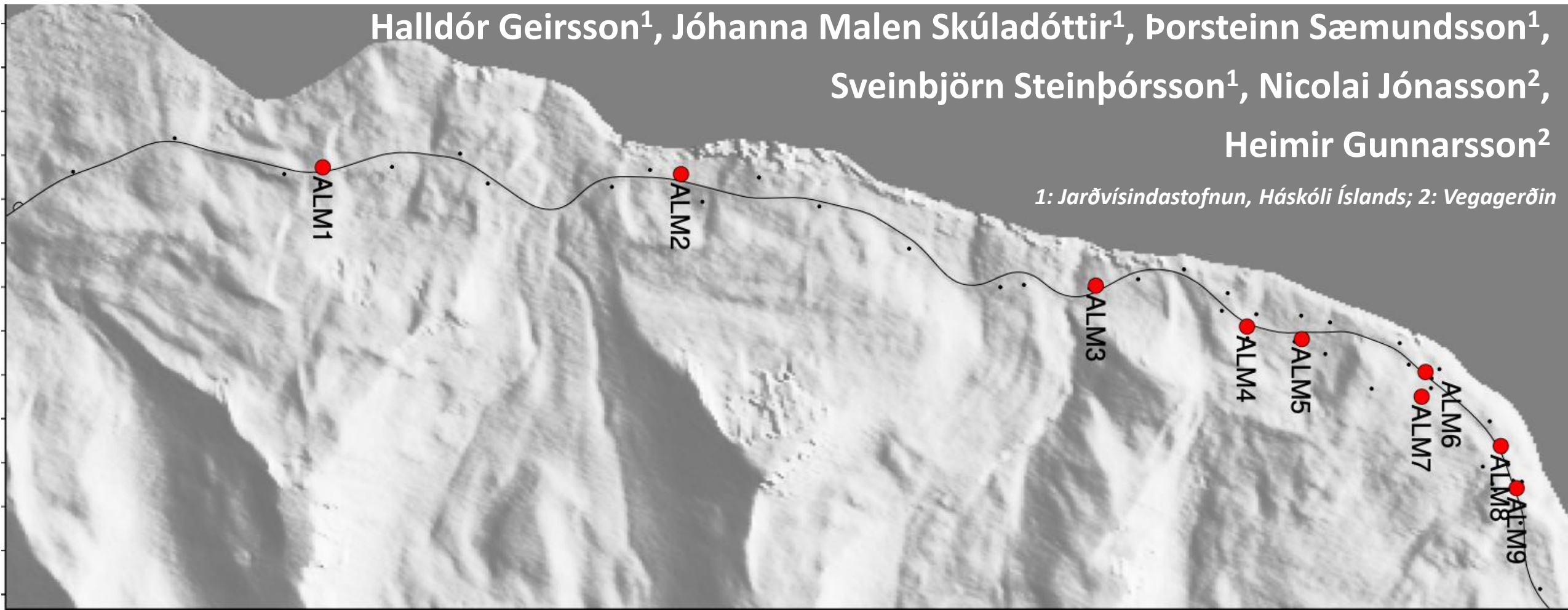


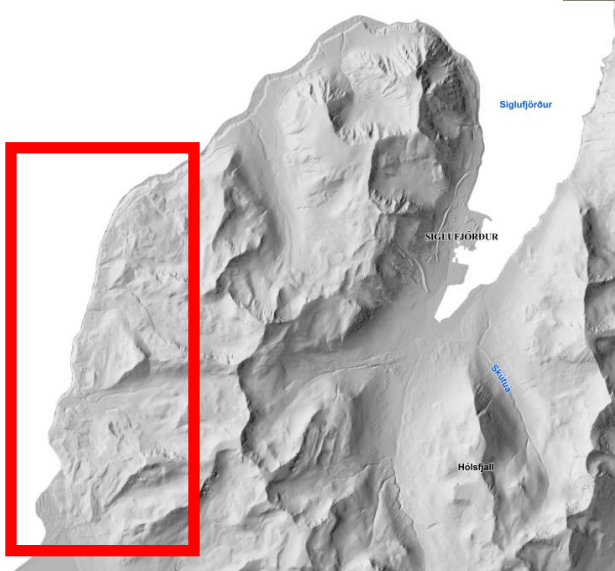
# Rannsóknir og vöktun á hreyfingum við vegstæði Siglufjarðarveggar um Almenninga með síritandi GNSS (GPS) staðsetningataekni

Halldór Geirsson<sup>1</sup>, Jóhanna Malen Skúladóttir<sup>1</sup>, Þorsteinn Sæmundsson<sup>1</sup>,  
Sveinbjörn Steinþórsson<sup>1</sup>, Nicolai Jónasson<sup>2</sup>,  
Heimir Gunnarsson<sup>2</sup>

