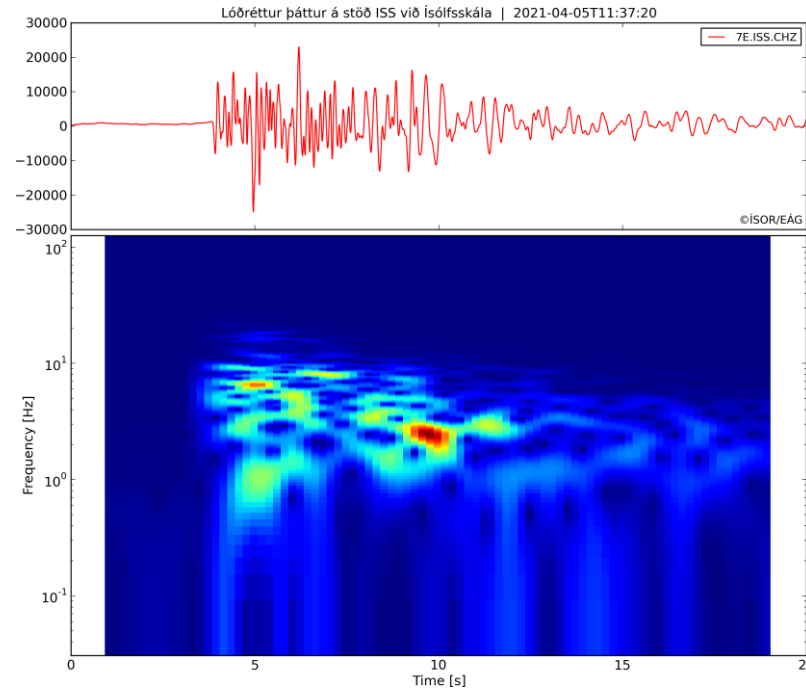
2021-03-19T08:00:00



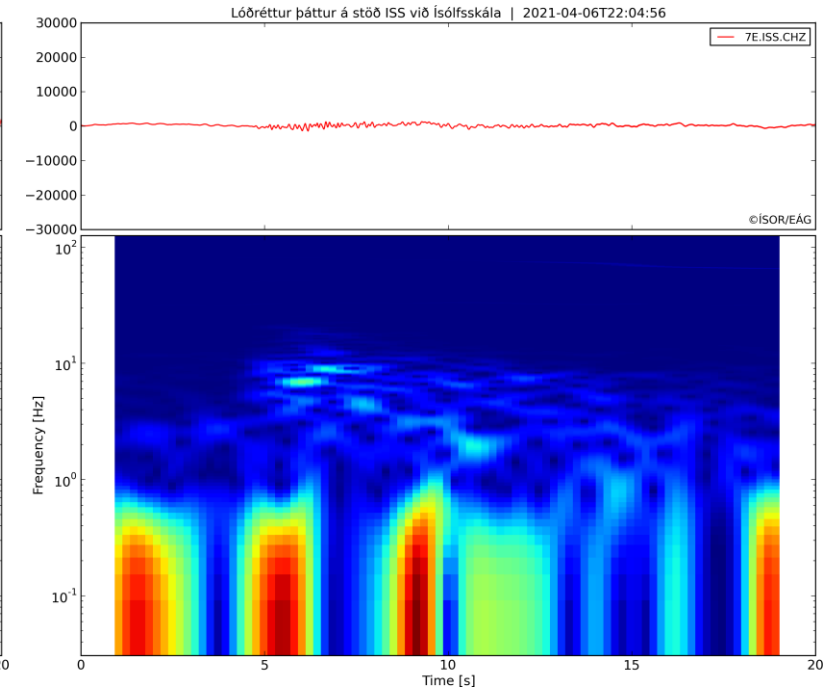
LF EVENTS ON ON ISS



2021-04-05T10:07:09



2021-04-05T11:37:20



