

Spjall um eldvirkni og eldgosavá

á Reykjanesskaga

Þorvaldur Þórðarson



HÁSKÓLI ÍSLANDS
VERKFRÆÐI- OG NÁTTÚRUVÍSINDASVIÐ

JARÐVÍSINDAEILD

Rannsóknarstofa í Eldfjallafræði og Náttúruvá
(REN)

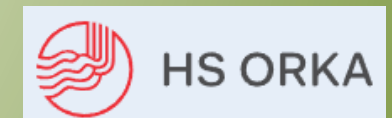


HÁSKÓLI ÍSLANDS

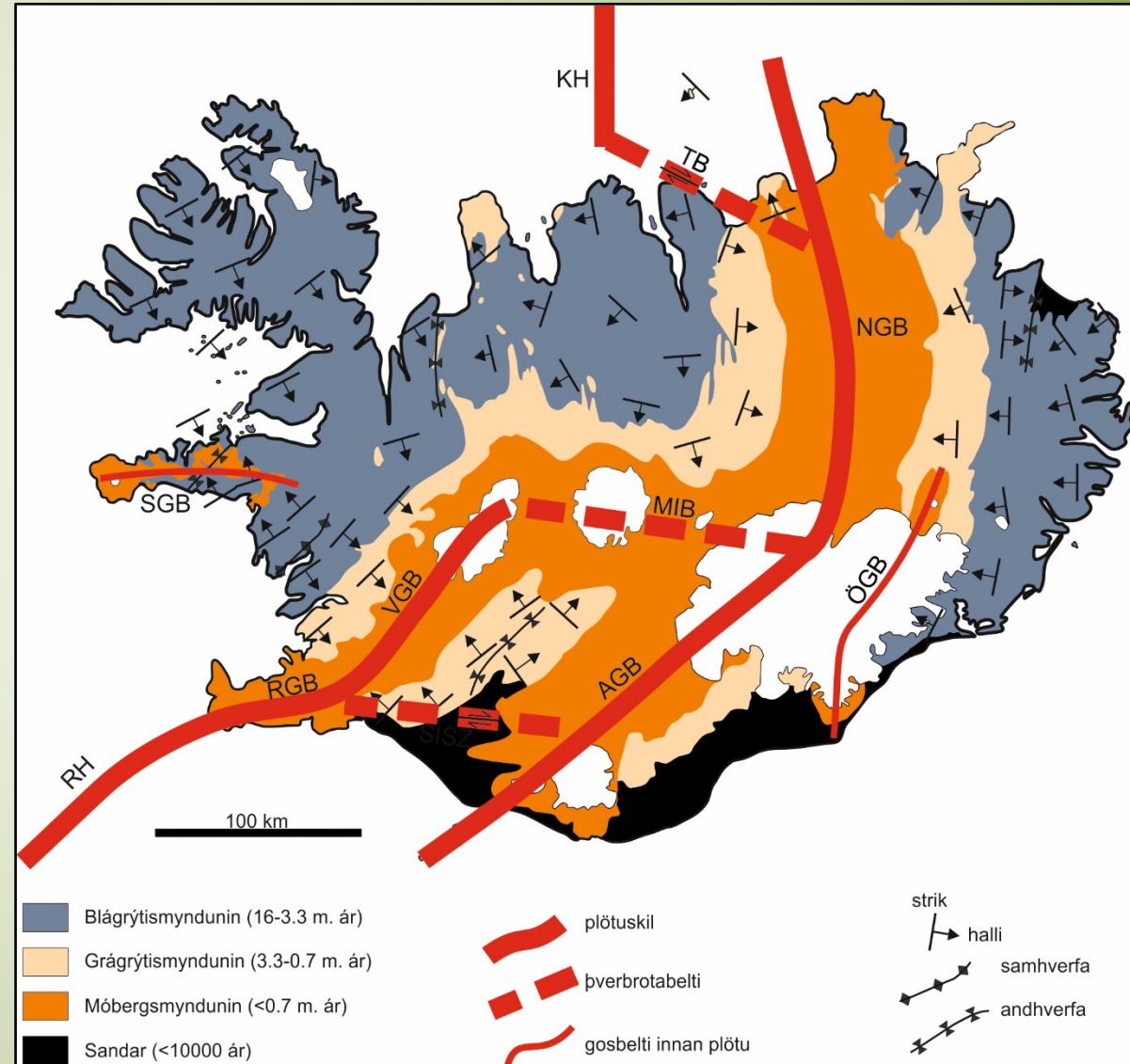
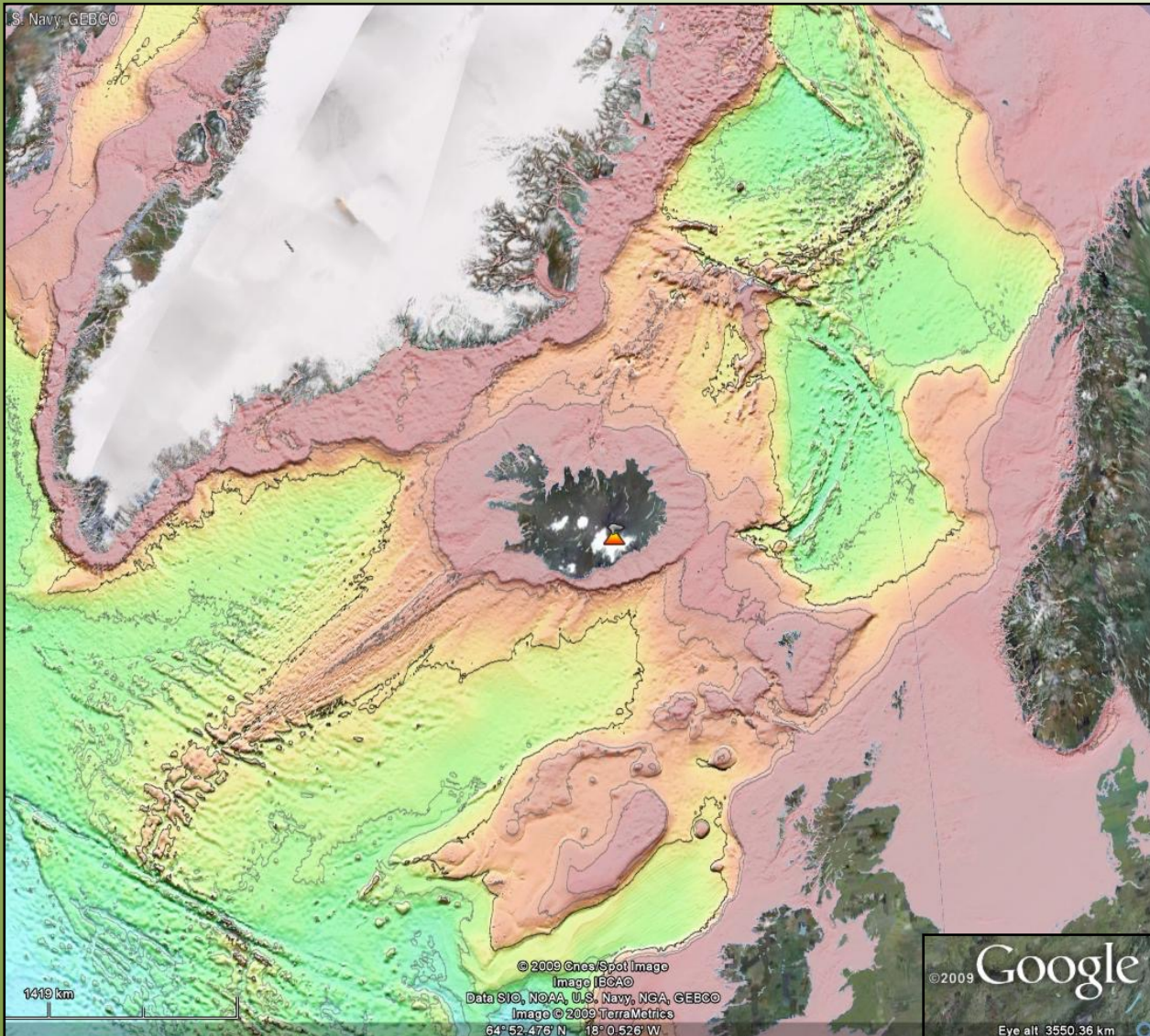


Samstarf og Stuðningur

Árman Höskuldsson, William M. Moreland, Ingibjörg Jónsdóttir, Gregory de Pascal, Iðunn K. Valdimarsdóttir, Jóna Sigurlína Pálmadóttir, Jacqueline Grech Licari, Méline Payet-Clerc, Diana B. D. S. G. Alvarez, Helga K. Torfadóttir, Catherine R. Gallagher, Robert A. Askew, Lidia Stroganova, Lucia A. Walters, Florian Le Béquec, Tanguy de la Fleche, Hörn Hrafnadóttir, Ari Guðmundsson, Bruce F. Houghton, Caroline Tisdale, Edward W. Llewellyn, Janina Gillies, Valentin Troll, Frances Deegan, Ilya Bindeman, Edgar U. Zorn, Lukáš Krmíček, Arianna Soldati, Don Dingwell, Oryaëlle Chevrel, Stephan Kolzenburg, Martin Harris, Jason Travis Parsons, Eva Eibl, Egill Á. Guðnason, Gylfi P. Hersir, Þorbjörg Ágústsdóttir, Tomáš Fischer, Pavla Hrubcova, Thomas Walter, E Zorn, Alina V. Shevchenko



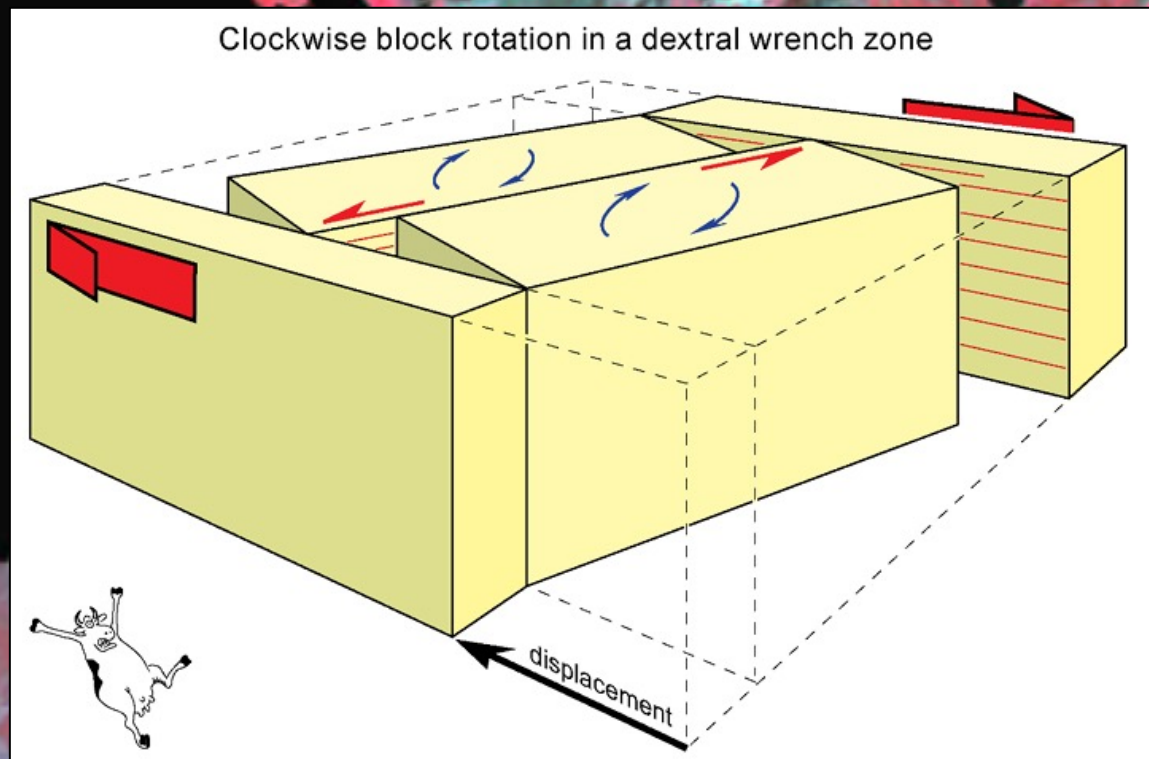
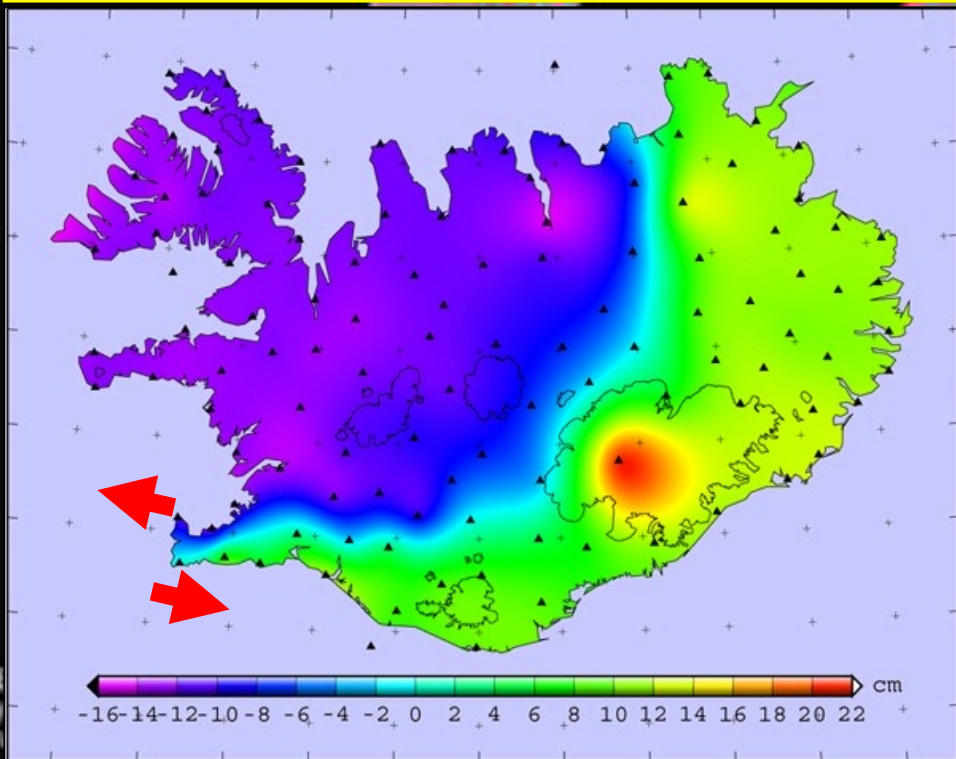
Jarðfræðileg lega Íslands