*1: Jarðvísindastofnun, Háskóli Íslands; 2: Vegagerðin*



# Almenningar



- Vegur lagður 1968
- Miklar hreyfingar á köflum

# Skýr merki um nýlegar færslur



# Sprungur fyrir neðan og ofan veg

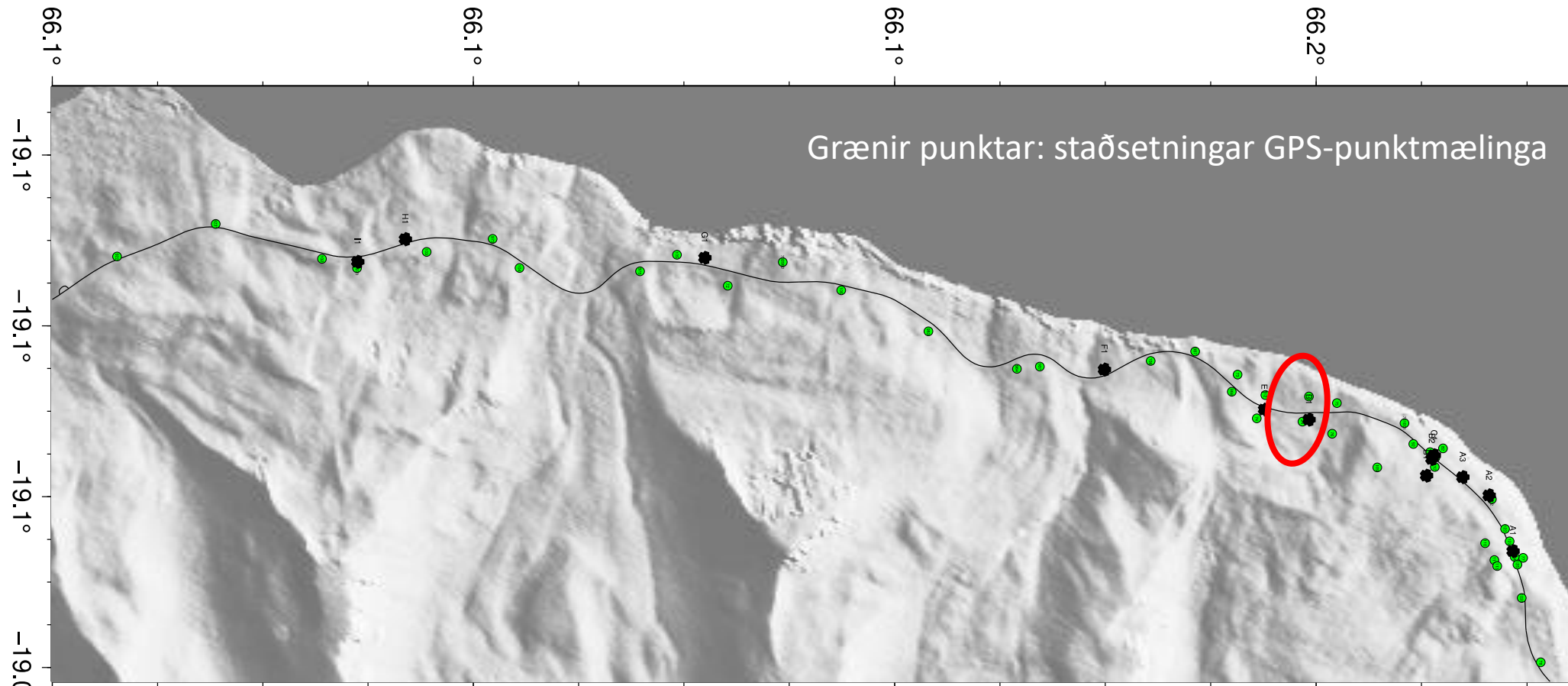




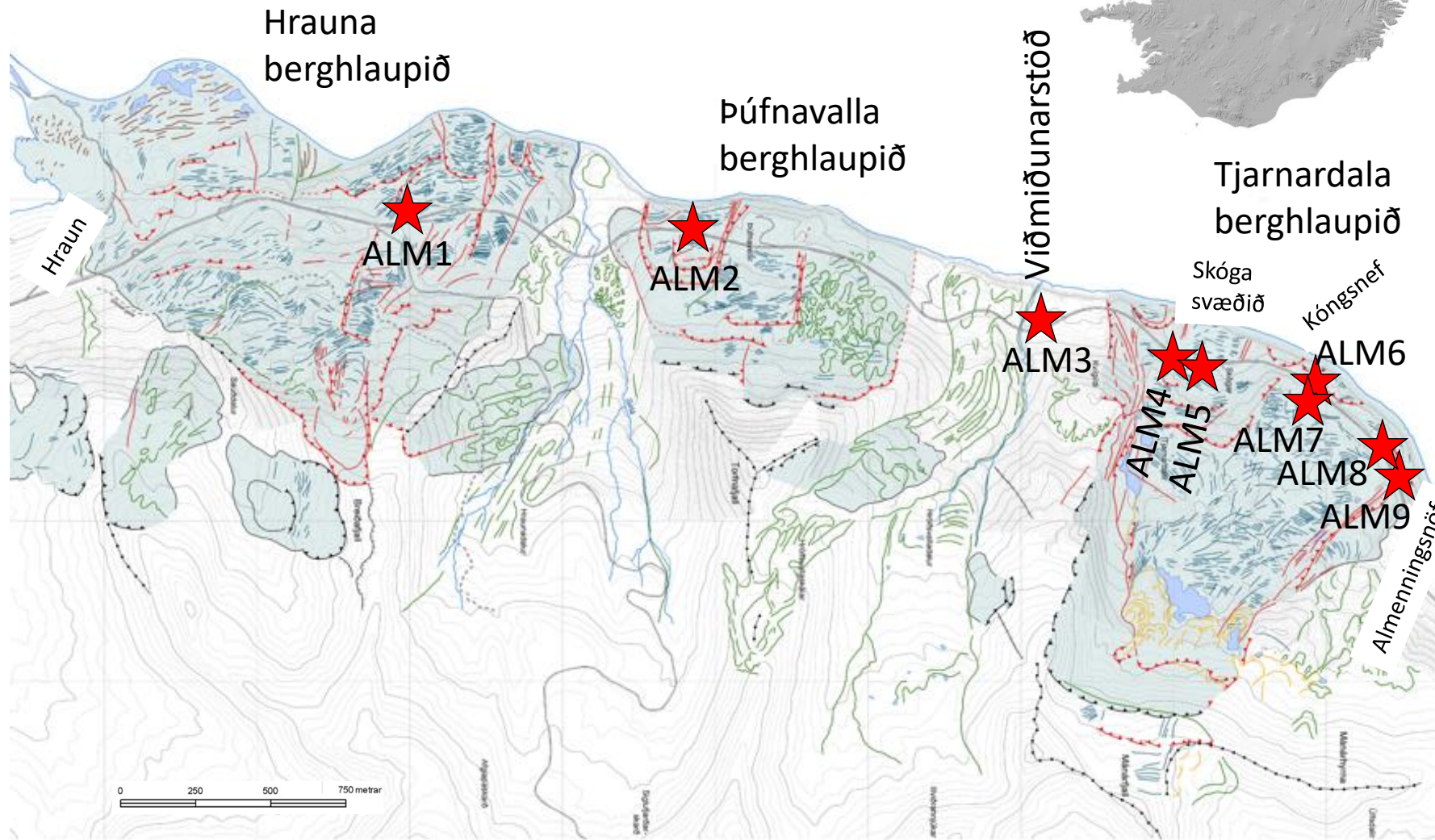
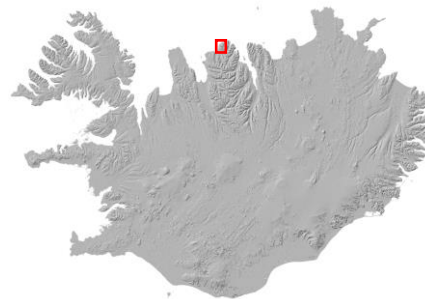
# GPS - punktmælingar

- Mælingar á jarðskriði síðan 1977
- Með GPS síðan 1997
- Mælt ca. árlega í seinni tíð
- Mestu hreyfingar um 1 m á ári

“Mestar hreyfingar hafa mælst í Tjarnardalaberghlaupinu en þar hefur sem dæmi mesta lárétt skrið (mælipunktur 24) mælst samtals 10,95 m og lóðrétt sig á sama mælipunkti 1,53 m frá 1999 til 2013. “



# Uppsetningar á GNSS tækjum: 9 síritandi stöðvar



## SKÝRINGAR

- Brot í berghlaupsurð
- Brot í berggrunni
- Stór sprunga
- Lítil sprunga
- Óviss sprunga / brot
- Landform úr seti
- Sethryggur
- Settunga í urð
- Jaðar / mörk berghlaups
- Brotalína í berggrunni
- Fjallsegg
- Skörp brún, fjallsbrún
- Berghlaup
- Vatn
- GNSS stöðvar