2021-04-06T22:04:56



LAVA: AREA, VOLUME, DISCHARGE, GEOCHEMISTRY, GASES

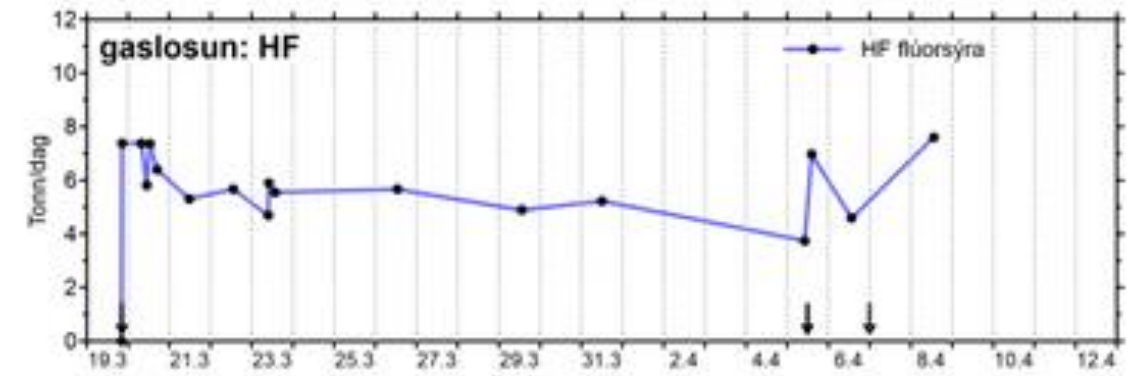
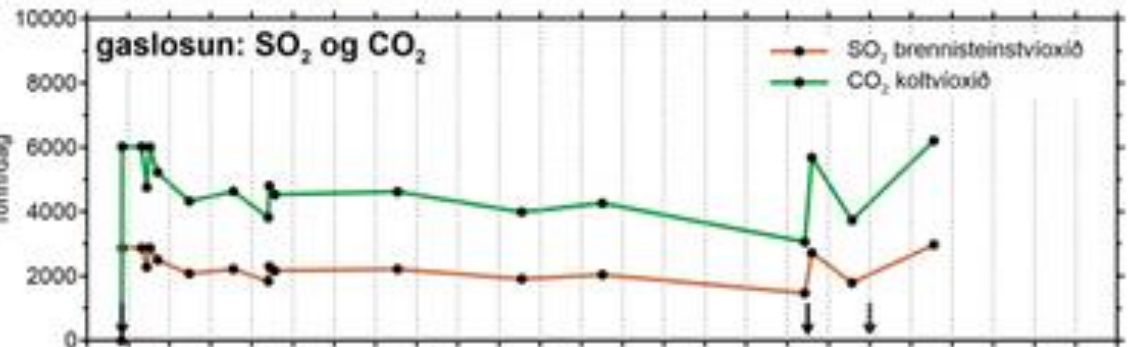