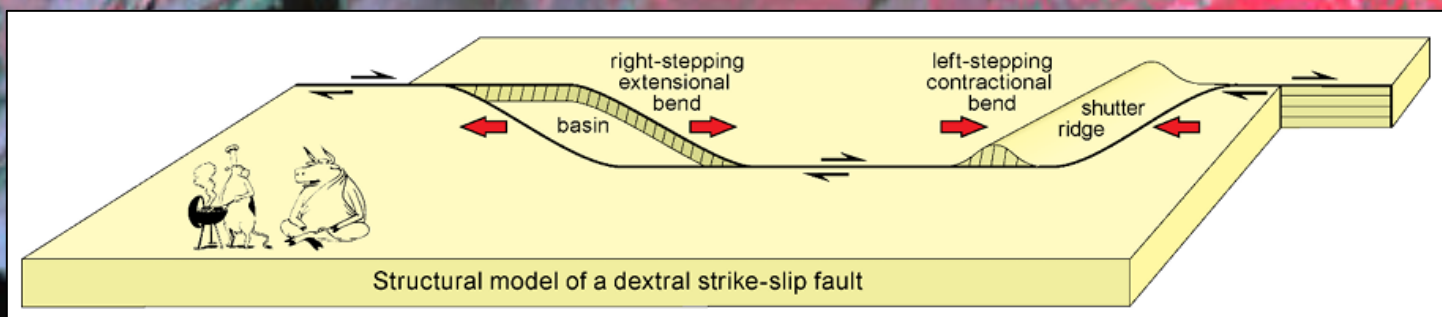
Atlantshafshryggurinn upp á land



Reykjanes



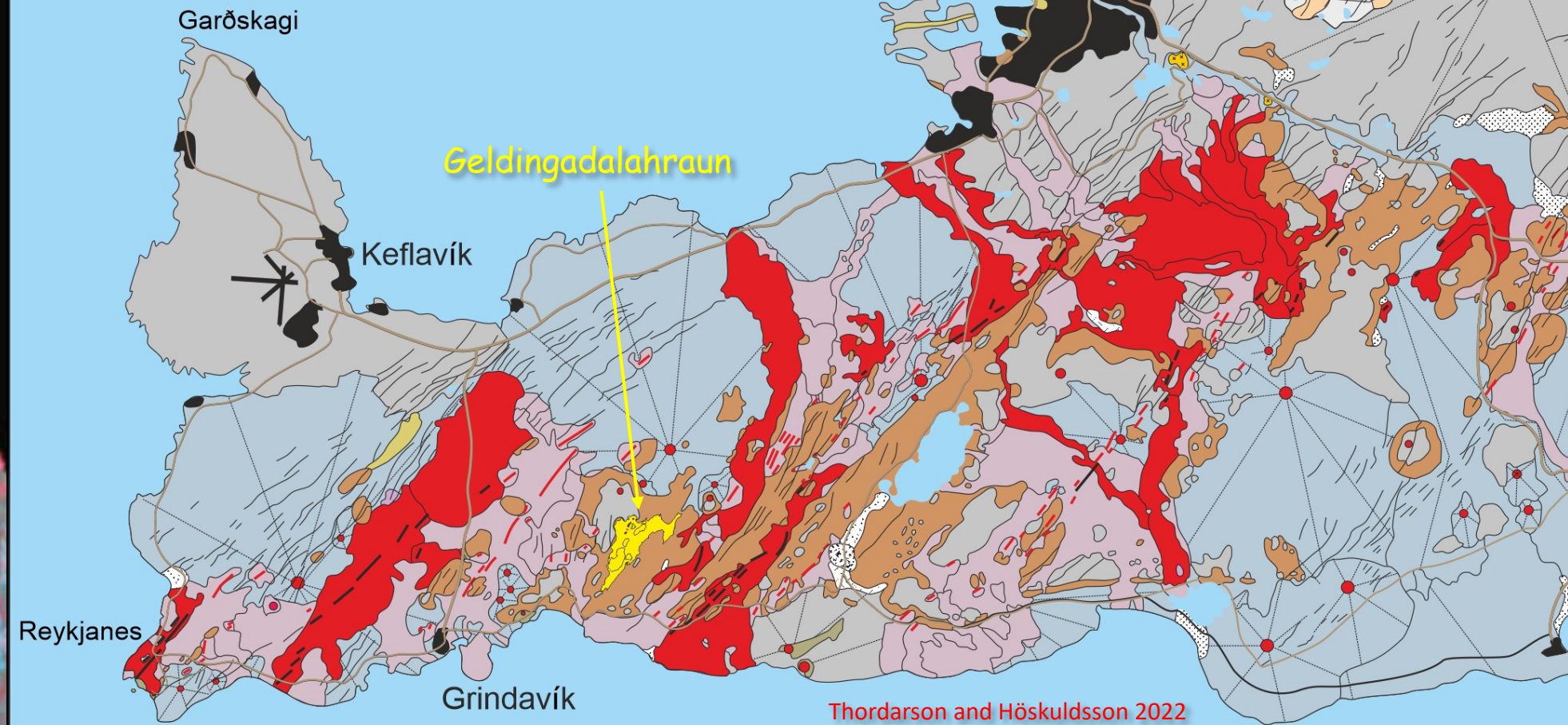
Af hverju gýs á Reykjanesskaganum



G.M.

Eldgos á Nútíma

þ.e. eftir að jökla leysti

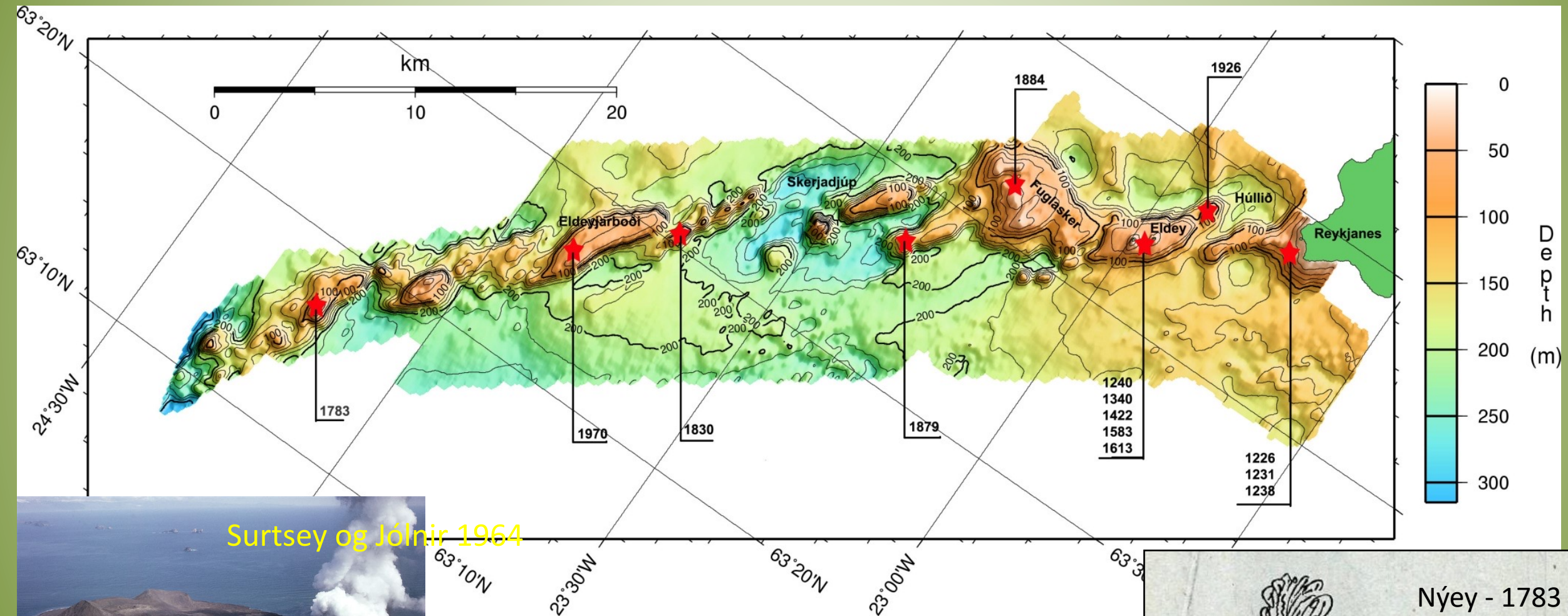


Með elstu myndunum eru píkúr dyngjur: 12 myndanir; helluhraun, $<10 \text{ km}^2$; $0,001-0,4 \text{ km}^3$.

Stærstu hraungosin eru ólivín þóleiit dyngjurnar: 14 myndanir; 2500-14100 ára; helluhraun, heildarflatamál = 700 km^2 ($1-167 \text{ km}^2$); rúmmál 32 km^3 ($0,01-9,8 \text{ km}^3$).

Sprungugosin á Nútíma eru um 100 talsins; 780-13500 ára; klumpahraun + fáein apalhraun, heildarflatamál = 600 km^2 ($0,001-60 \text{ km}^2$); rúmmál $9,8 \text{ km}^3$ ($0,1-0,7 \text{ km}^3$).

Reykjaneshryggur og eldvirkni.



Surtsey og Jólnir 1964



Ey myndandi eldgos á Reykjaneshrygg:
 1211 1422 1783 1830 1879 1884

Gostímabil

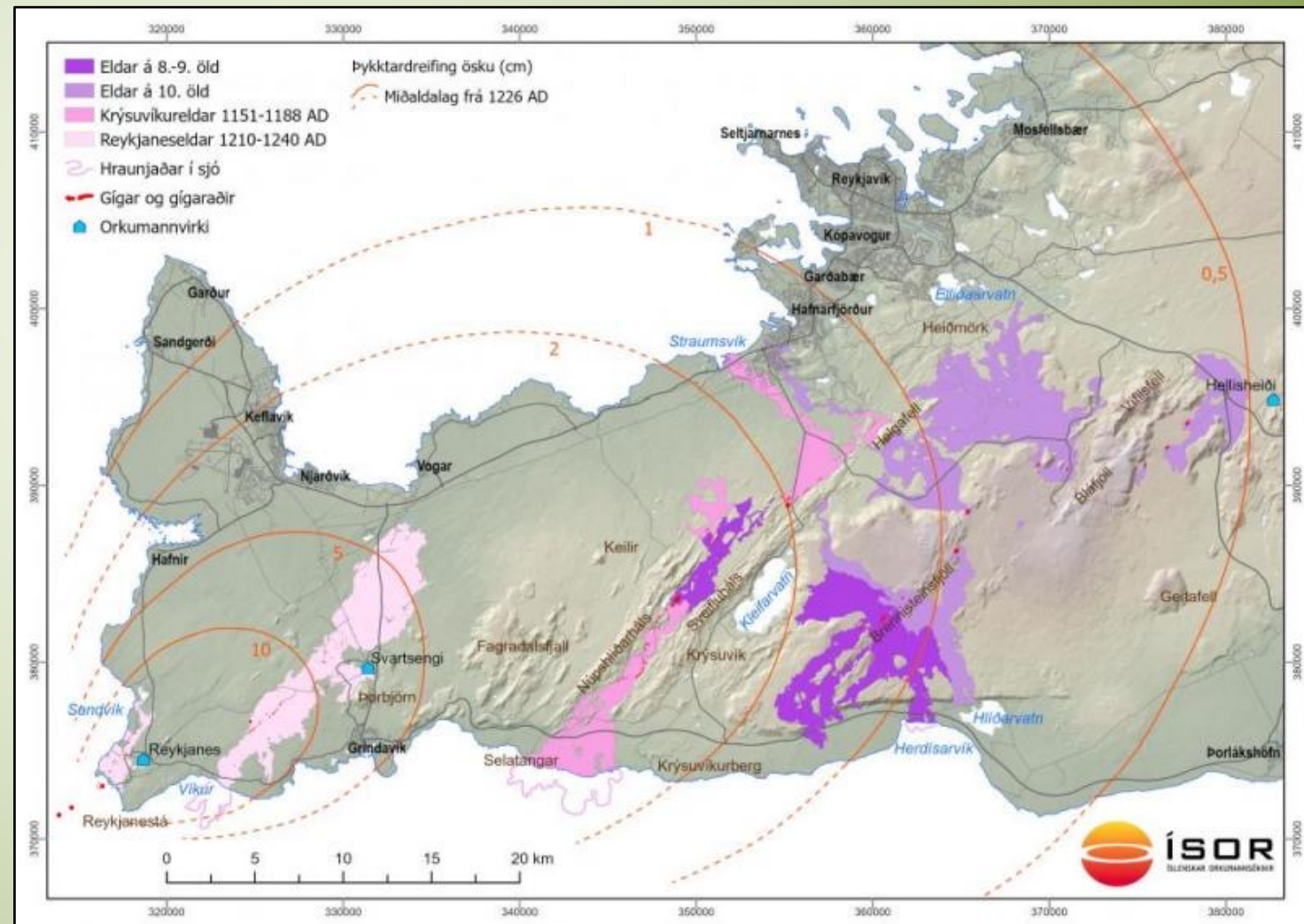
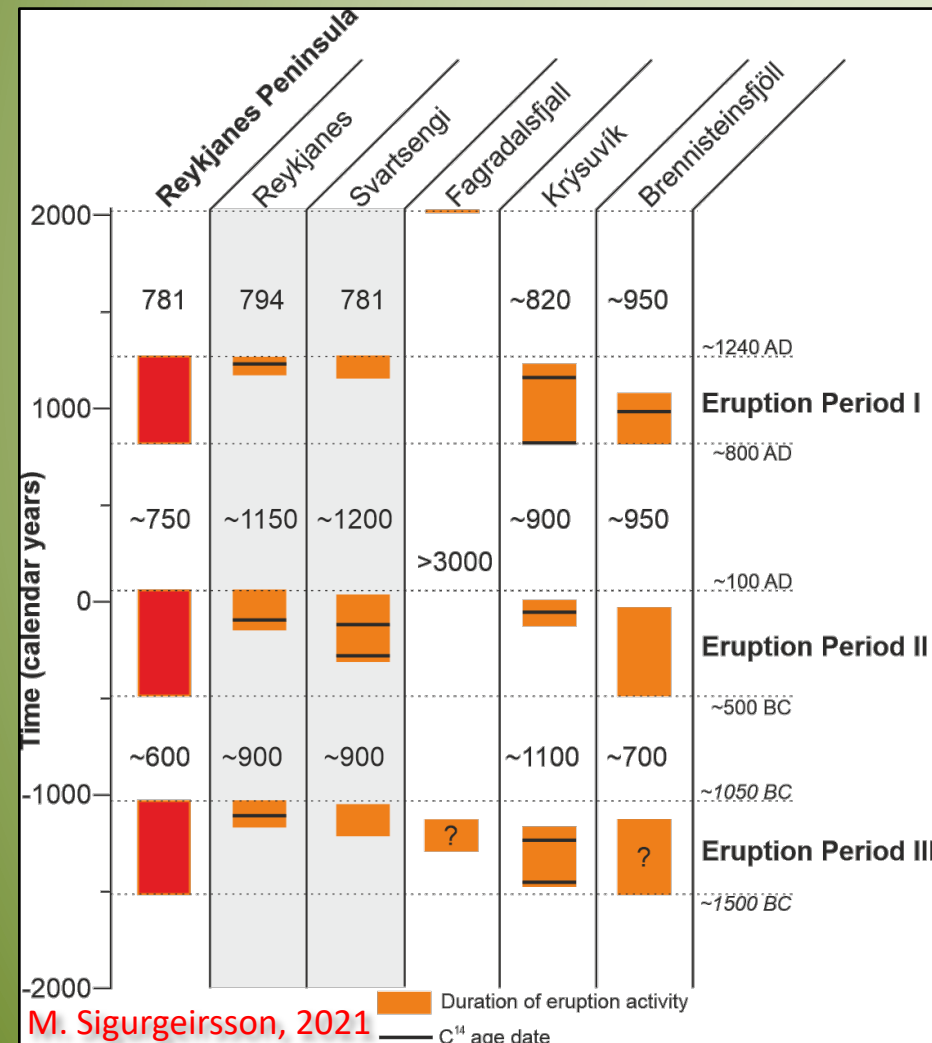
Standa í 300-400 ár