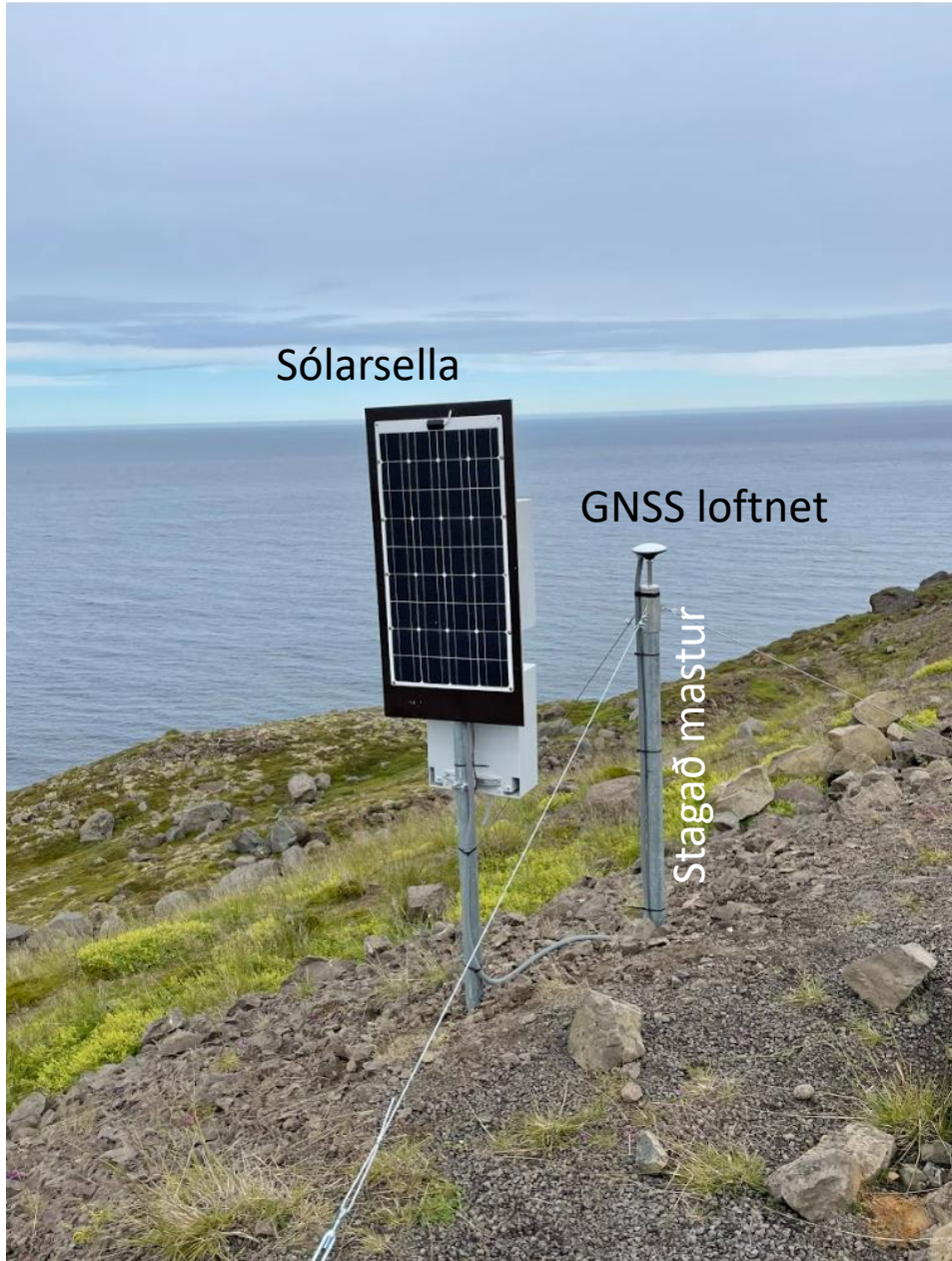
## Uppsetning á GNSS mælitækjum



Þrjár ferðir: staðarval; rör rekin niður; tækjabúnaður settur upp (þessi mynd)