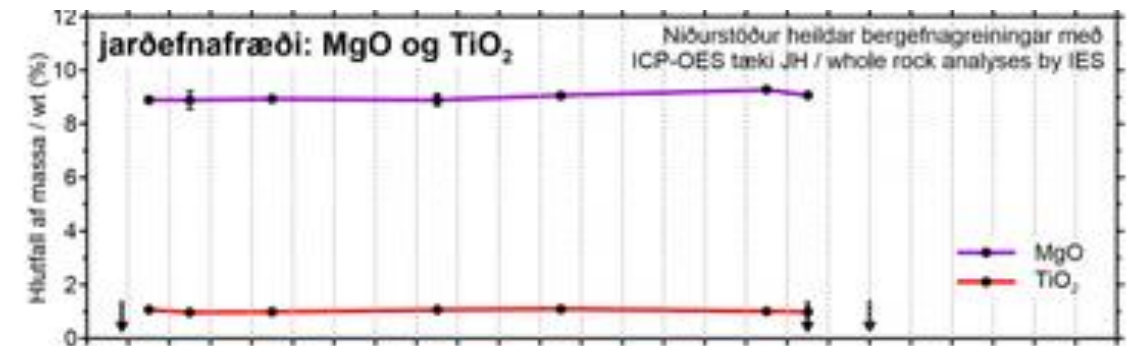
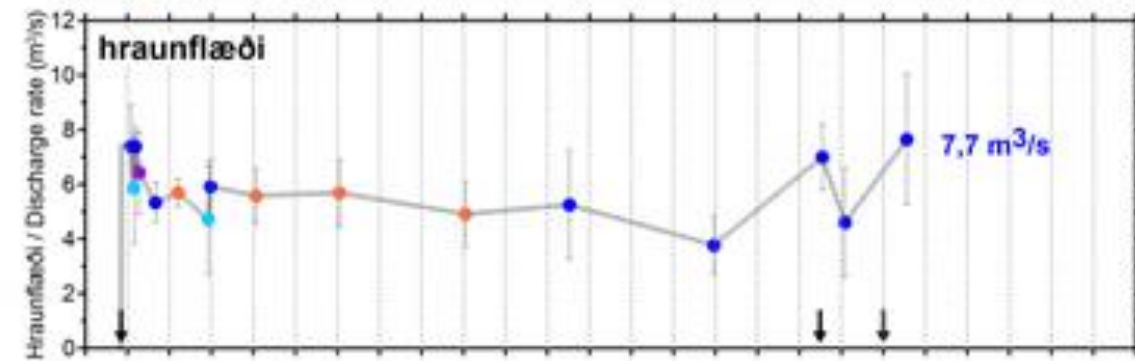
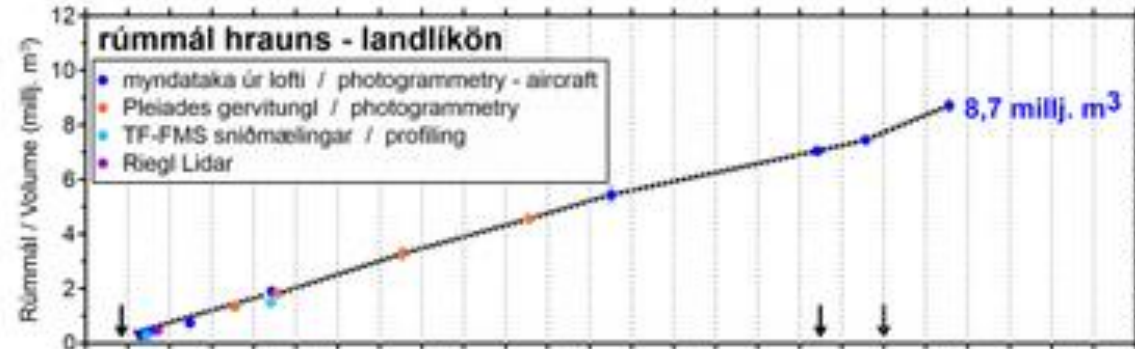
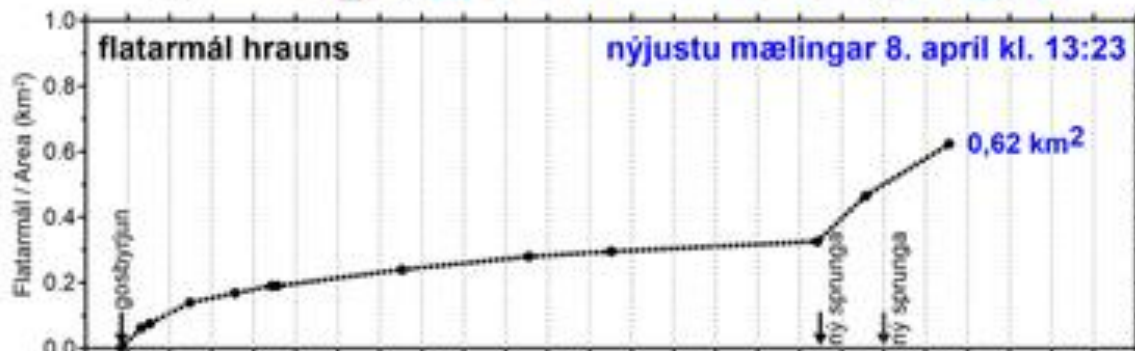
Gos í Geldingadöllum 2021