Pása í 600-1000 ár

Eldar

Reykjaneseldar - Eldgos

1210, 1211, 1223, 1226,
1227?, 1231, 1238, 1240



M. Sigurgeirsson, 2021

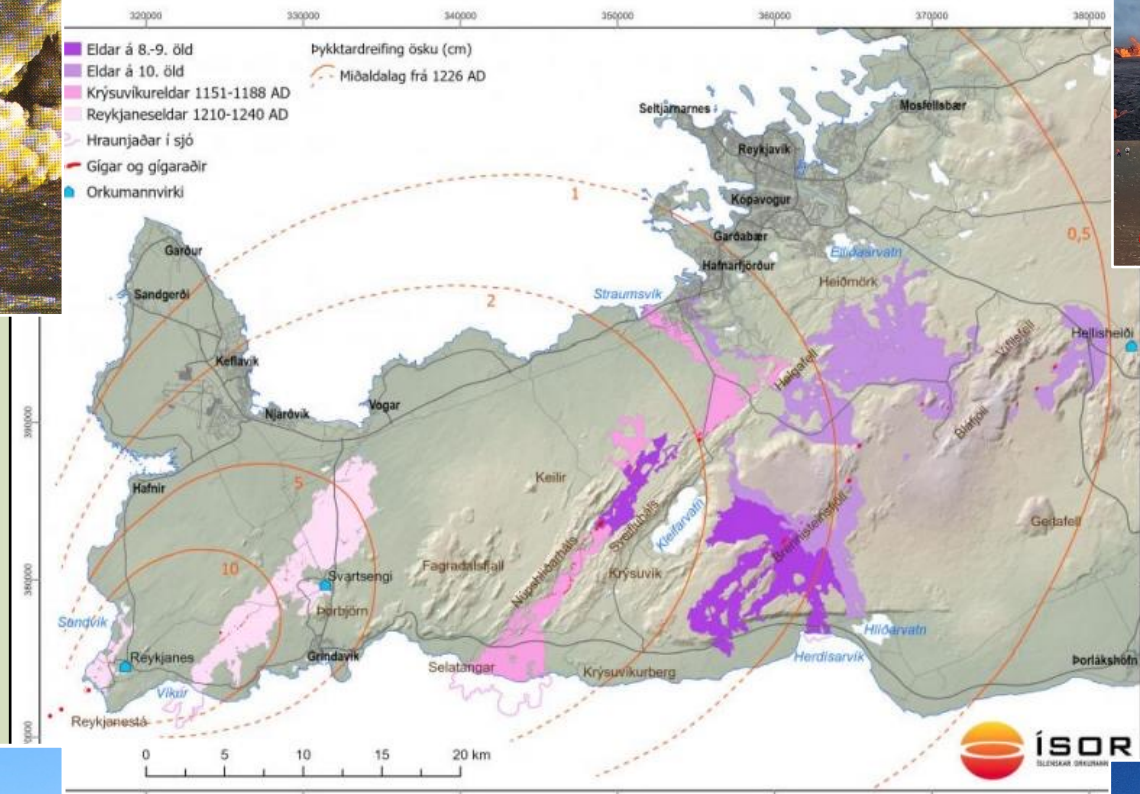
Eldgosagerðir



Gjóskugos í sjó



Hraungos



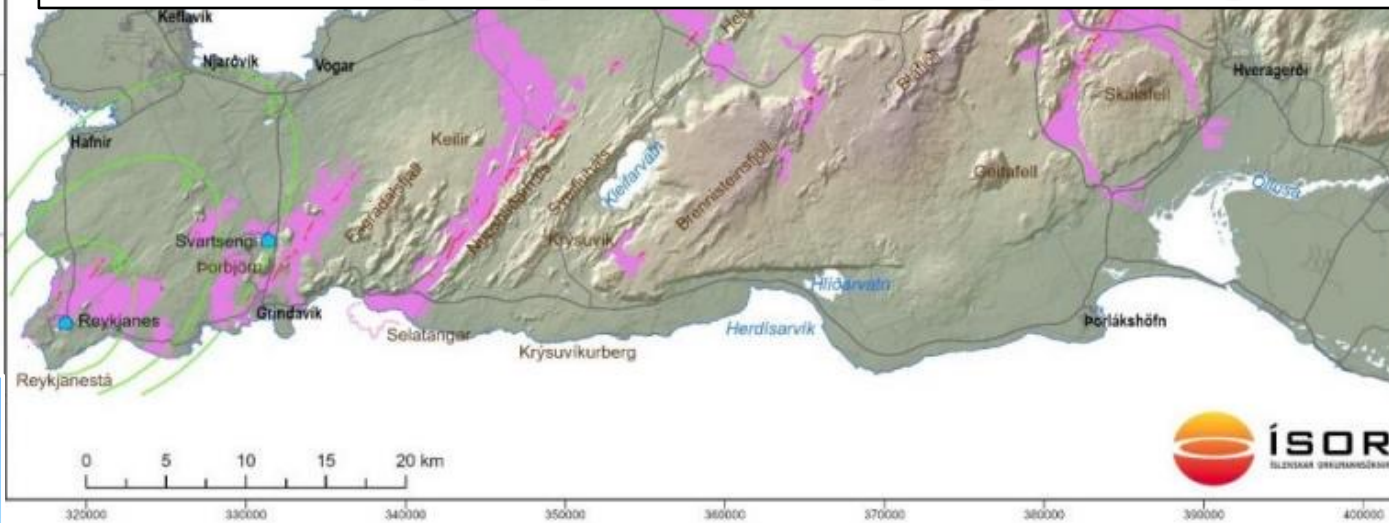
Blandgos á landi



Eldgosavá

Umfang eldgosavárinnar ræðst af:

- i. staðsetningu eldstöðvarinnar
- ii. afli, stærð og/eða lengd gossins
- iii. forvörnum og viðbragði
- iv. samfélagslegum skilningi og viðbrögðum



**Pekking
+
upplýsingar**

Viðbragð

**Undirbúningur
+
Framkvæmdir**



Hraungos

Hvað er hættu?

Íbúar

Innviðir

Atvinnustarfsemi

Eldgosa-ferðamenn



Gjóskugos í sjó

Hver er váin?

Gjóskufall

Gasmengun

Hraunflæði

Gervigígagos



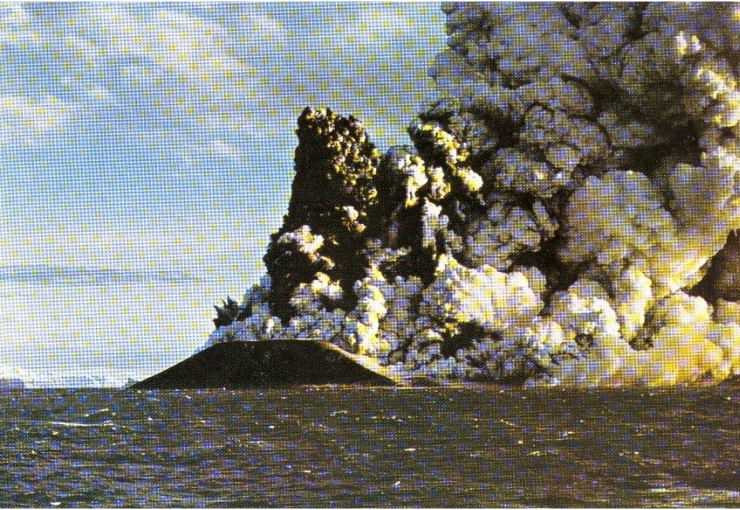
Blandgos á landi



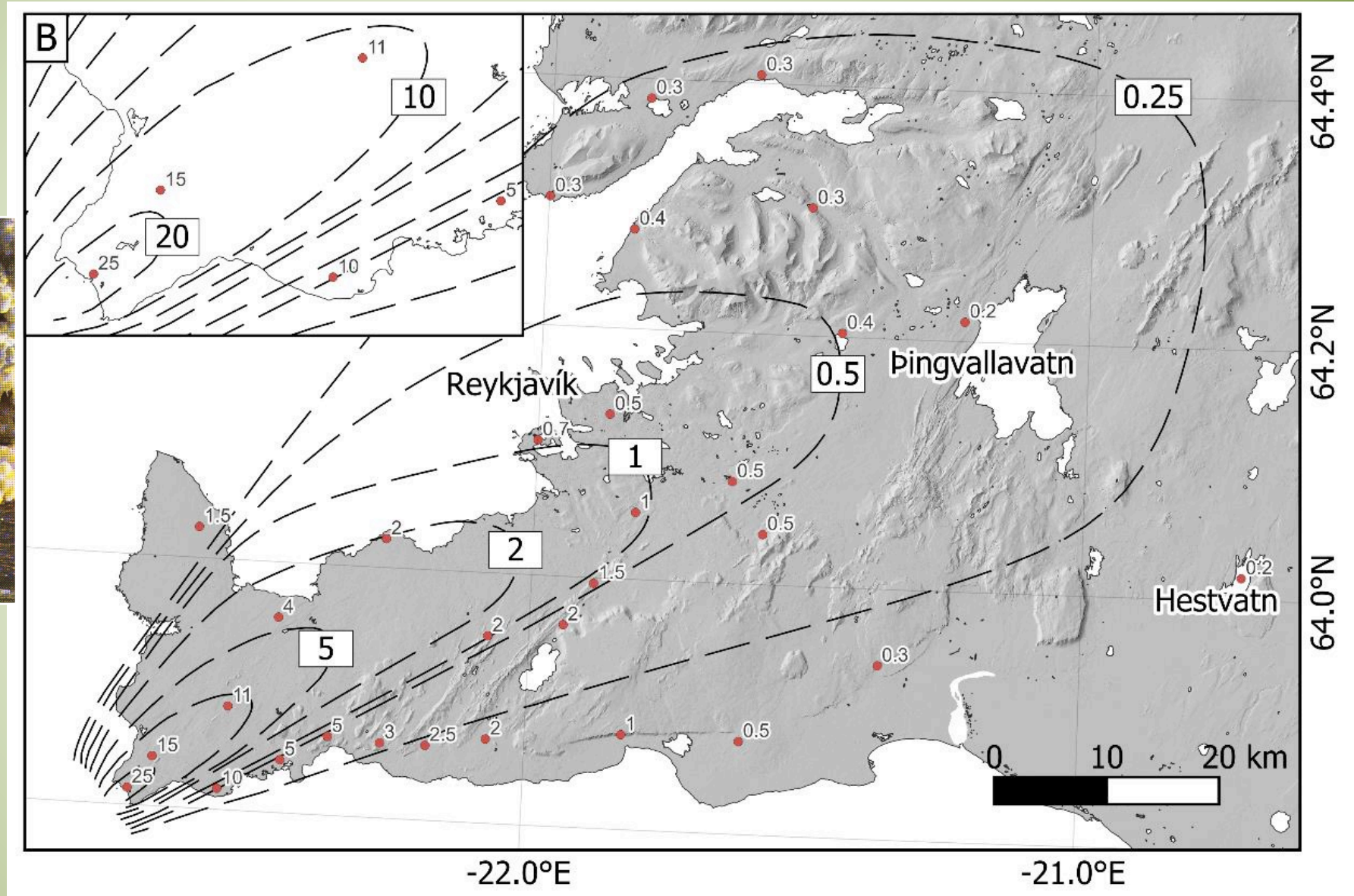
Gervigígagos

Gjósflugos í sjó

Almennt ekki mannskæð



Geta valdið verulegum
truflunum og óþægindum



Heimaey 1973



Heimaey 1973

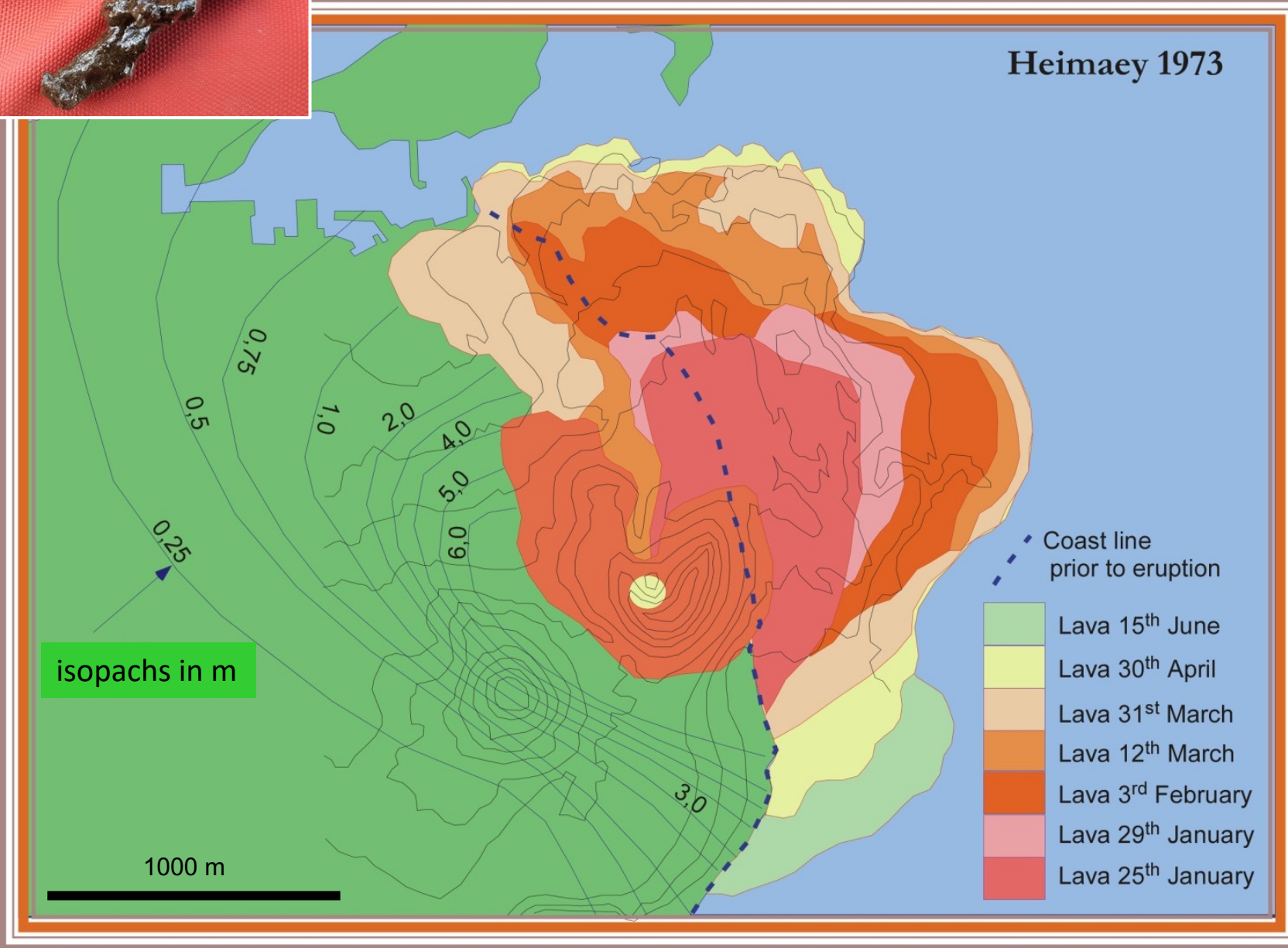


Geldingadalir 2021



Blandgos á landi

Ditto



Eldgosamengun



Photo: G. De Pascale,
Institute of Earth Science
University of Iceland
10 July 2023

Litla-Hrútsgosið 2023

Brennisteinn -> brennisteinssýruagnir

SO_2 -> H_2SO_4

Klórsýra (HCl) , Flúorsýra (HF)

H_2SO_4 mengun (24-PM_{2,5}) > 15 $\mu\text{g}/\text{m}^3$ -> hættu



brennisteinssmökkur

Photo: G. De Pascale,
Institute of Earth Science,
University of Iceland

Litla-Hrútsgosið 2023

Hraungos og Hraun

Sprungugos lang algengust á Reykjaneskaganum

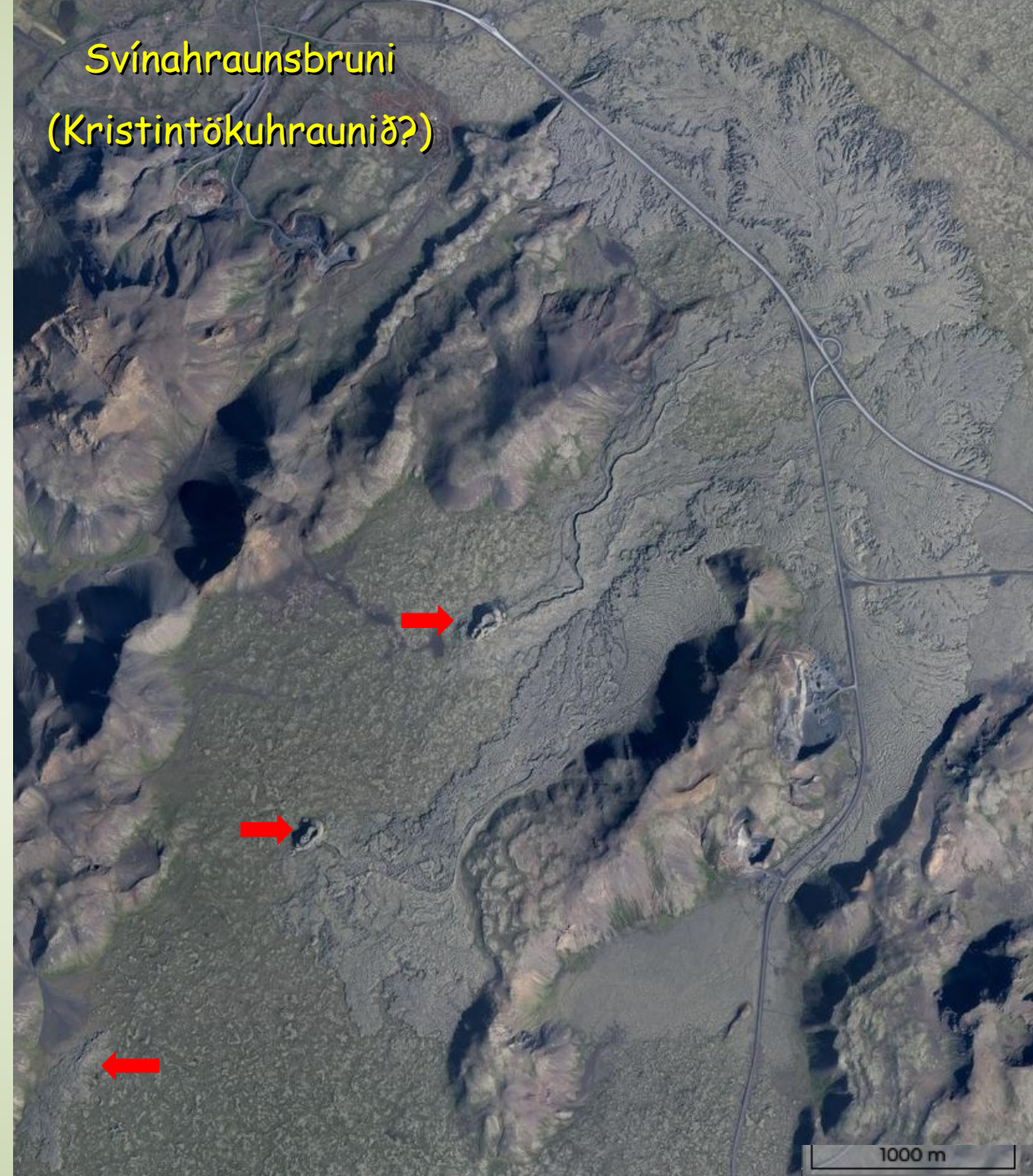
Meðalatal, há- og lágildi fyrir flatarmál, rúmmál og lengd hraunbreiða frá Nútíma (<14000 ár) sprungugosum á Reykjaneskaga.