# GNSS uppsetningar



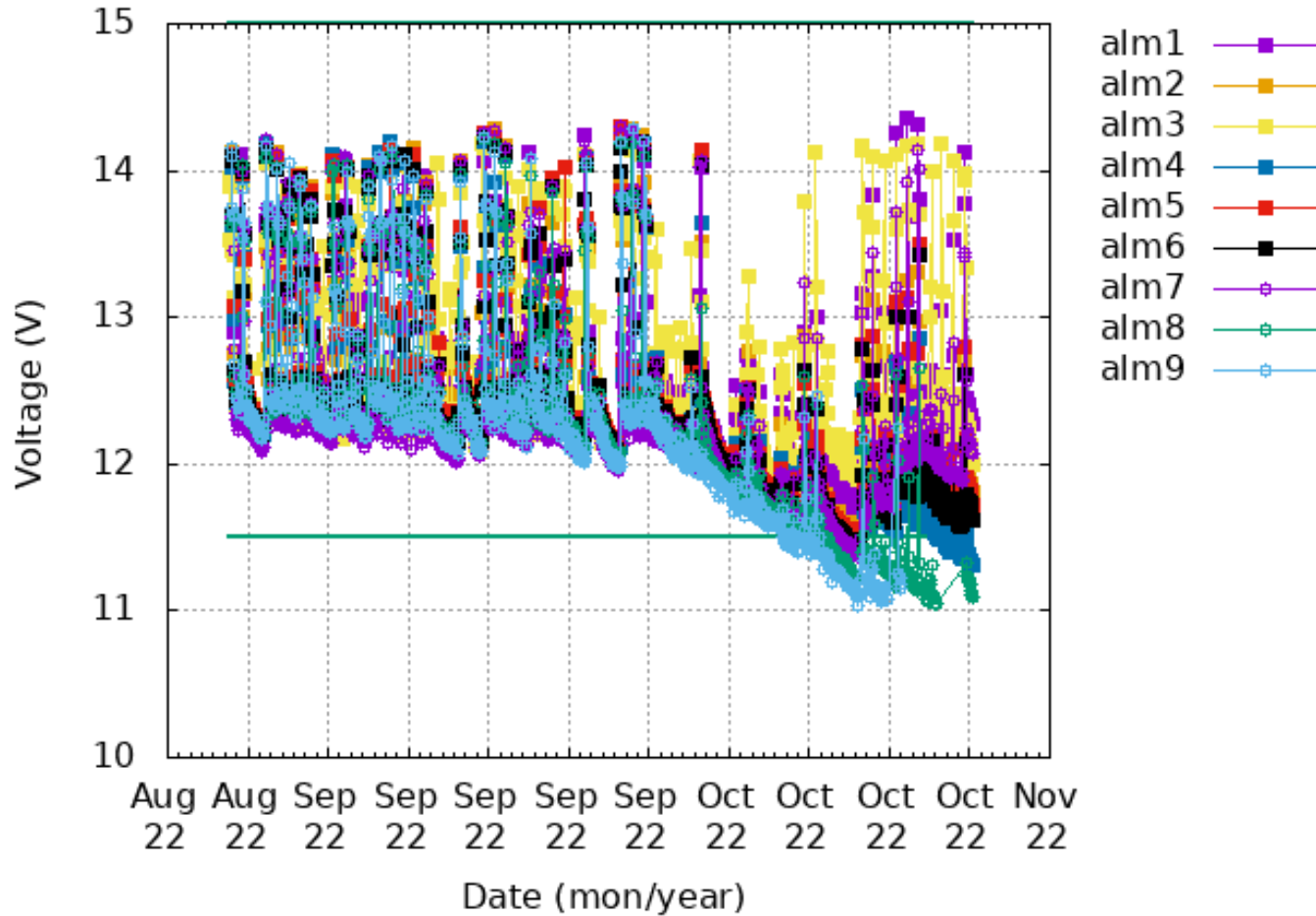
# GNSS uppsetningar



# GNSS rekstur og rafgeymaspenna

Rafgeymaspenna er lesin af GSM módemi á tveggja tíma fresti

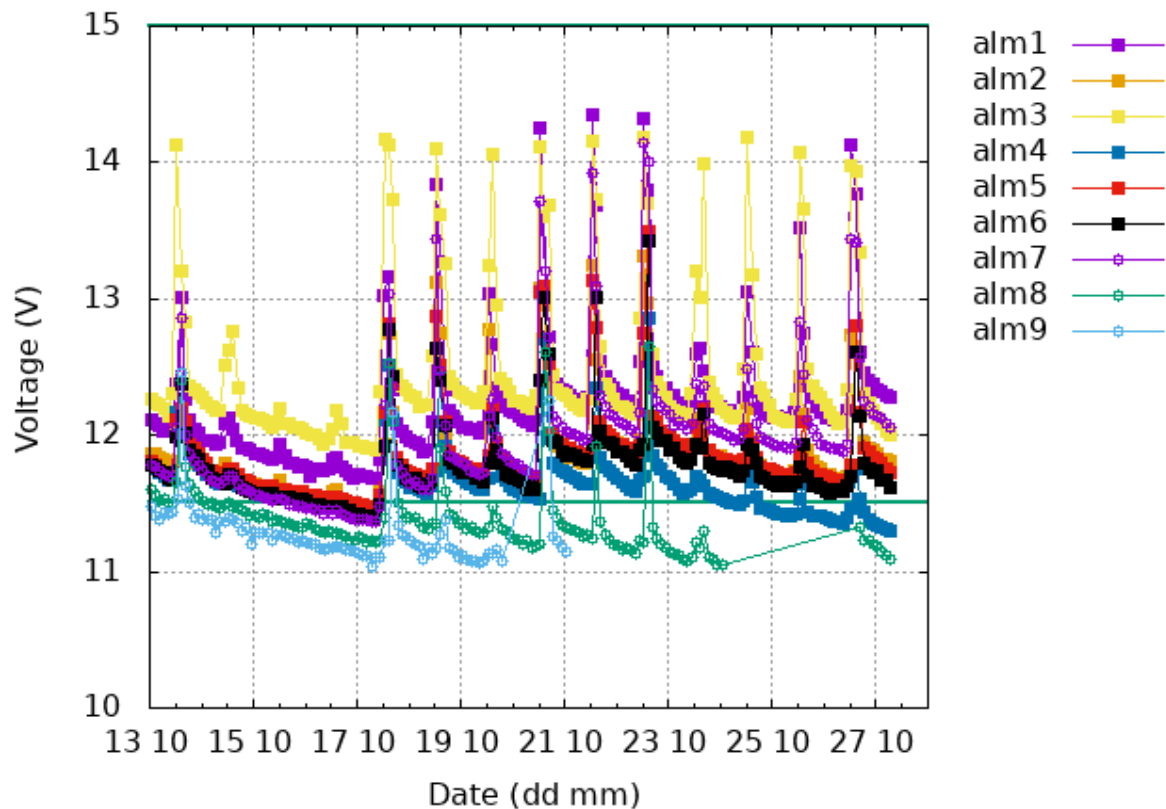
Voltage on HI sites since start of measurements



# GNSS rekstur og rafgeymaspenna

Rafgeymaspenna er lesin af GSM módemi á tveggja tíma fresti

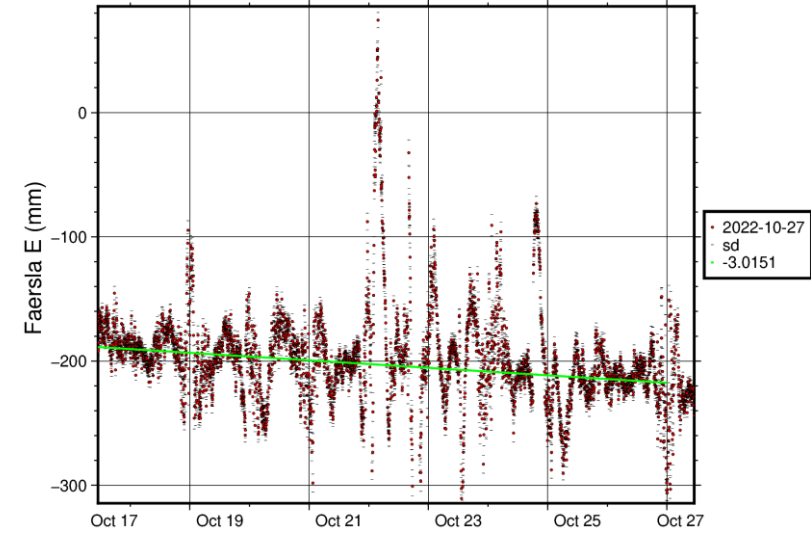
Voltage on HI sites last 2 weeks



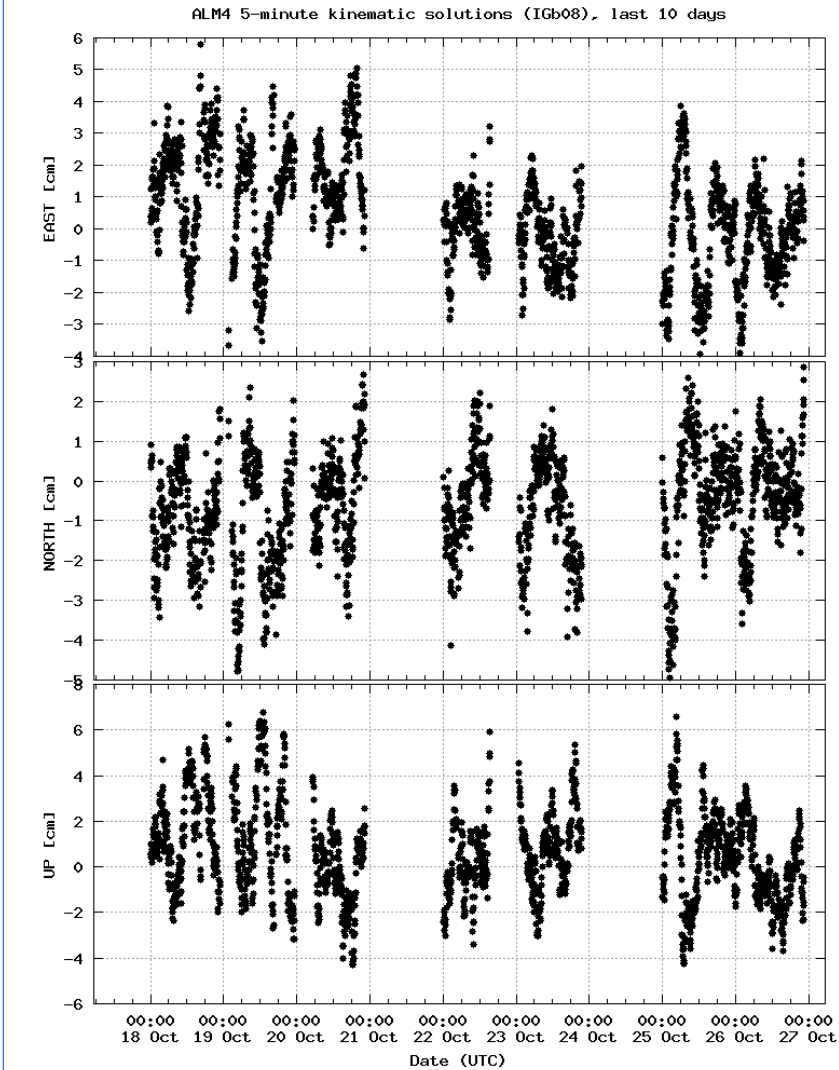
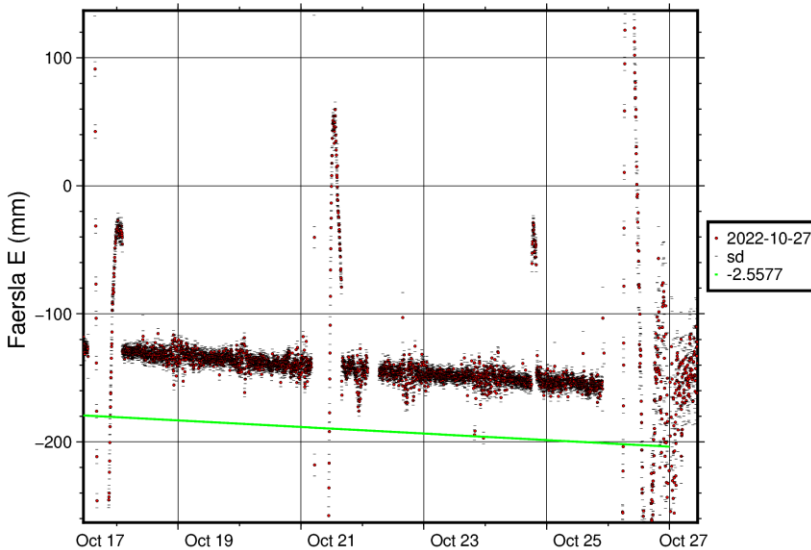
- Rafbúskapur ræðst af stærð sólarcellu og skuggum af fjallshlíðum
- Nyrstu stöðvarnar (ALM9, ALM8) eru í mesta skugga
- Vitað var að ein 100 W sólasella myndi ekki duga yfir háveturinn; áætlað að skipta um rafgeyma tvisvar til þrisvar yfir veturinn