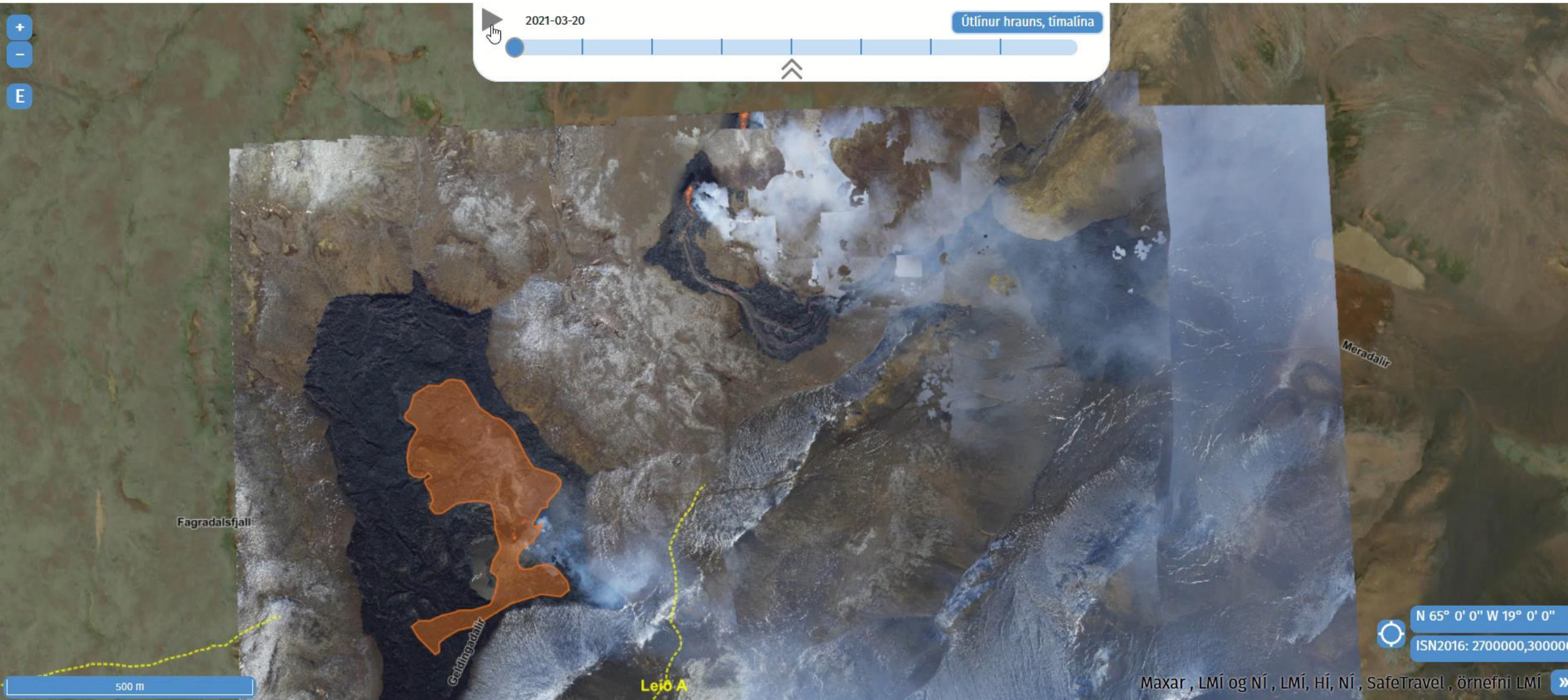
hraun: flatarmál, rúmmál, flæði; jarðefnafræði; gaslosun