N= 98	Flatarmál (km ²)	Rúmmál (km ³)	Mesta Lengd (km)
Meðaltal	7	0,075	4,5
Staðalfrávik	9	0,113	3,9
Hágildi	36	0,54	17,3
Lágildi	0,001	0,001	0,001

Meðalatal, há- og lágildi fyrir flatarmál, rúmmál og lengd hraunbreiða frá sögulegum sprungugosum á Reykjaneskaga.

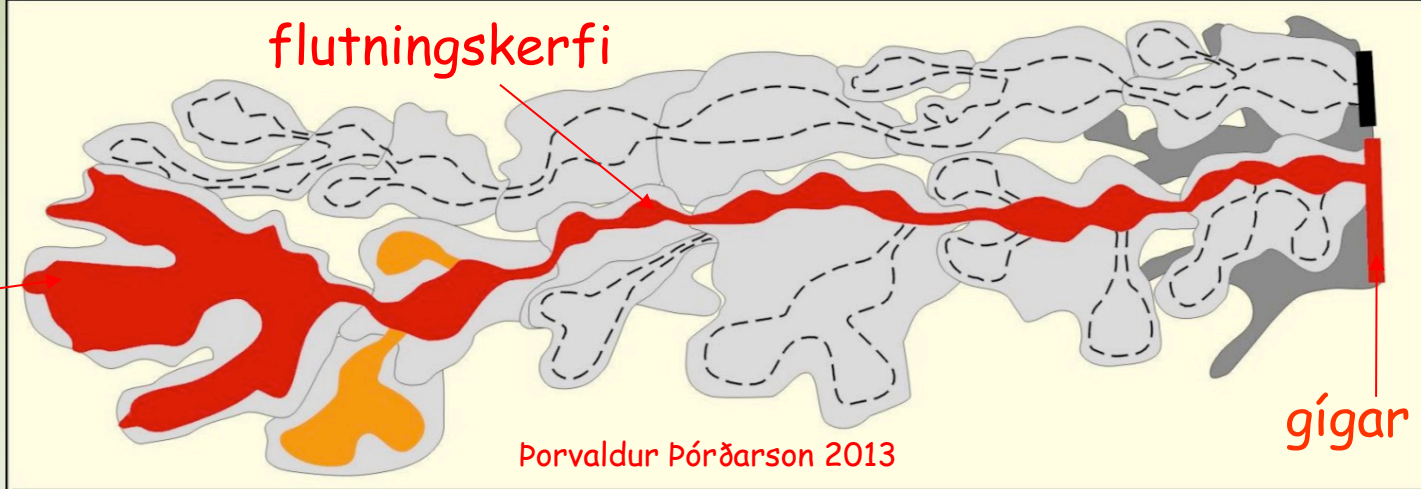
N=22	Flatarmál (km ²)	Rúmmál (km ³)	Mesta Lengd (km)
Meðaltal	13	0,11	6
Staðalfrávik	10	0,11	4.5
Hágildi	35	0,45	17
Lágildi	0,001	0,001	0,001

Svínahraunsbruni
(Kristintökuhraunið?)



Hraungos og Hraunflæði

virkur
hraunjaðar



Hraun búa til sitt
eigið landslag

Hraun hylja og eyðileggja
það sem er í vegi þeirra



virkur hraunjaðar

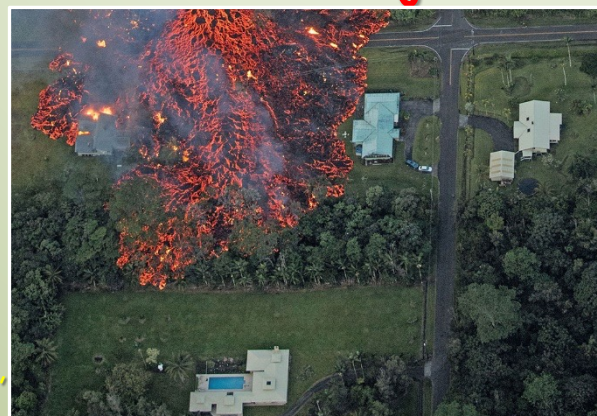


flutningskerfi

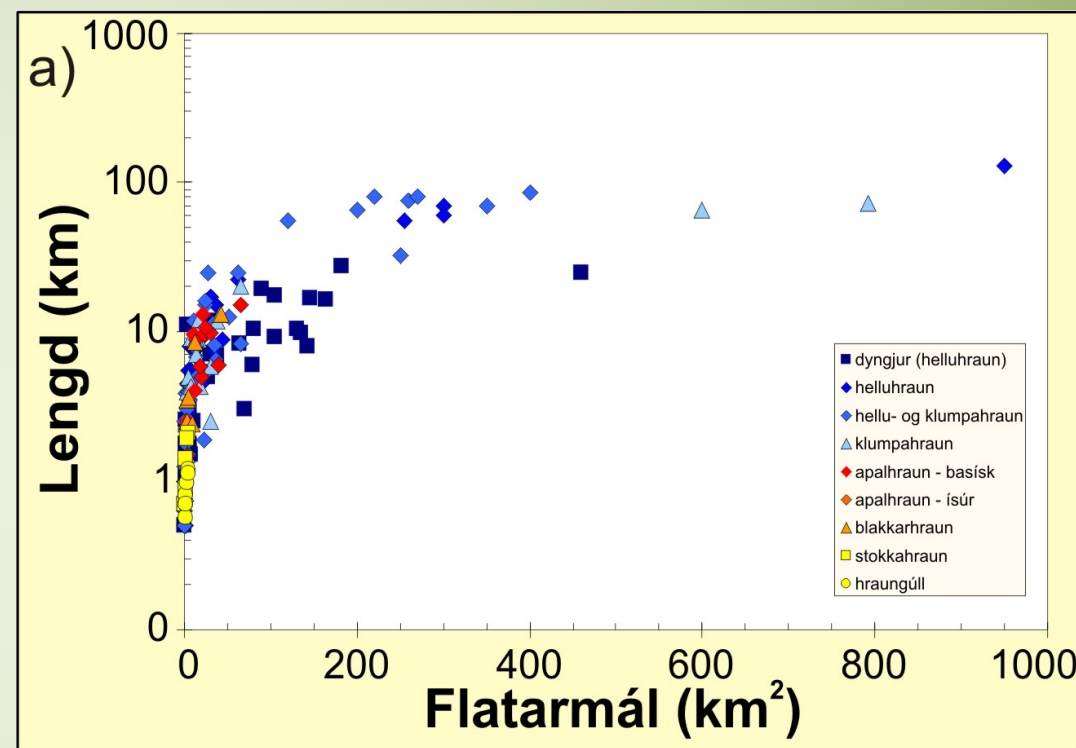
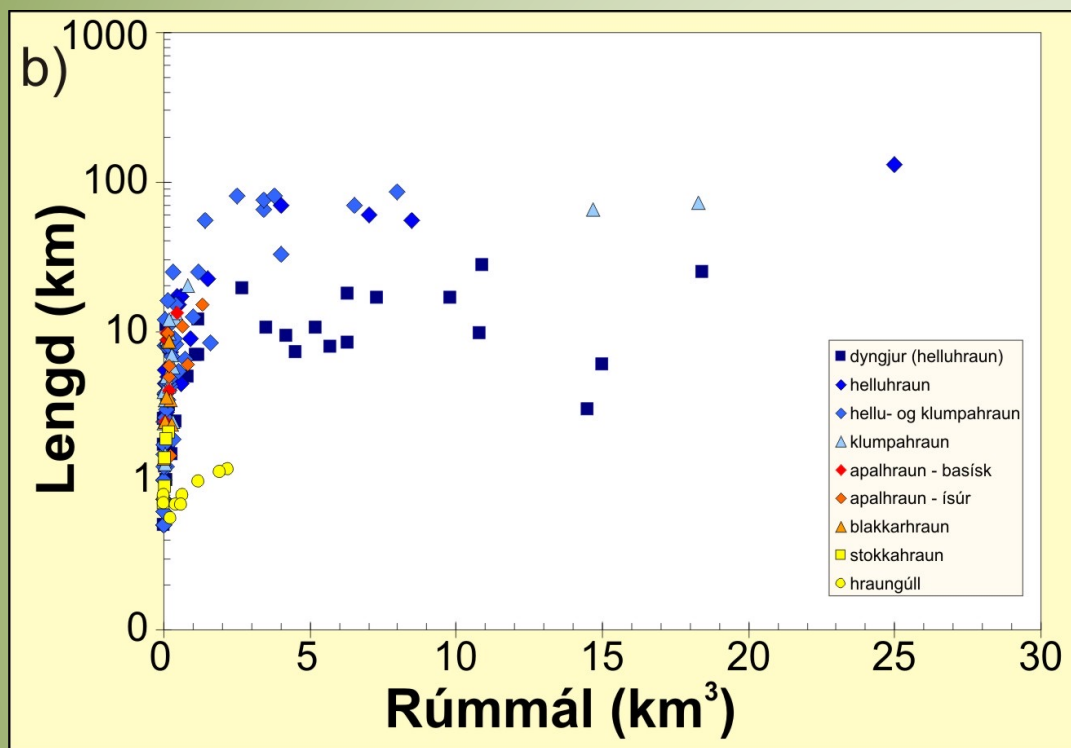


gígar

Við stoppum ekki flæði hrauns,
en hugsanlega getum stýrt því
upp að vissu marki.



Rensilslengdir hraunbreiða á Íslandi



Íslenskar hraunbreiður hafa „kjörlengd“, þ.e. lengd sem hraunflæði nær við ákveðna kvikuframleiðni (m³/s).

Kjörlengd hrauna í aflmestu gosunum (t.d. Laki) er um 100 km

í millistærðinni (t.d. Ögmundarhraun) er algeng kjörlengd um 12-13 km

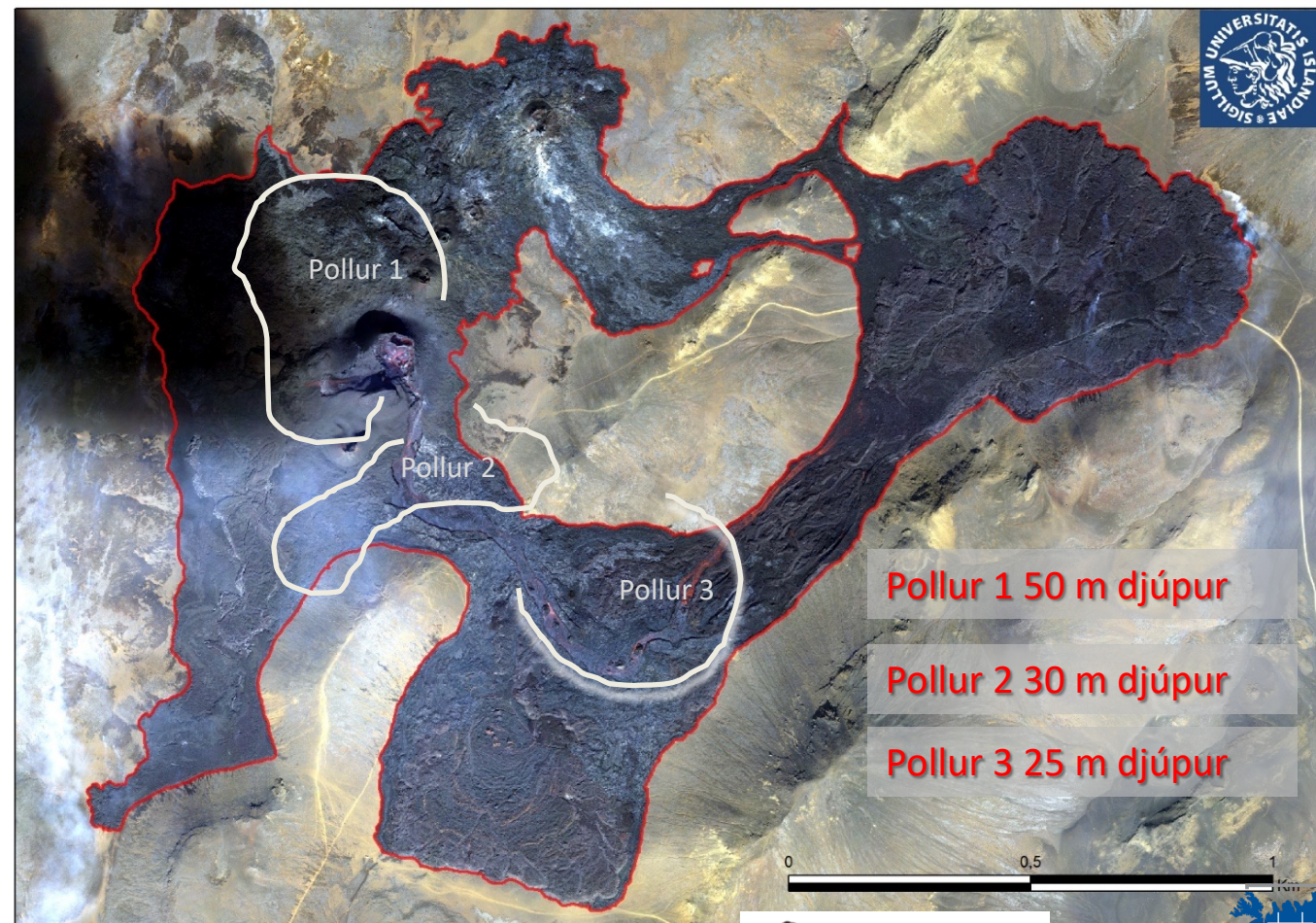
Geldingadalagosið 2021

Mjög lág framleiðni (4-8 m³/s)