# Úrvinnsla gagna: rauntímaúrvinnsla og eftiráúrvinnsla

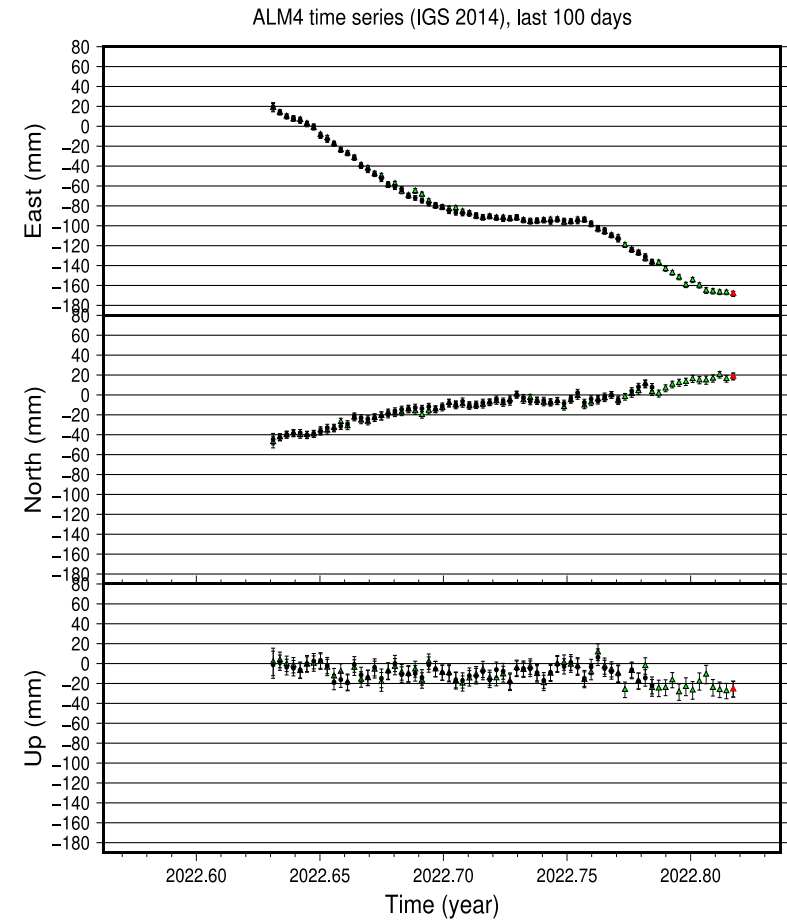


ALM4 med SIFJ sem vidmid  
 Rauntímaúrvinnsla, RTKLIB  
 5-mínútna mæligildi/taftími  
 Mismundandi viðmiðunarstöðvar



Created at UI by HG at 27/10/22 05:24 GMT

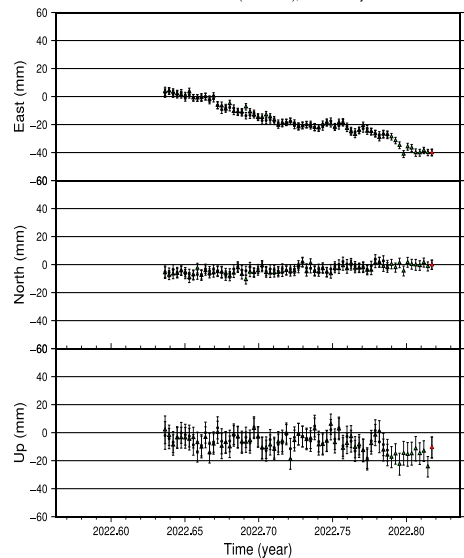
Nær-rauntíma úrvinnsla, GIPSY/OASIS II  
 5-mínútna mæligildi/ 2-4 klst taftími  
 Engin viðmiðunarstöð ("PPP")



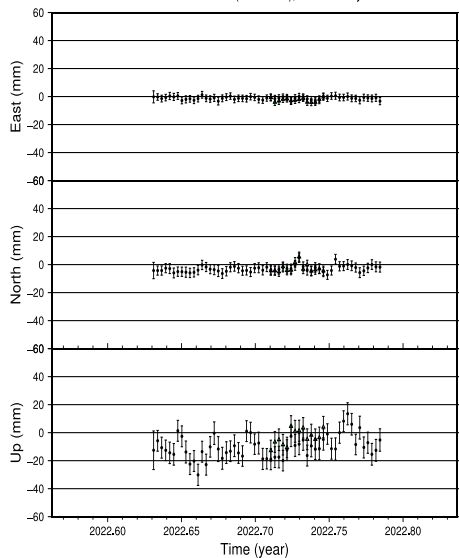
Úrvinnsla úr 24 klst gögnum  
 GIPSY/OASIS II  
 ½ - 1 dags taftími  
 Bráðabirgða- og lokabrautir