Institute of Earth Sciences:

http://jardvis.hi.is/eldgos_i_geldingadolum





Resource Landmælingar Íslands:

http://atlas.lmi.is/mapview/?application=umbrotasja&fbclid=IwAR2G0bo3iZ2dP_CitaUm825kUSrftiWWFLy4zV8HJ2ZHhENLPuWujsfx4Oc

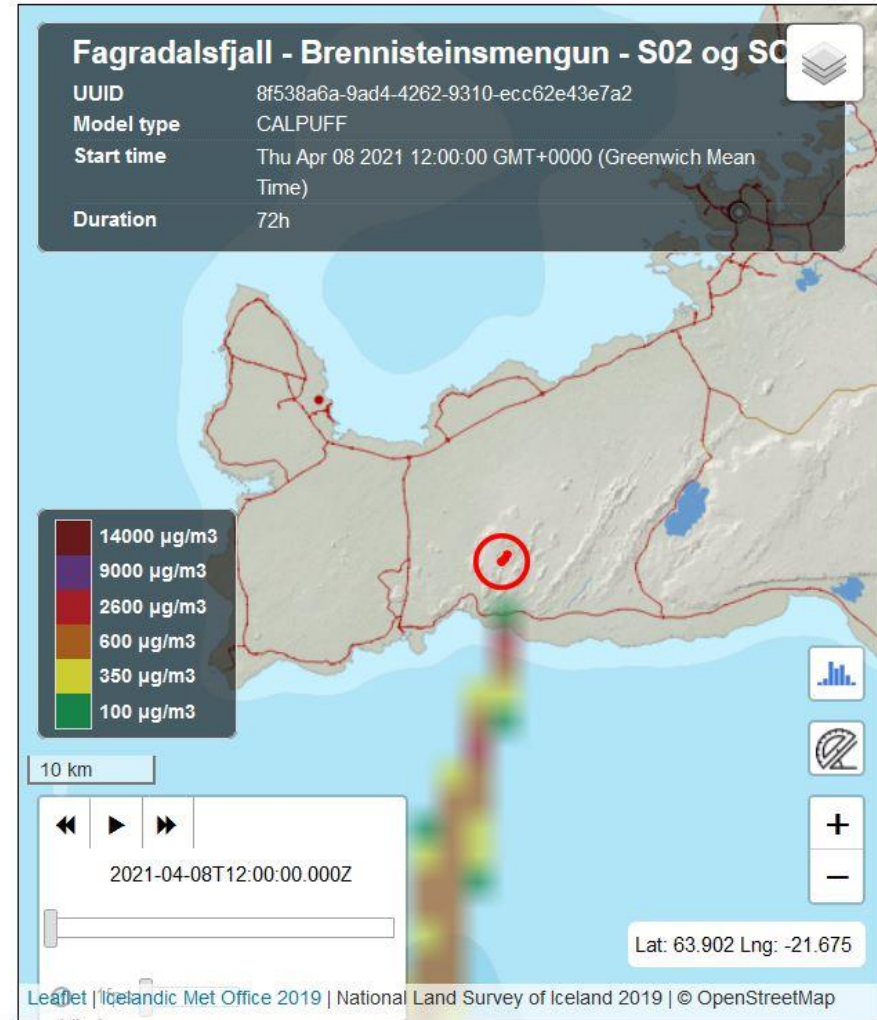
OTHER MONITORING

- Continuous GPS
- Lava flow modelling
- Gas measurements
- Fracture mapping
- Drone footage

Spá veðurvaktar um gasdreifingu

Norðan og norðvestan 5-10 m/s á morgun en hæg vestlæg eða norðvestlæg átt síðdegis og annað kvöld með dálitilli snjókomu eða slyddu. Nægilega hægur vindur svo uppsöfnun gass geti orðið hættuleg nærri gosstöðvum en ekki líklegt að mengunar verði vart í byggð.

Spá gerá: 08.04.2021 21:58. Gildir til: 09.04.2021 23:59.