Hraunið safnaðist fyrir í pollum,
sem síðan miðluðu því áfram



Pollur 3



Pollur 1 50 m djúpur

Pollur 2 30 m djúpur

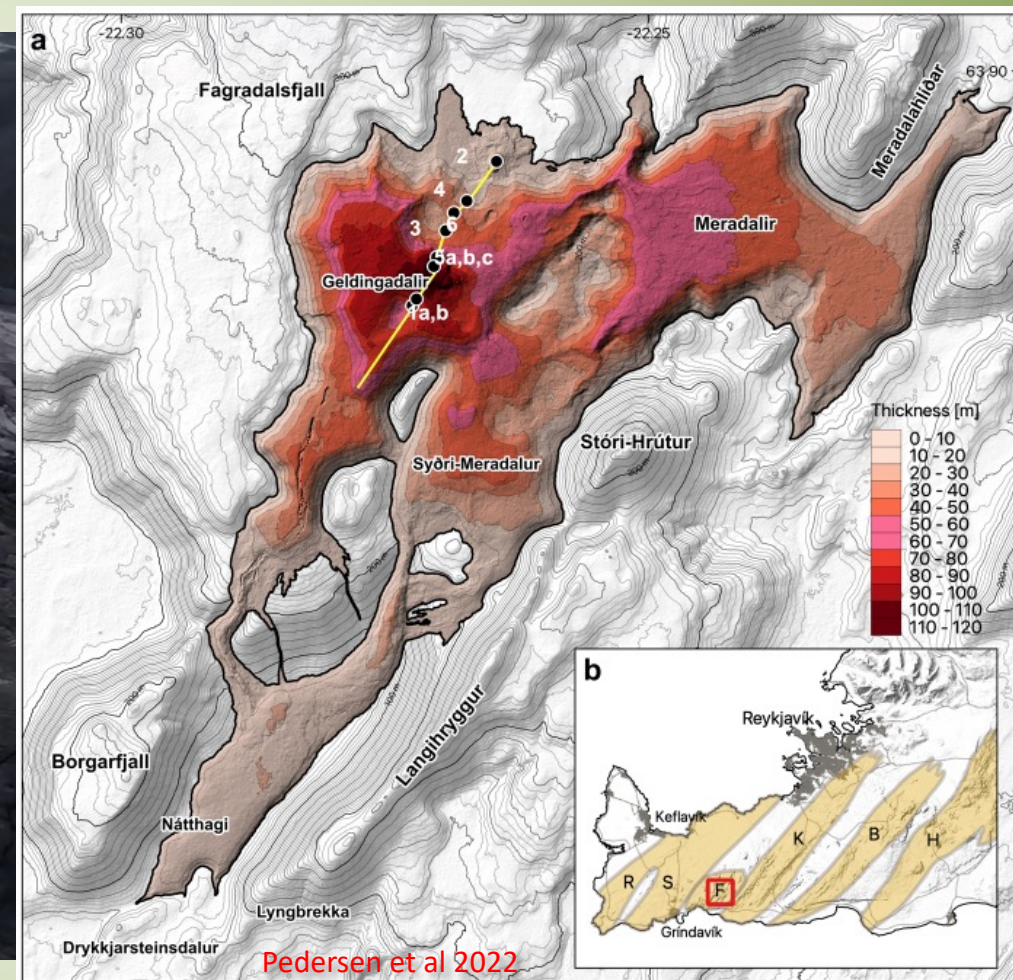
Pollur 3 25 m djúpur



mesta lengd hrauns án
hraunpolla 1.3 km

Hraunflæði

Geldingadalir - ekki er allt sem sýnist



Hraunflæði

Nátthagi - innri flutningur og vöxtur hrauns



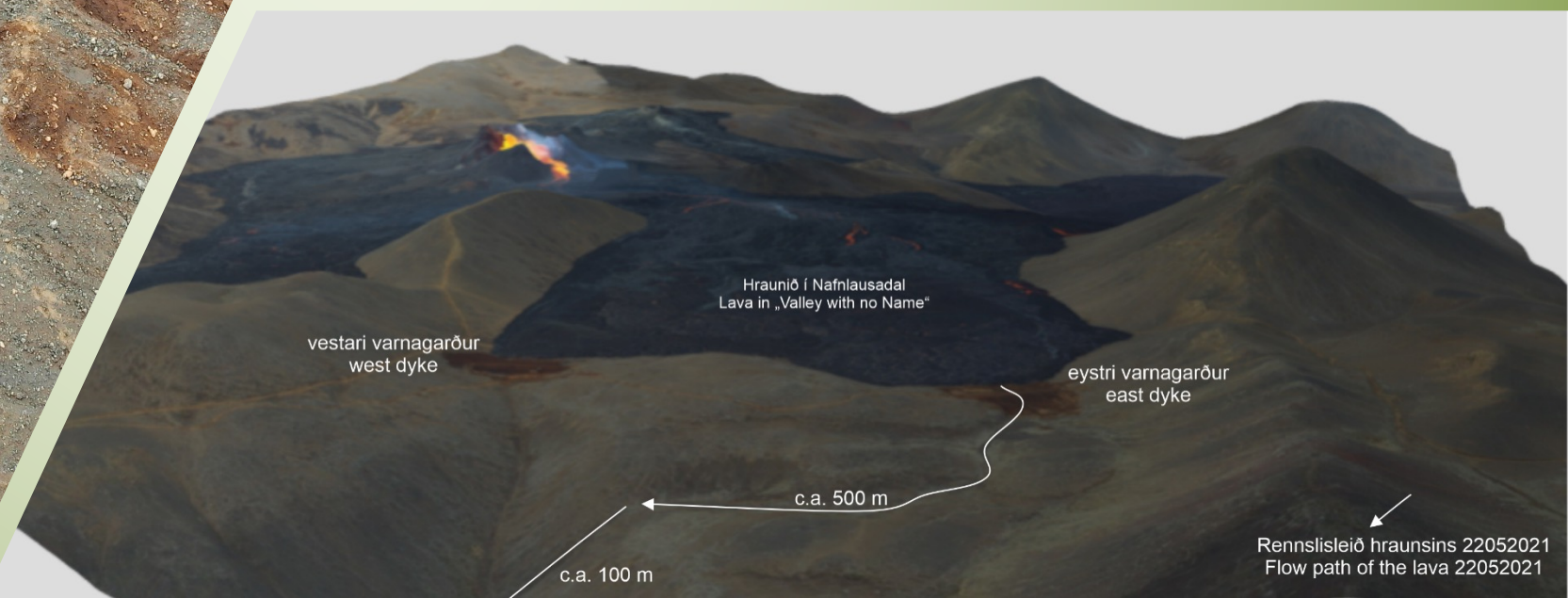
mbl.is

SAMSUNG

2021-06-14 05:32:52

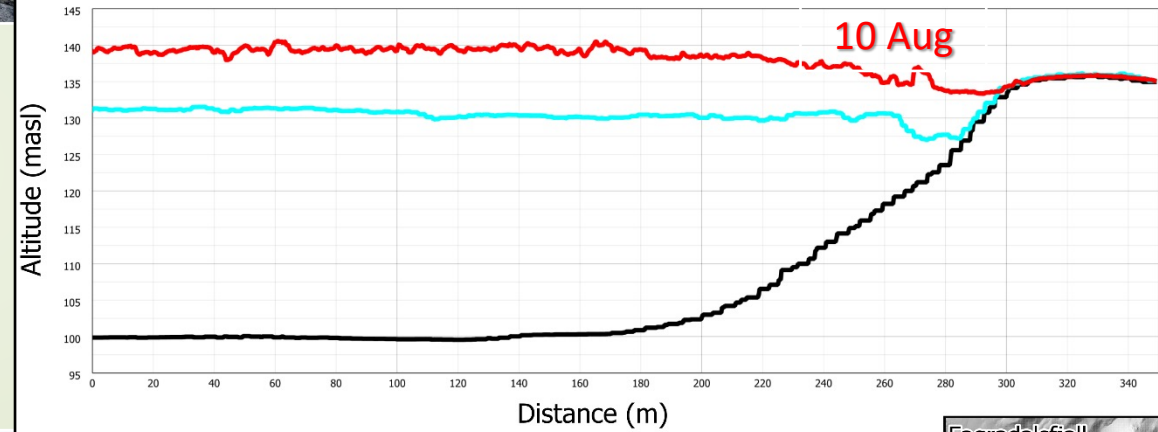
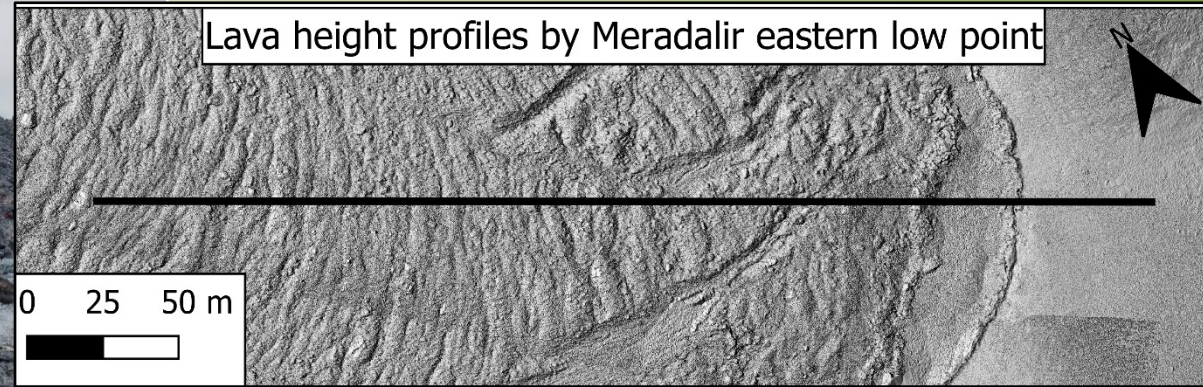


Innri vöxtur og hindranir



Athuganir á hraunum í austurhluta Meradala

7 Aug.

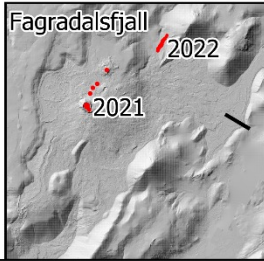


10 Aug.

- New lava surface 2022-08-10 (Moreland et al. 2022)
- Post-Fagradalsfjall 2021 topography (Óskarsson and Belart 2021)
- Pre-2021 eruption topography (Loftmyndir ehf.)

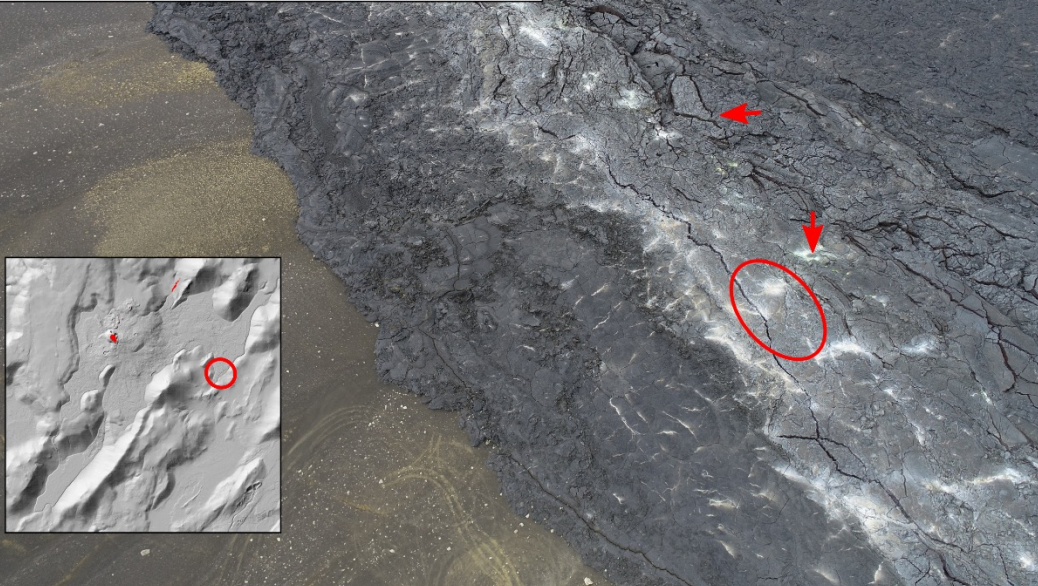


Birgir V. Óskarsson and Joaquín M.C. Belart 2021, Náttúrufræðistofnunar Íslands, Landmælingar Íslands and Raunvísindastofnun Háskólans
William M. Moreland, Þorvaldur Þórðarson, Ármann Höskuldsson, Ingibjörg Jónsdóttir and the University of Iceland
Volcanology and Natural Hazards Group 2022
DEM on inset map from Landmælingar Íslands, ArcticDEM **REN, unpubl. data 2023**



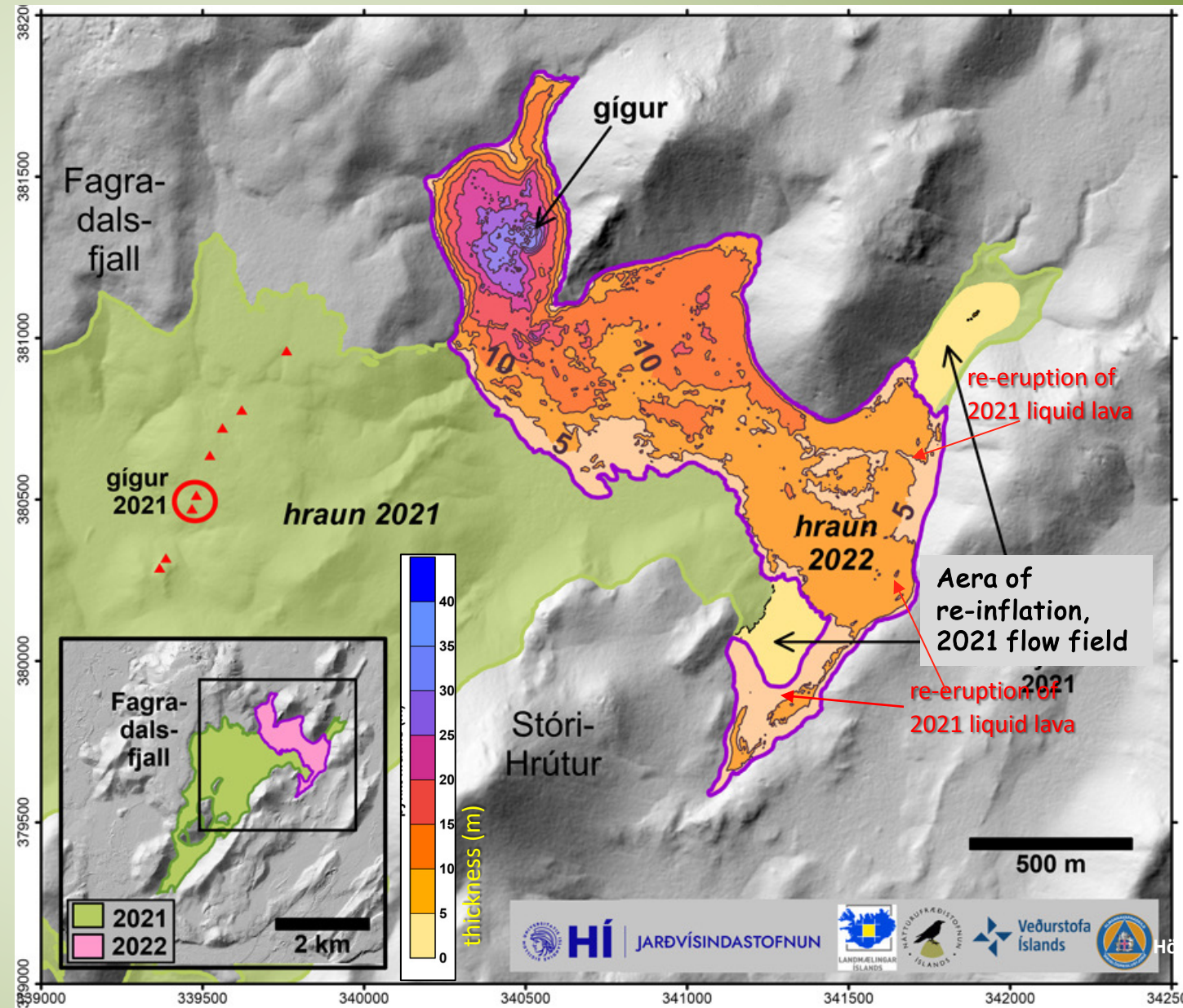
Observations of outbreak of 2021 lava from Meradalir