# Fyrstu niðurstöður, tímaraðir síðan í ágúst 2022

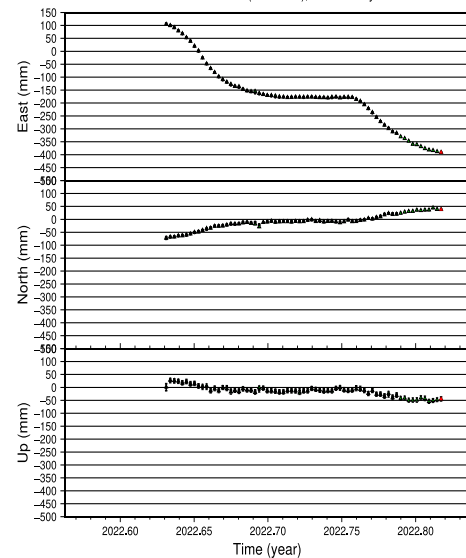
ALM1 time series (IGS 2014), last 100 days



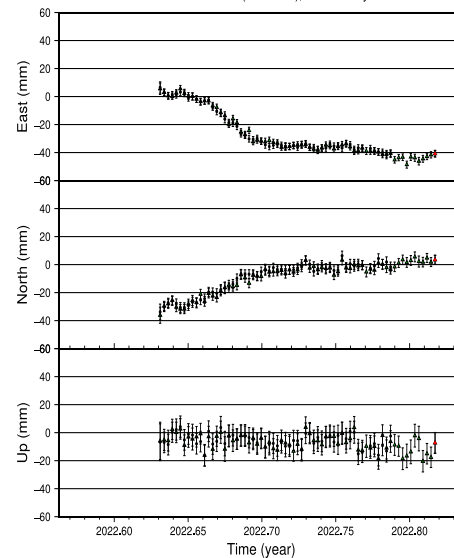
ALM3 time series (IGS 2014), last 100 days



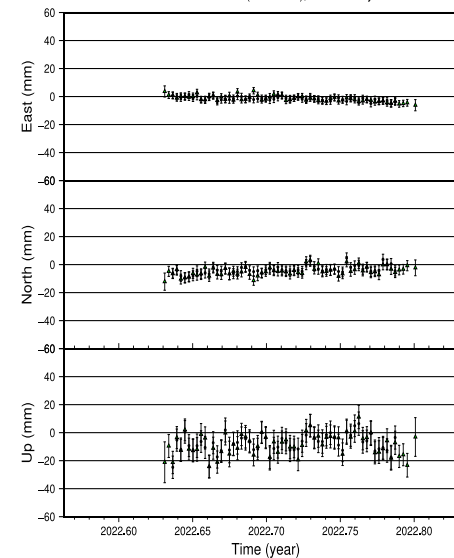
ALM5 time series (IGS 2014), last 100 days



ALM7 time series (IGS 2014), last 100 days



ALM9 time series (IGS 2014), last 100 days



GM 2022 Oct 27 05:46:42

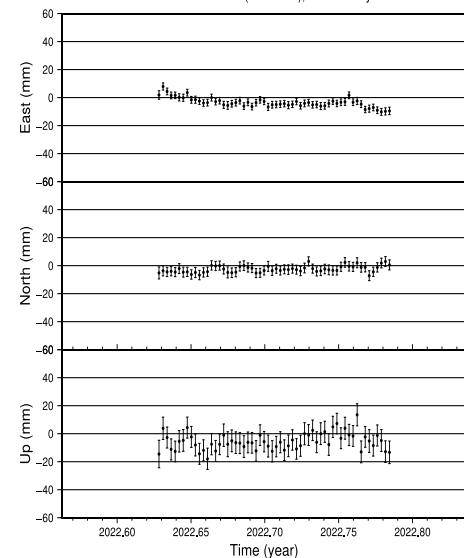
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GM 2022 Oct 27 05:47:47

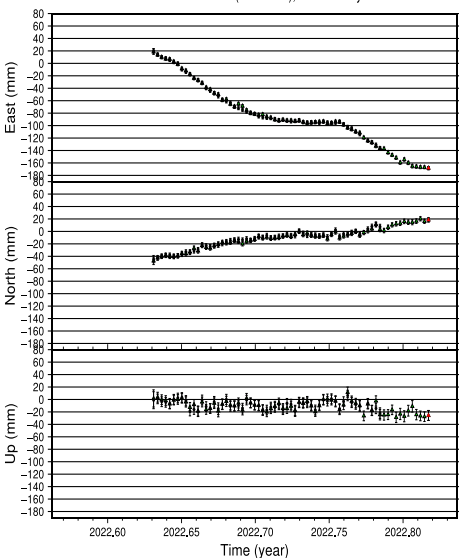
GM 2022 Oct 27 05:48:22

GM 2022 Oct 27 05:48:53

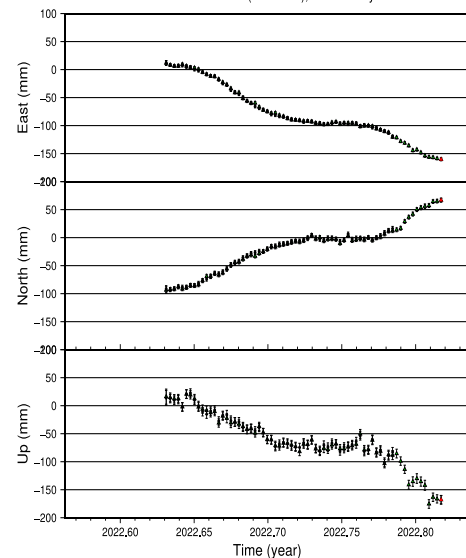
ALM2 time series (IGS 2014), last 100 days



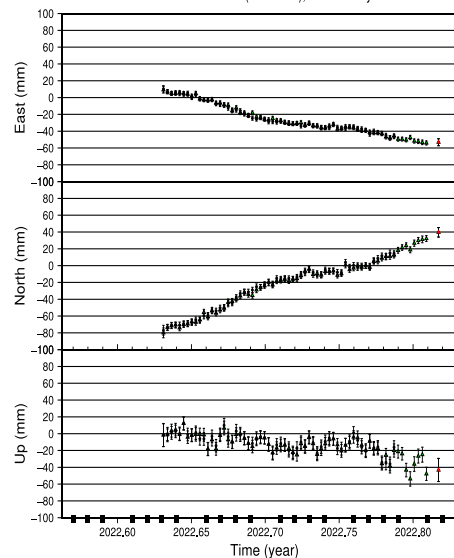
ALM4 time series (IGS 2014), last 100 days



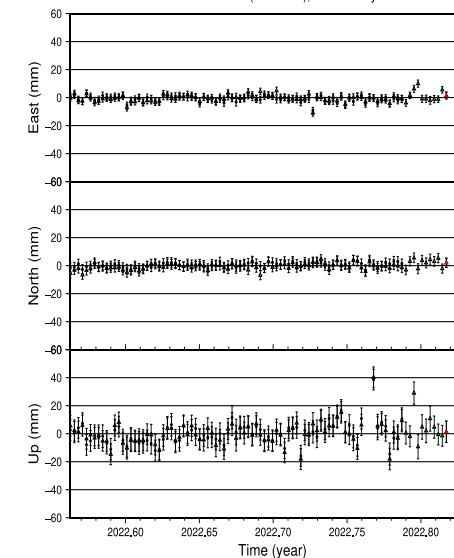
ALM6 time series (IGS 2014), last 100 days