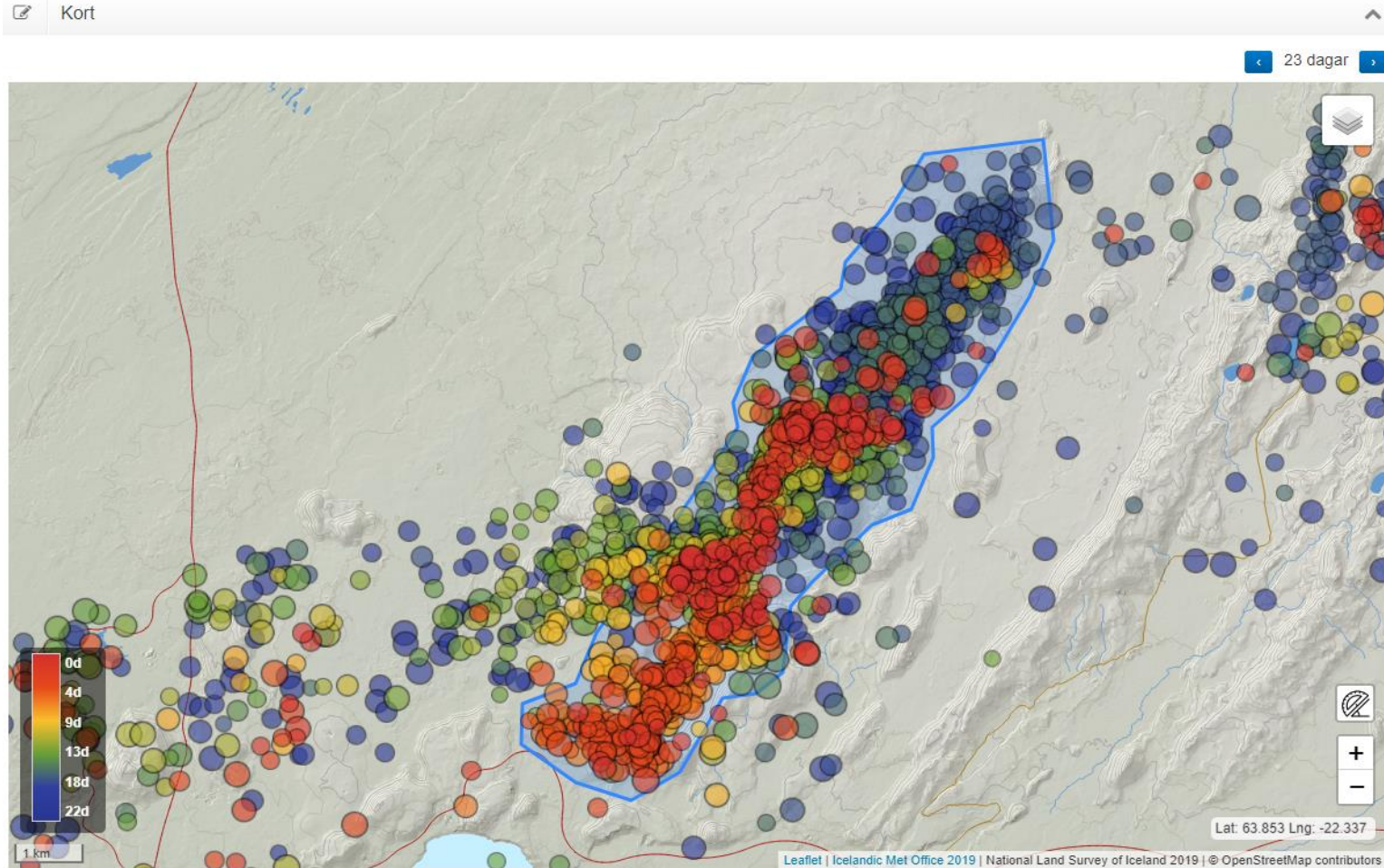
Northernmost eruption fissure
08.04.2021.