Photograph from 2022-06-12

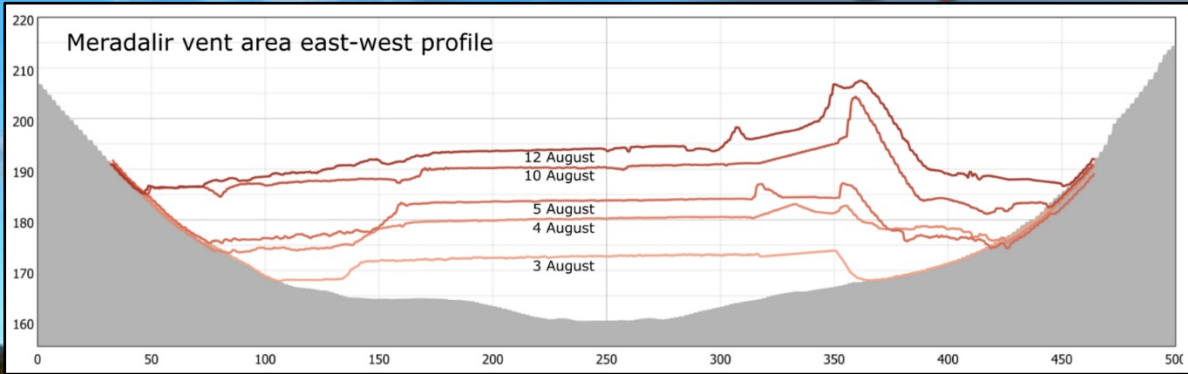


Photograph from 2022-08-10

Ófyrirséð hraunflæði



Hraunflæði - augljóðsar hættur fyrir ferðamenn



3 August

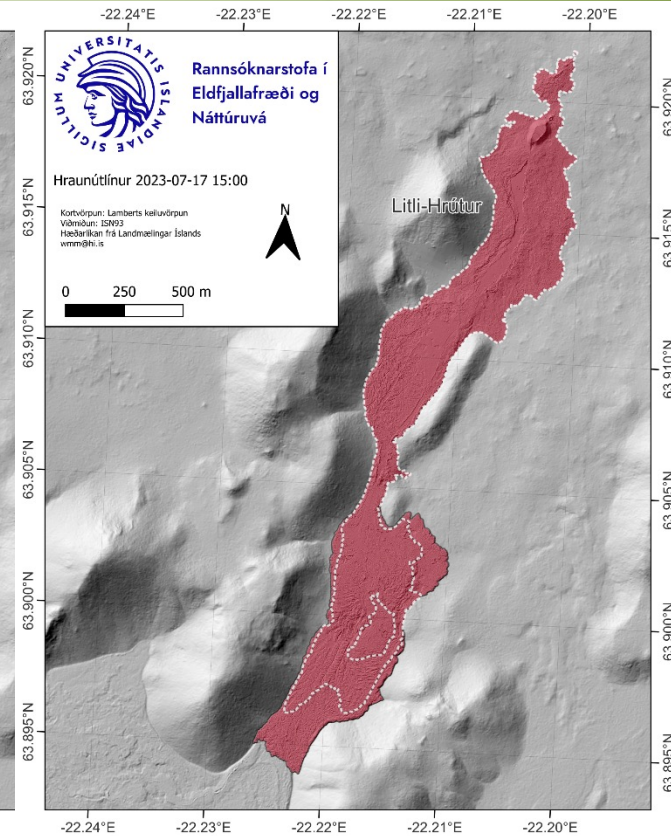
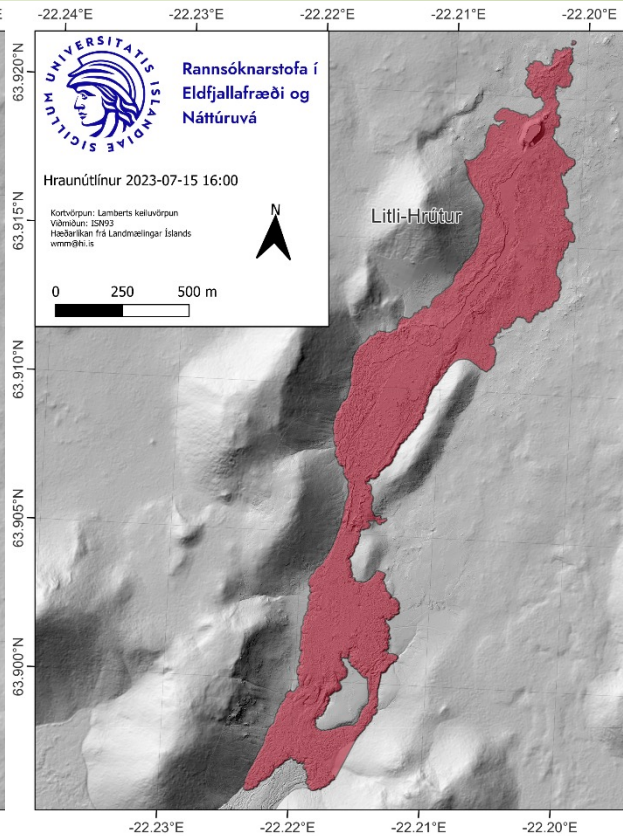
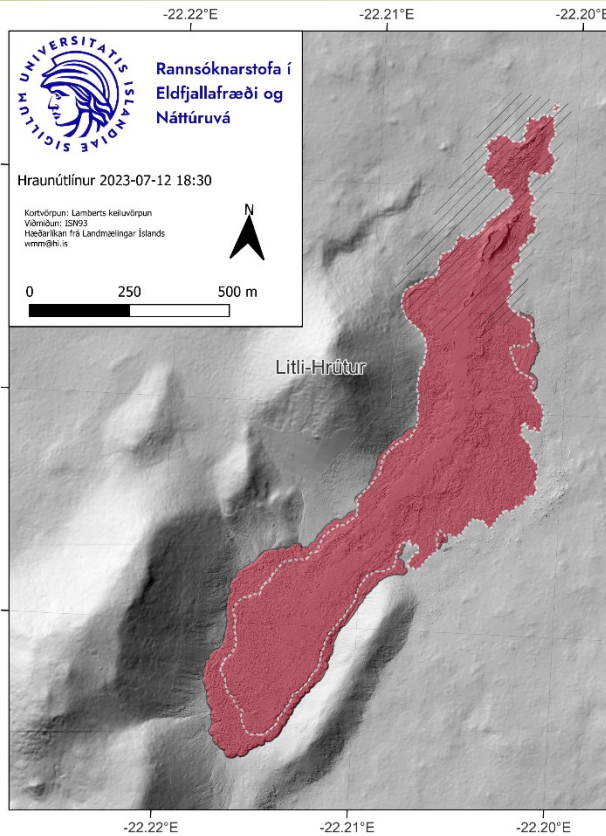
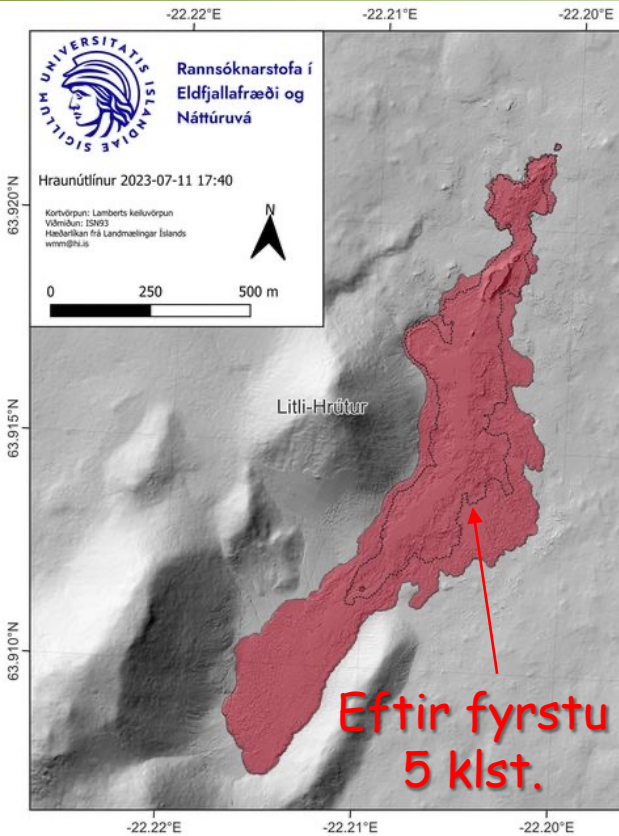
Hraunakortlagning

11 júlí

12 júlí

15 júlí

17 júlí



Framleiðni

0-5 klst = $\sim 40 \text{ m}^3/\text{s}$

11 júlí = $\sim 16 \text{ m}^3/\text{s}$

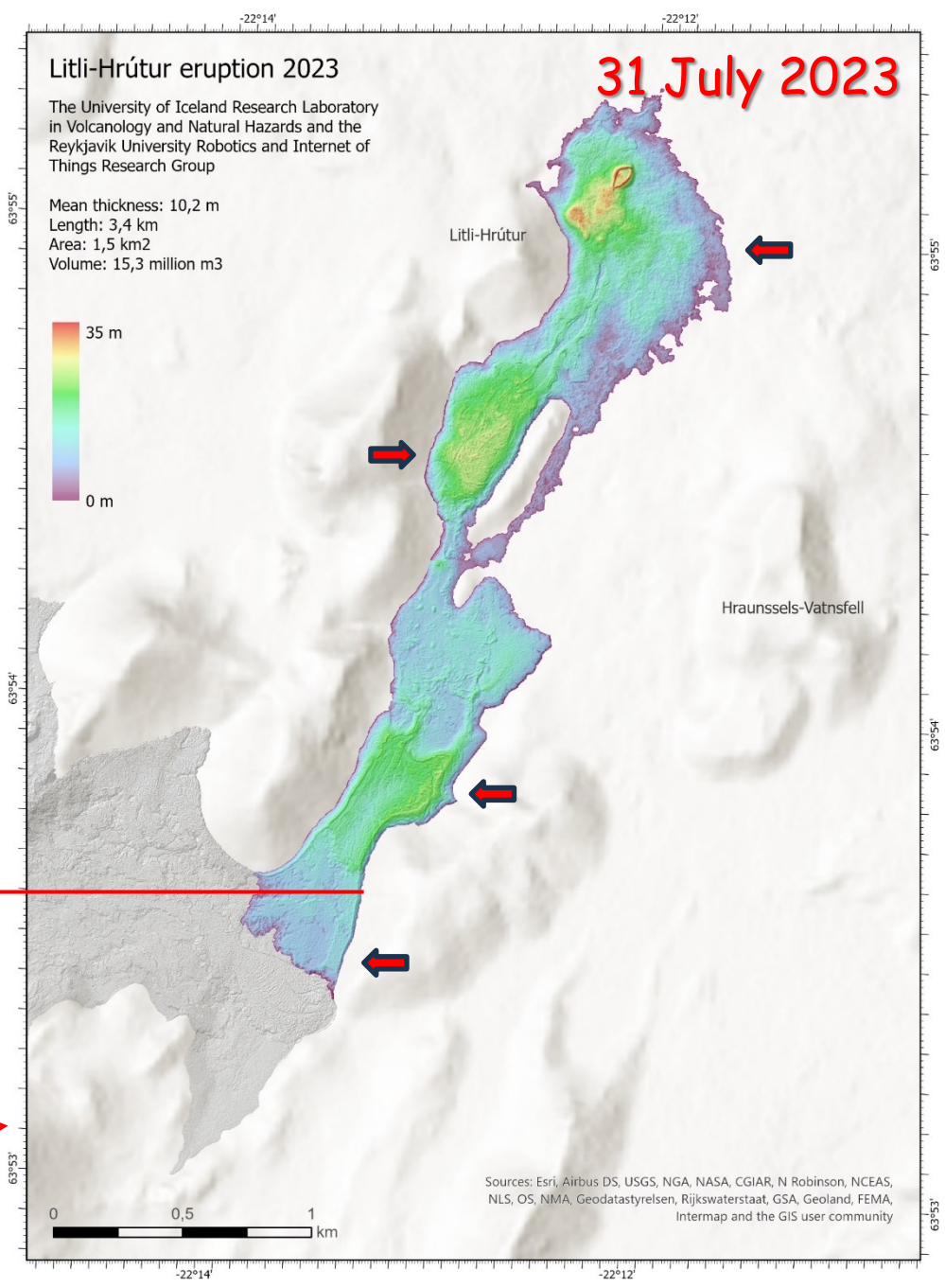
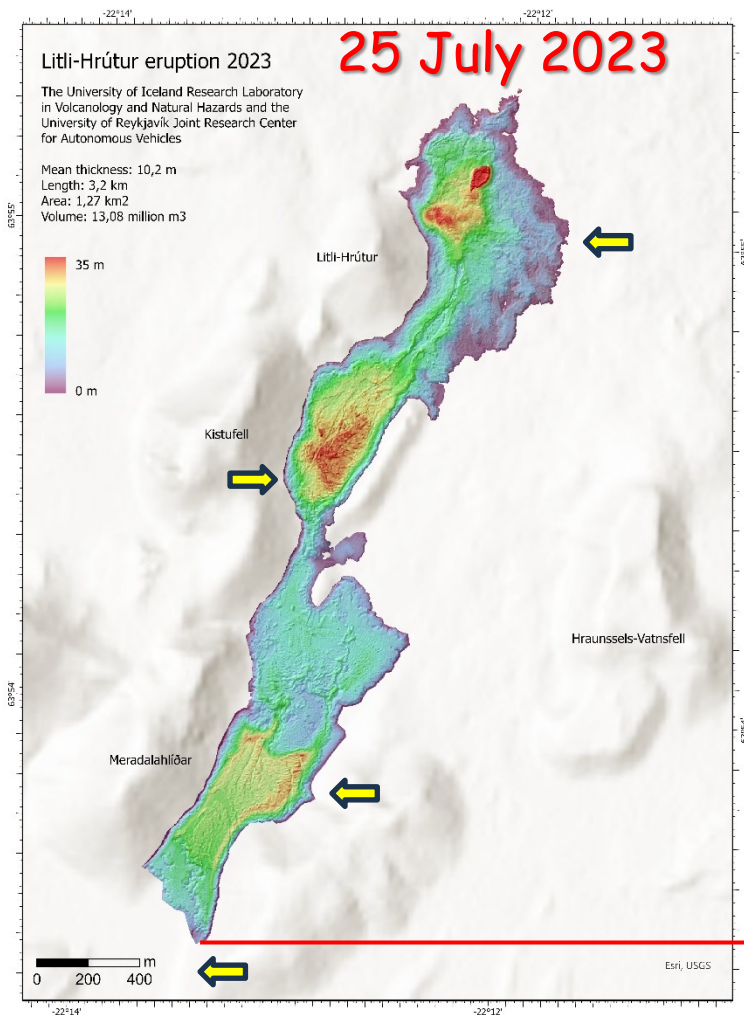
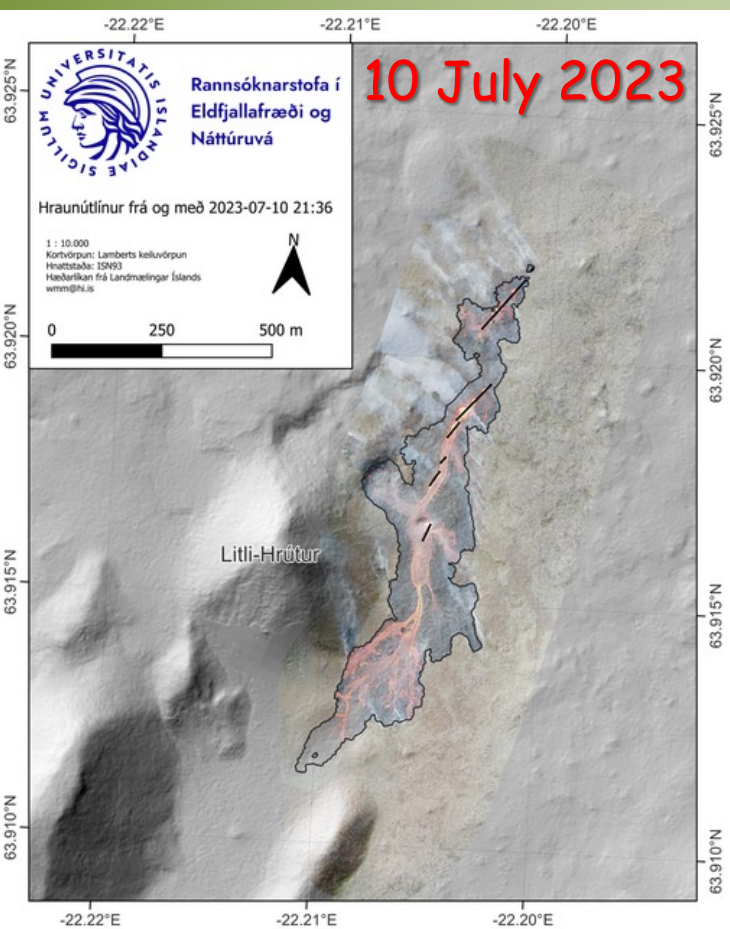
12 júlí = $\sim 10 \text{ m}^3/\text{s}$