ALM8 time series (IGS 2014), last 100 days



SIFJ time series (IGS 2014), last 100 days



GM 2022 Oct 27 05:47:01

GM 2022 Oct 27 05:47:32

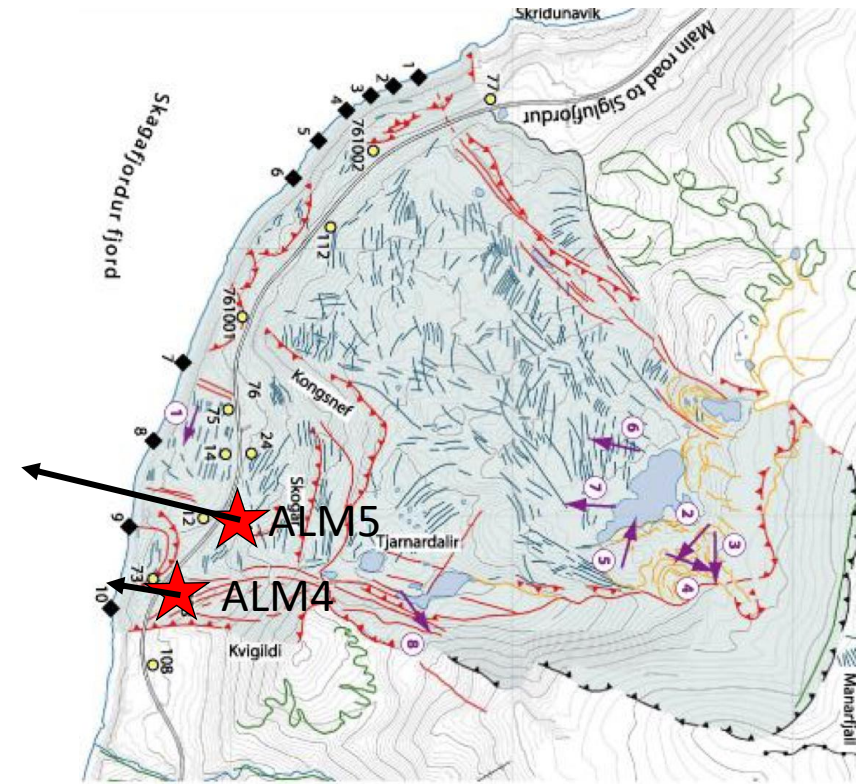
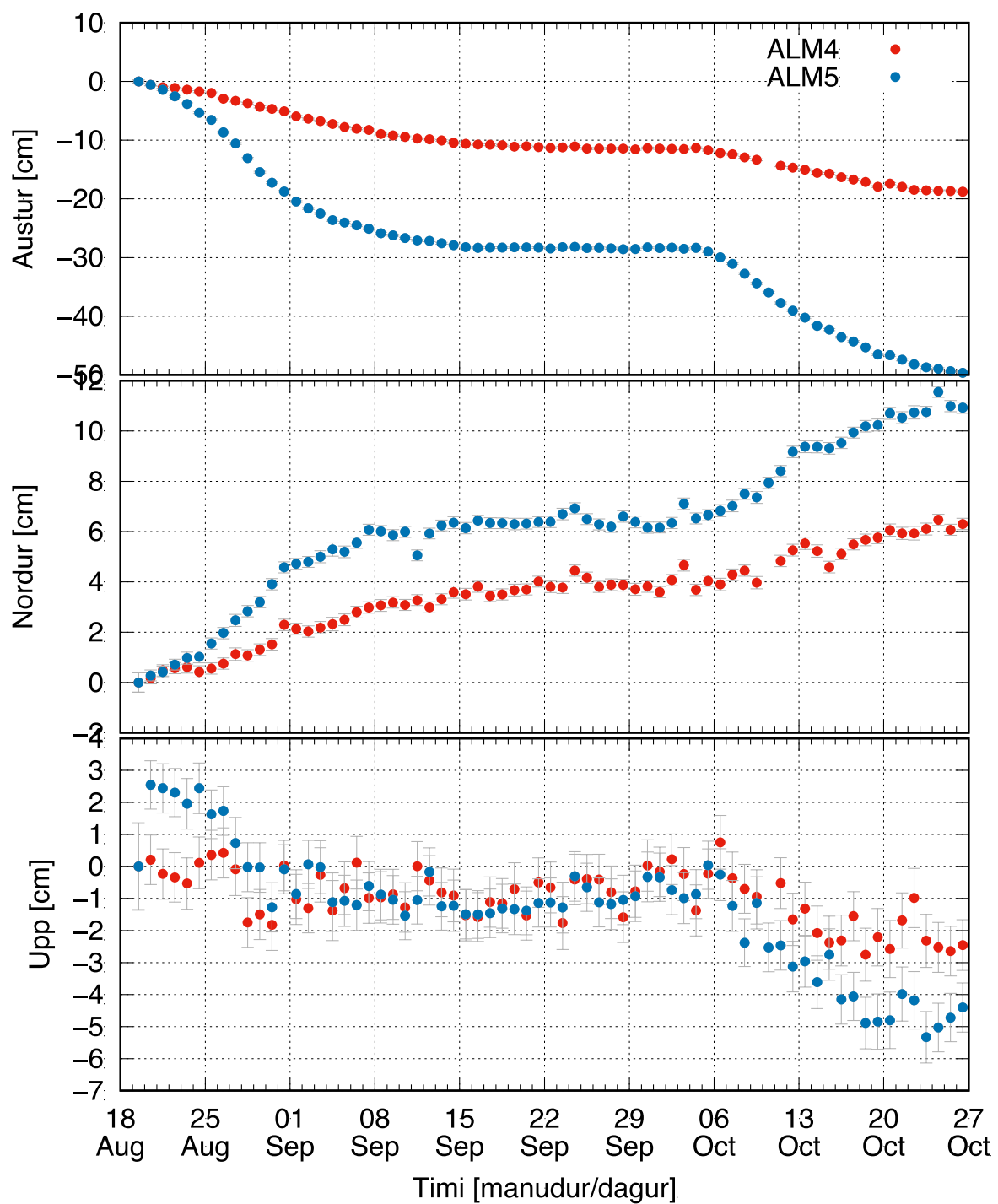
GM 2022 Oct 27 05:48:03