In yellow: mapped surface
fractures by Ásta Rut
Hjartardóttir IES



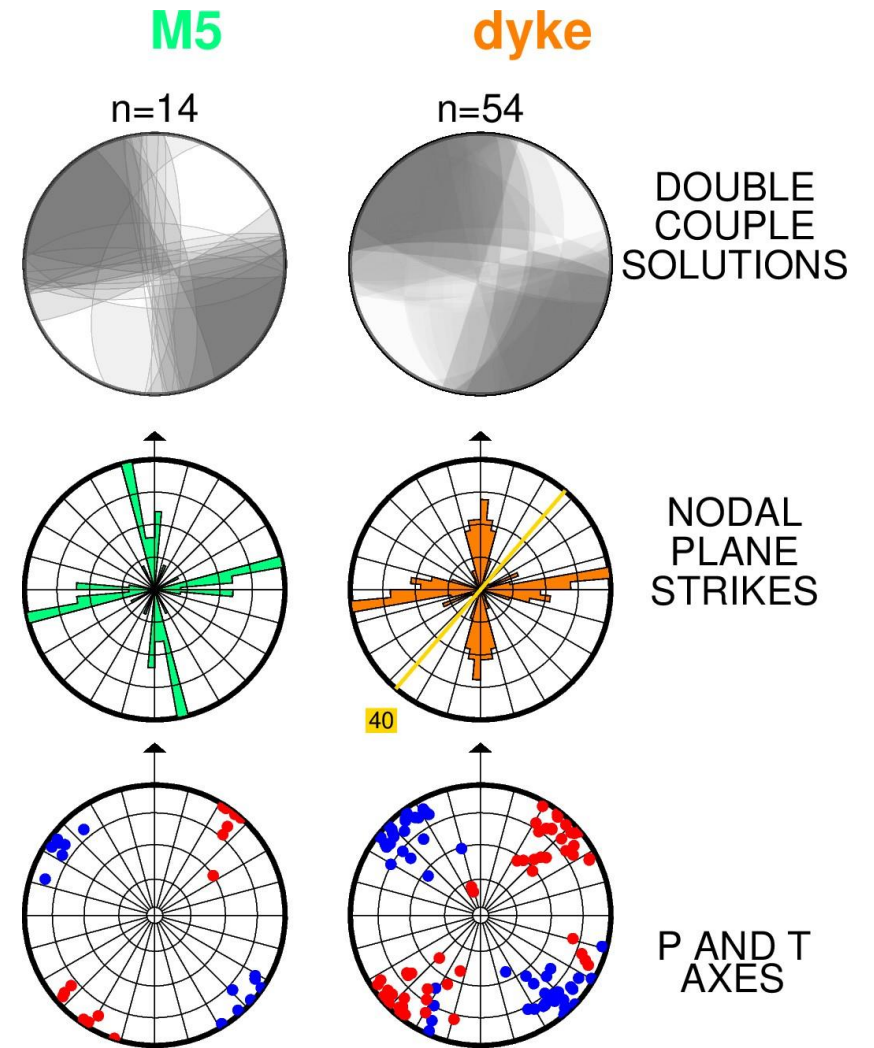
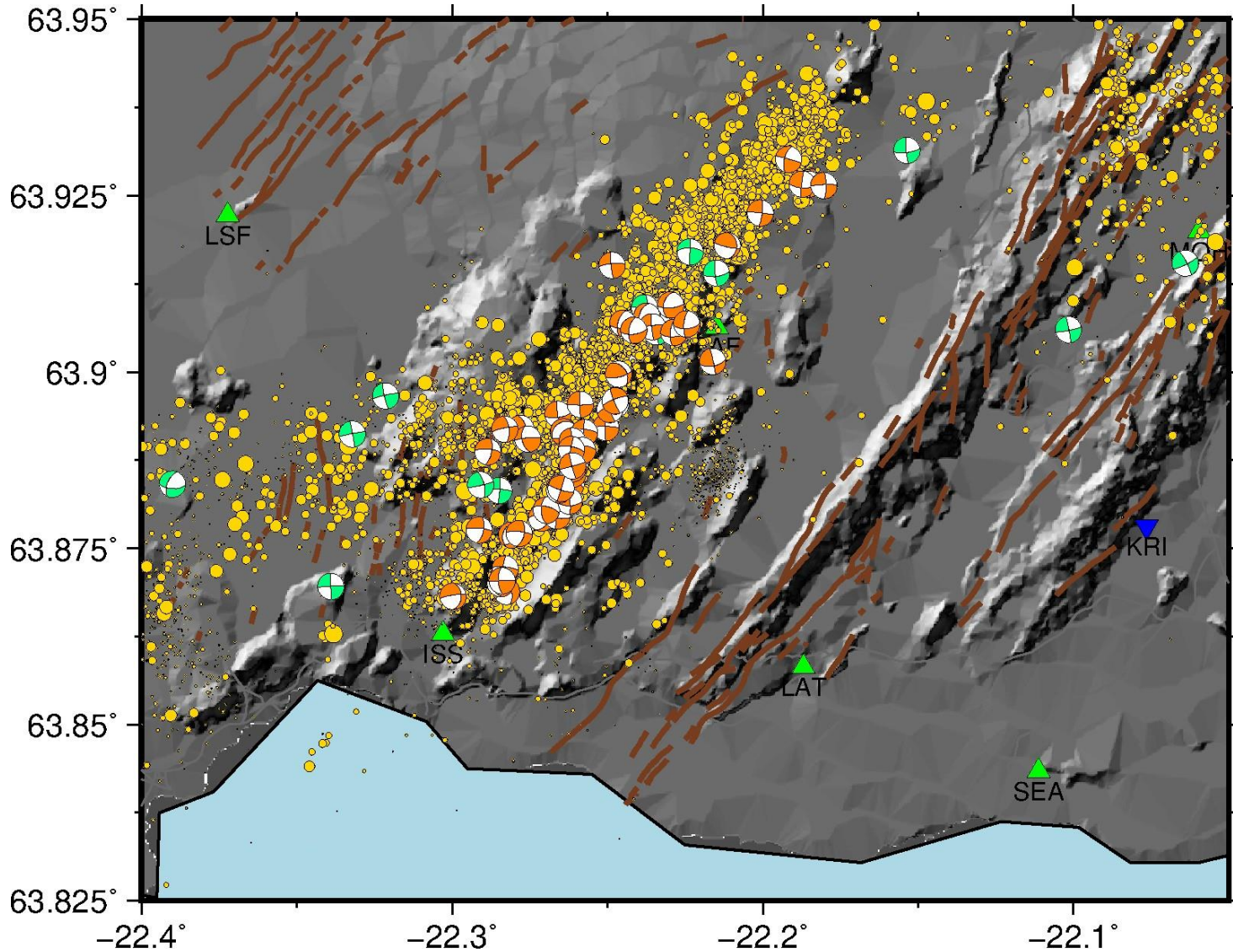
DYKE EVENTS 25. FEB. – 18. MARS

(MYND FRÁ 18.MARS)



- Skjálfta-Lísa Ví notuð til að velja skjálftana.
- Skjálftar frá 25. feb. til 18. Mars.
- Stærðarbil: ML1.5-2.5.
- Valdir af handahófi til að fá góða dreifingu yfir ganginn.
- Pikkaðir í SeisComP ÍSOR, endurstaðsettir með NonLinLoc og loks brotlausn reiknuð í MTfit.

DYKE EVENTS 25. FEB. – 18. MARS ~M5 EVENTS 24. FEB - 14. MARS





Thank you!

Photo: Björn Oddsson

06.04.2021

- https://www.mbl.is/frettir/innlent/2021/04/06/loftmyndir_af_raudgloa_ndi_fljoti/



08.04.2021

- <https://www.ruv.is/frett/2021/04/08/eldgosid-tilkomumikid-i-snjokomunni>
- https://www.mbl.is/frettir/innlent/2021/04/08/nyr_heimur_i_motun/