15 júlí = $\sim 10 \text{ m}^3/\text{s}$

17 júlí = $\sim 10 \text{ m}^3/\text{s}$

25 júlí = $\sim 3 \text{ m}^3/\text{s}$

31 júlí = $\sim 3 \text{ m}^3/\text{s}$



Extent of the Litli-Hrútur lava flow field 25 July 2023

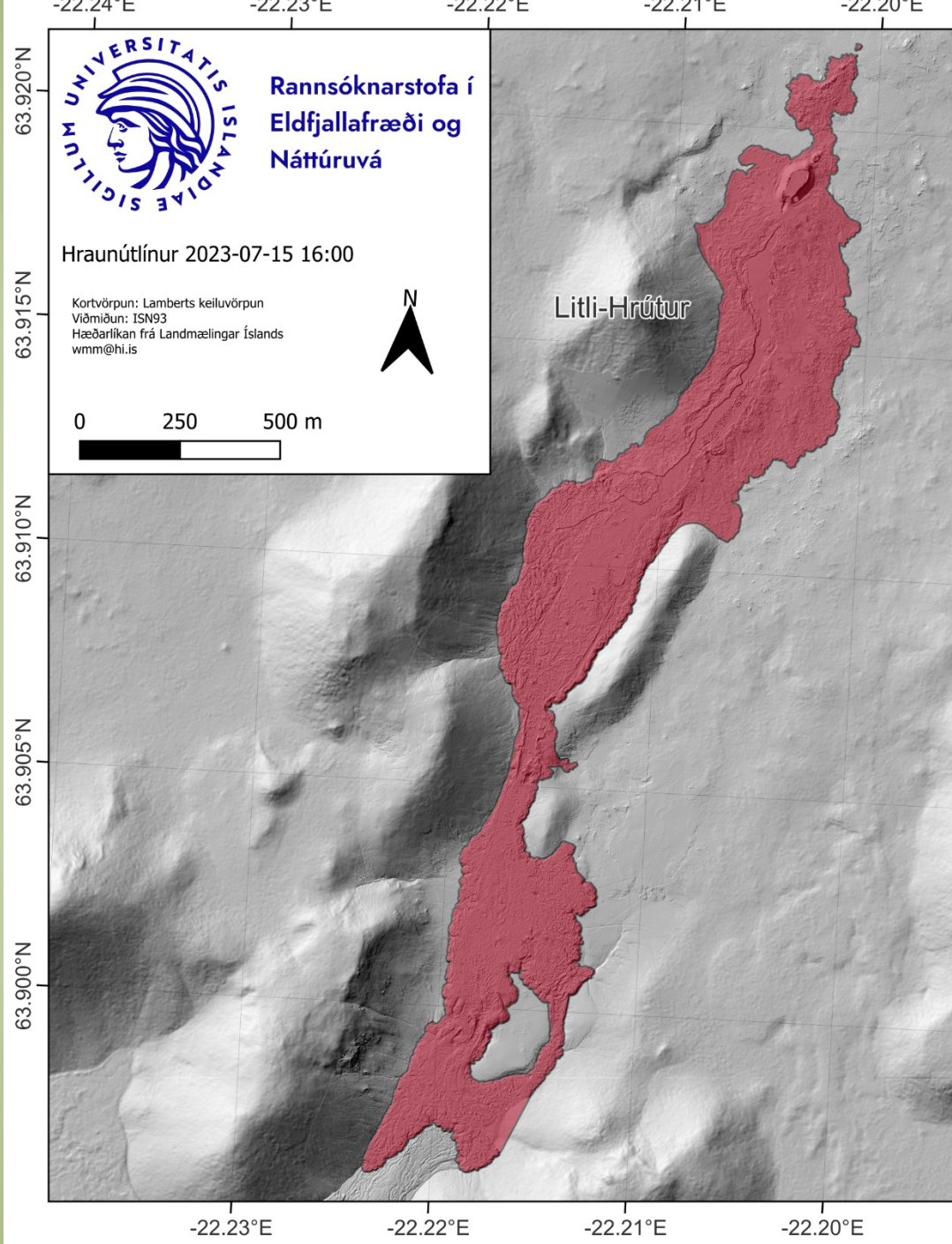
REN, unpubl. data 2023

Fyrstu 5 klst.

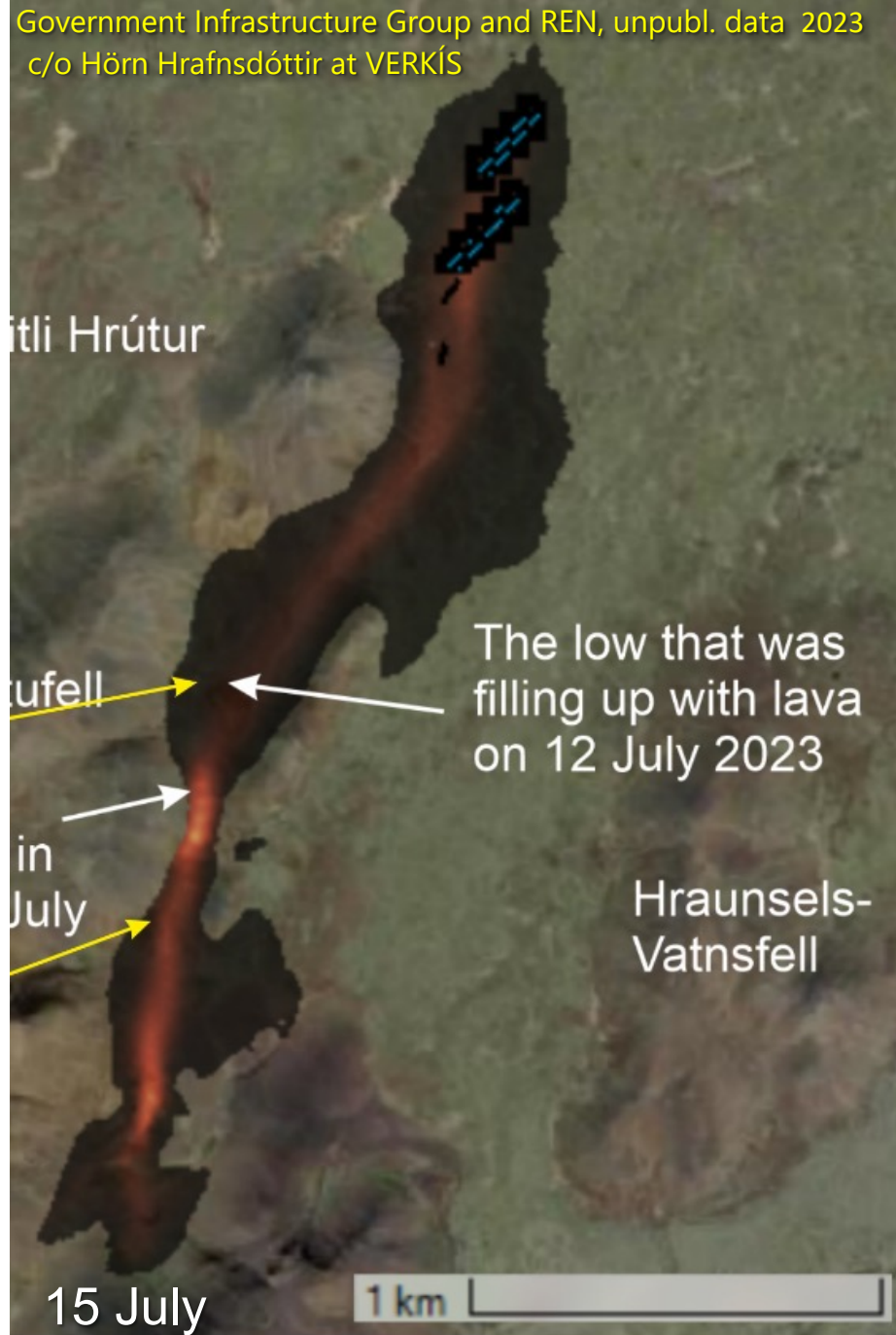
Innra flæði í Litla-Hrútsgosinu

Extent of the Litli-Hrútur lava field on July 31 2023

Hraunhermanir

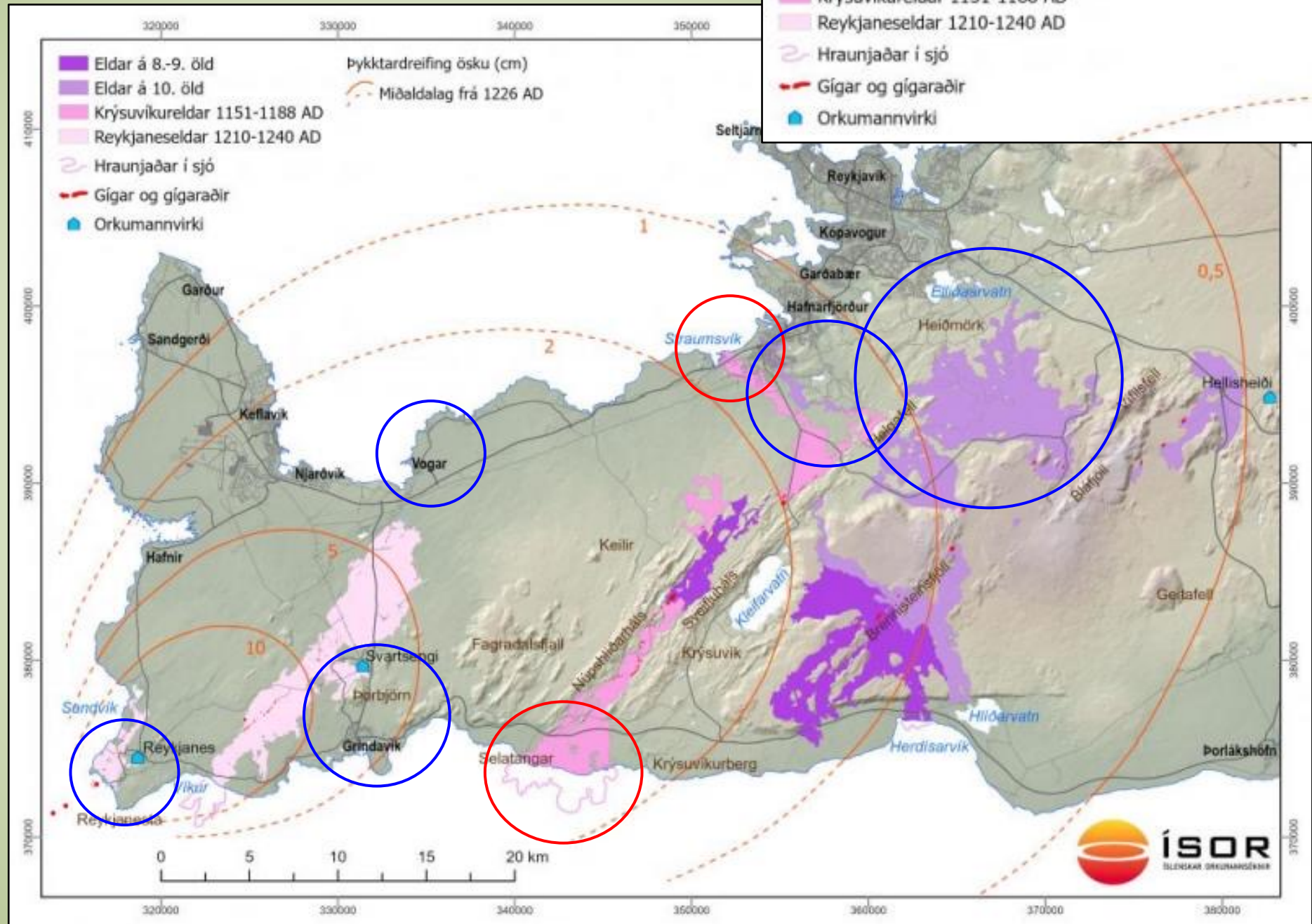


Government Infrastructure Group and REN, unpubl. data 2023
c/o Hörn Hrafnadóttir at VERKÍS

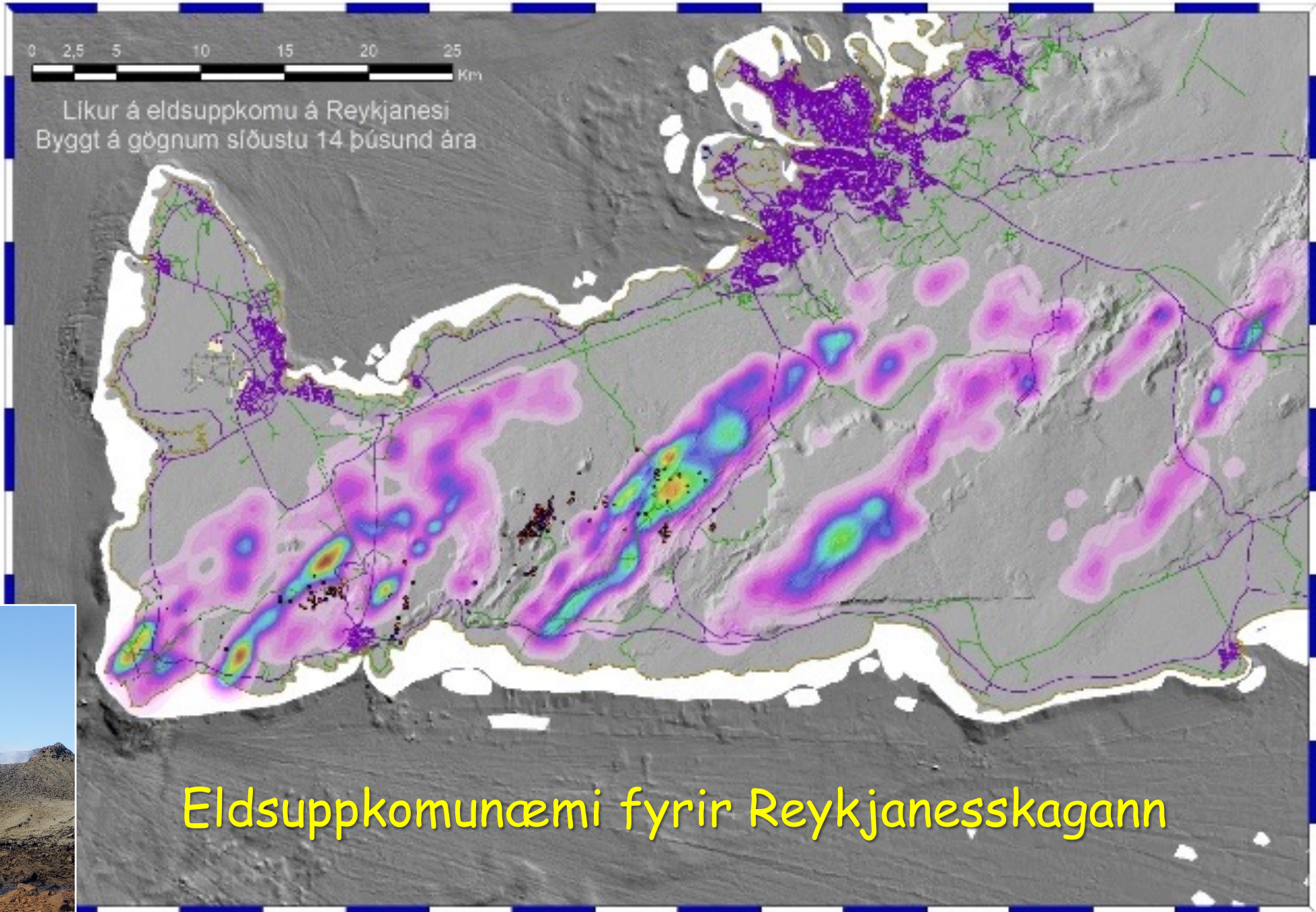


Hver er skaðlegasta eldgosaváin á skaganum?

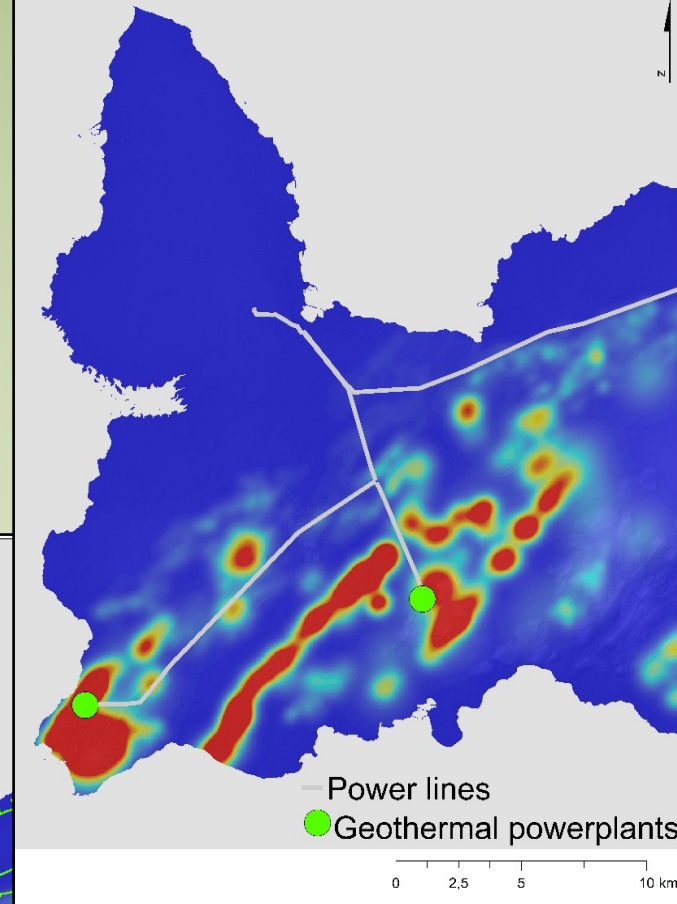
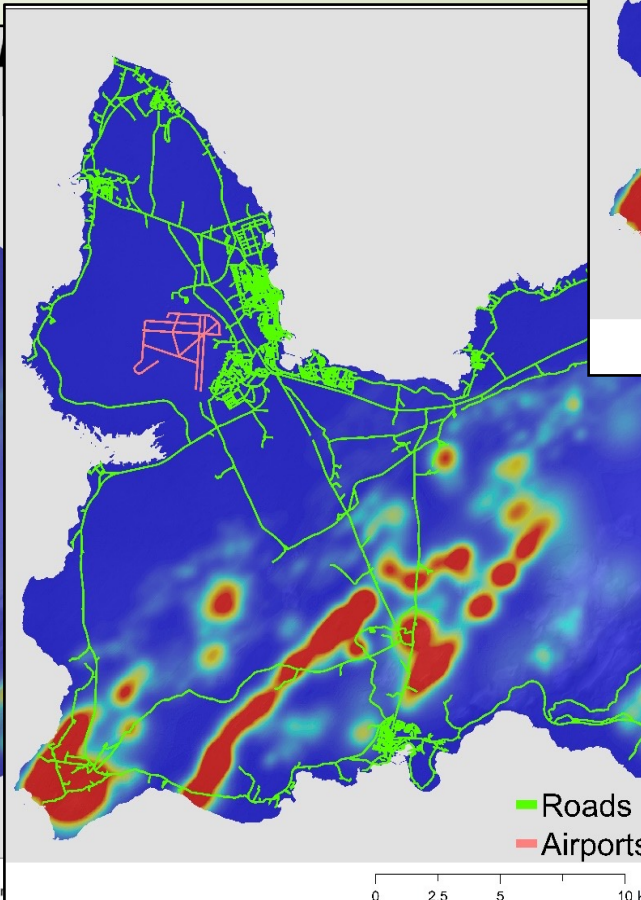
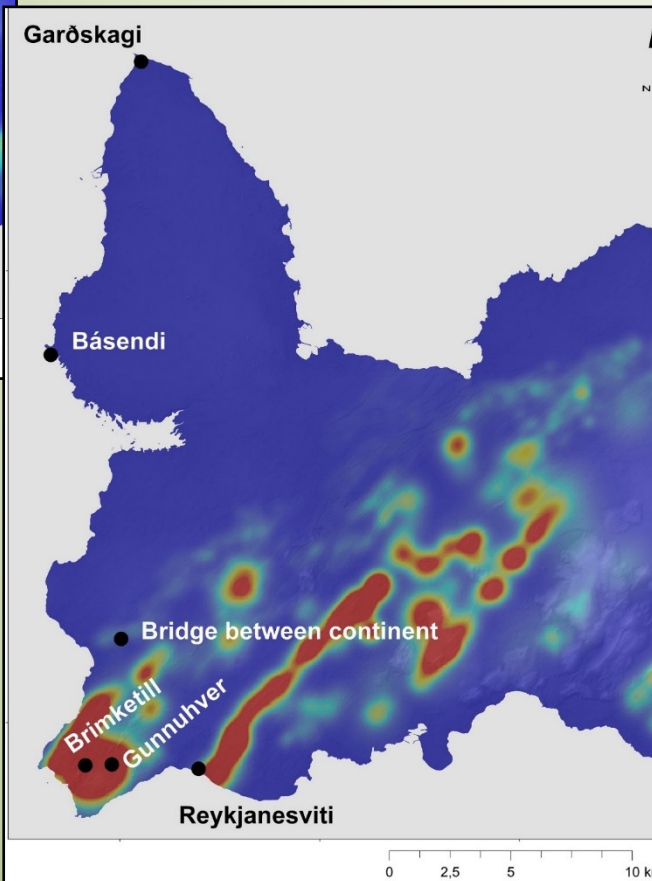
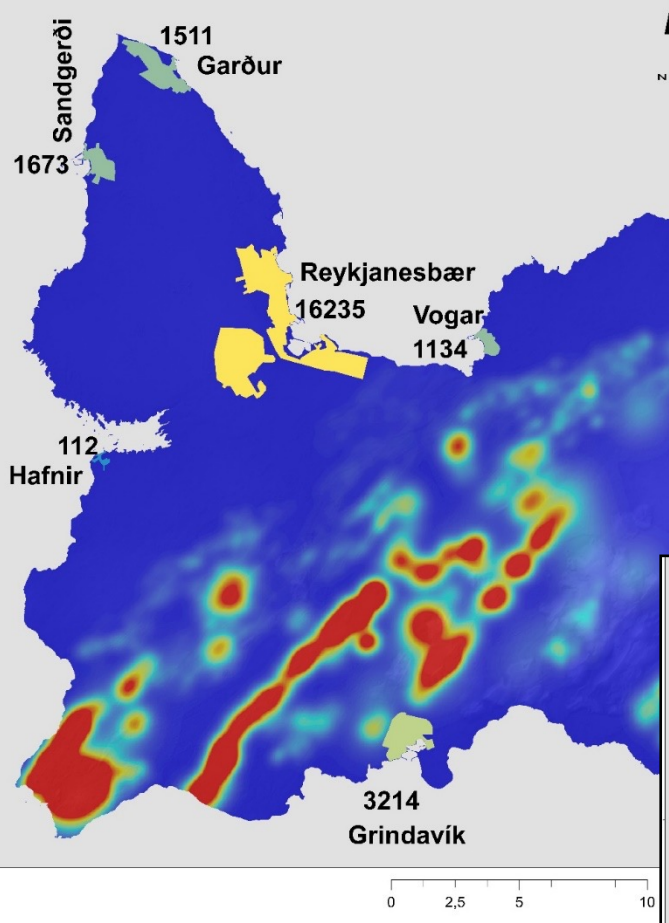
Líklegast að hún tengist hraunflæði



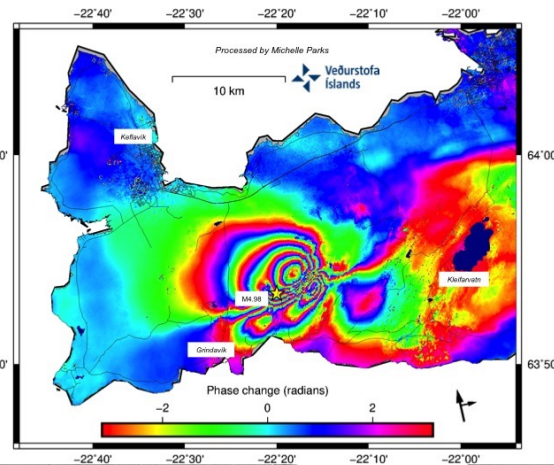
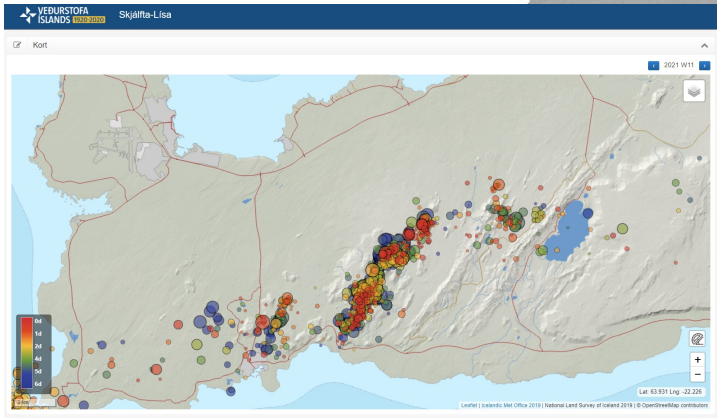
Langtíma-
hættumat
með
VETOOLS



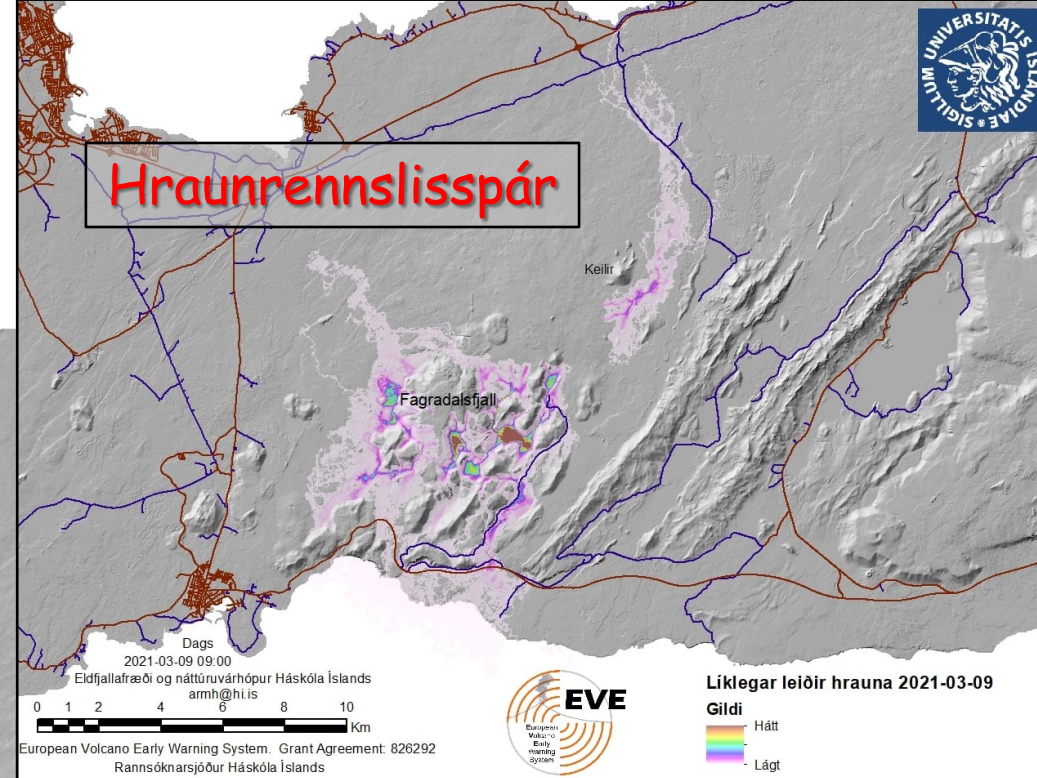
Eldsuppkomunæmni og Þéttbýli + Innviðir



Ný gögn komu inn

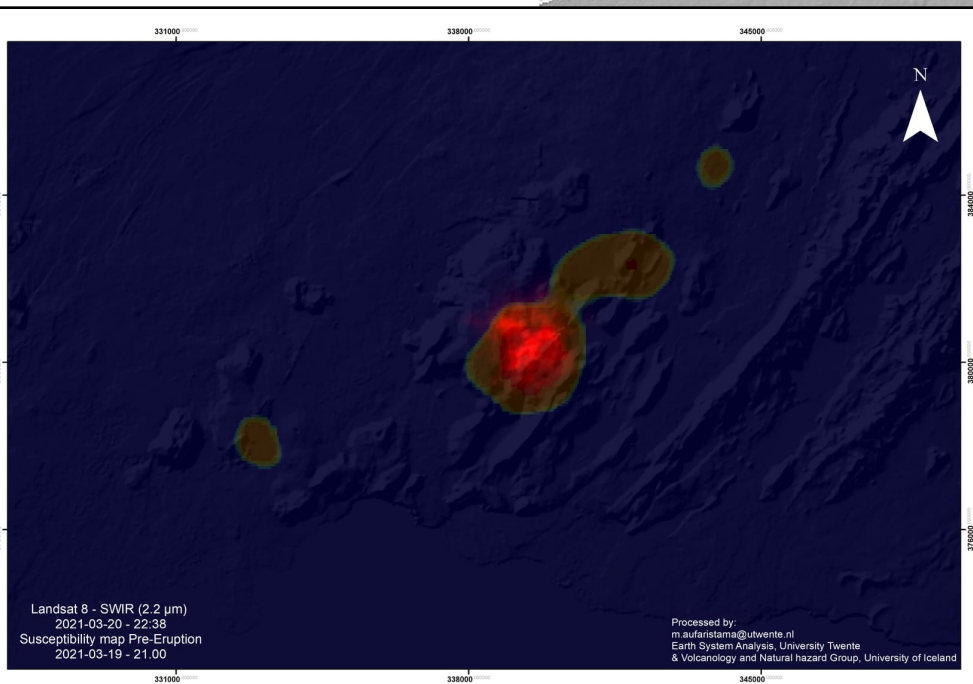


Hraunrennisspár

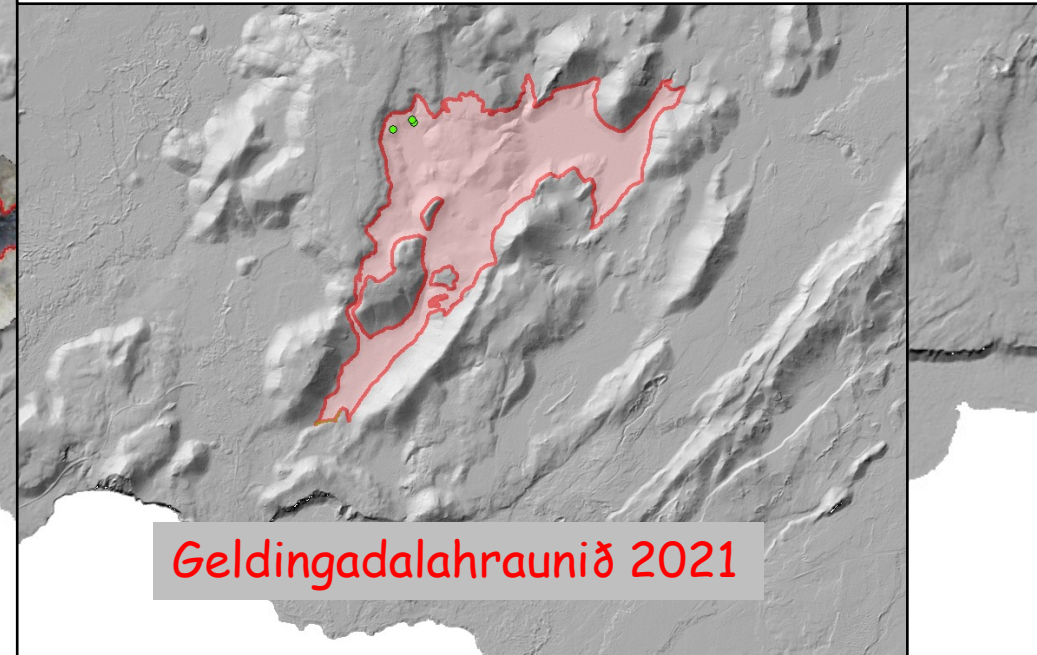


Skammtímahættumat með VETOOLS

VETOOLS stóðst prófið



Geldingadalahraunið 2021



Takk fyrir að hlusta