GM 2022 Oct 27 05:48:51

GM 2022 Oct 27 05:49:30

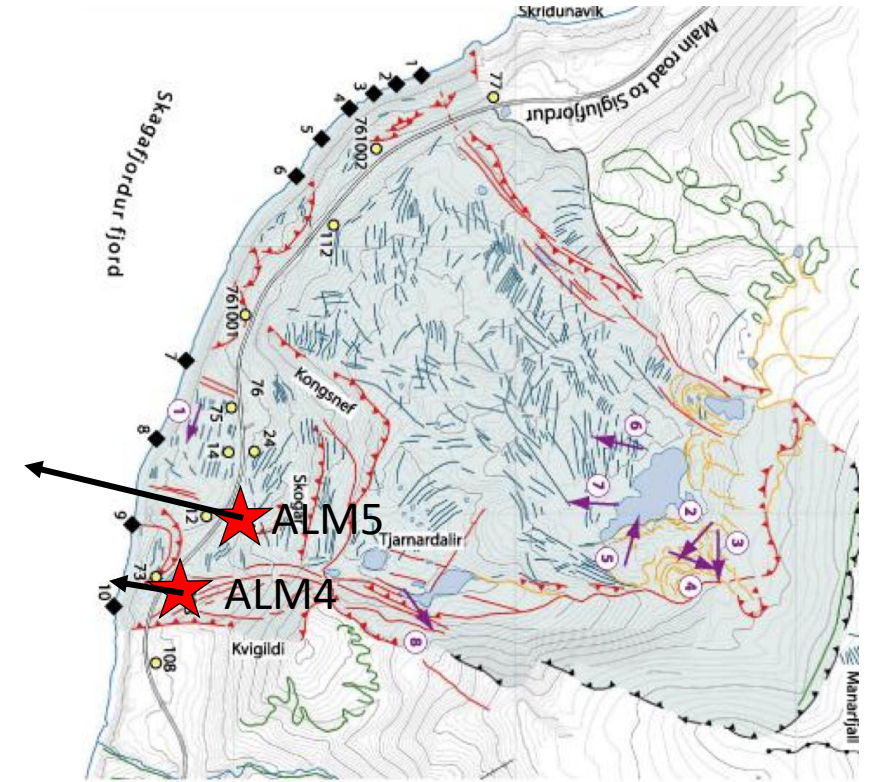
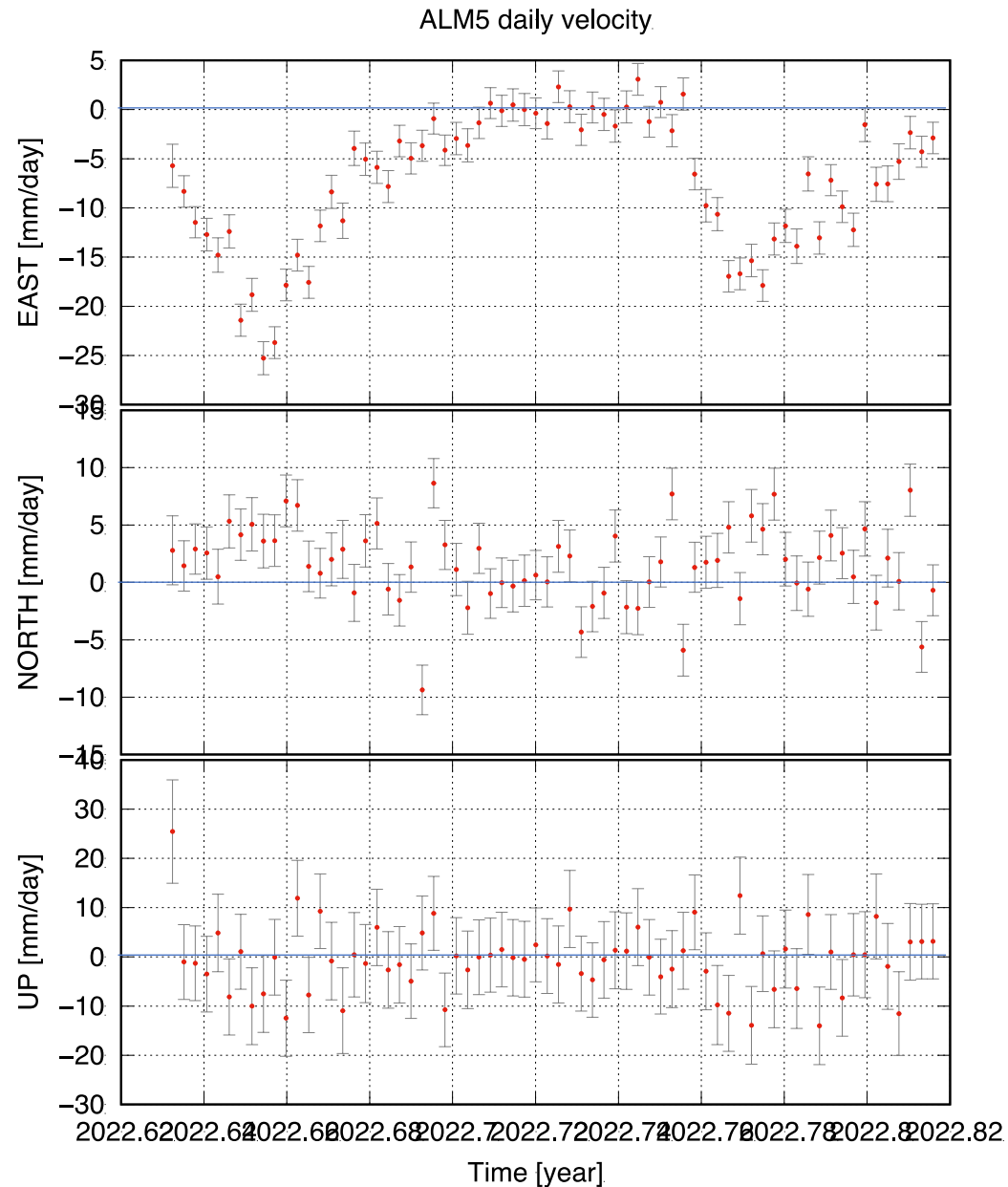
→ Í samræmi við fyrri GPS mælingar: mestar hreyfingar við Tjarnardali

# Tjarnardalir: færslur



- Færslur verða á afmörkuðum tímabilum
- Tvö færslutímabil
- 18. ágúst – 15. september
- 5. október – amk núna !

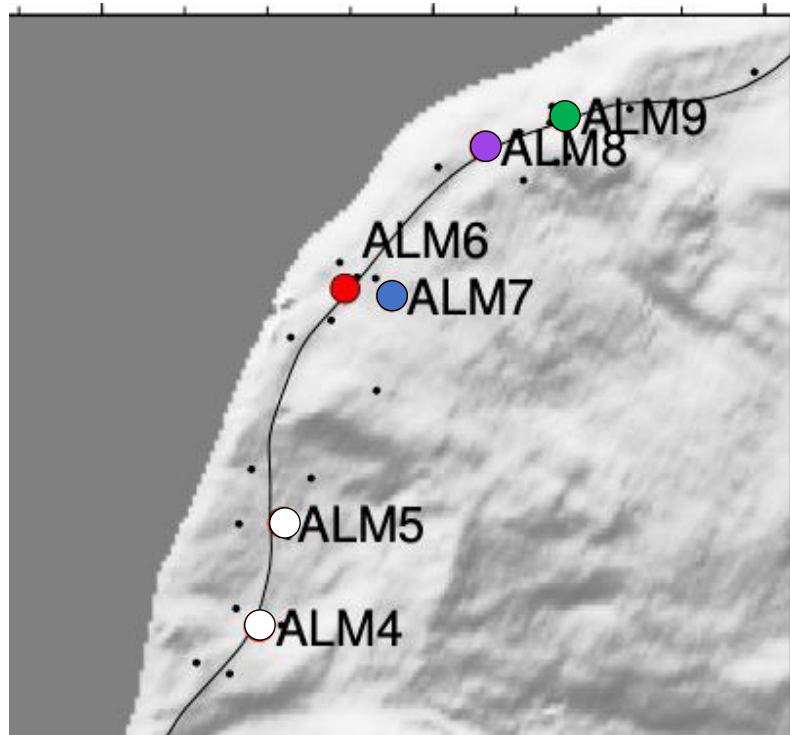
# Tjarnardalur: færsluhraði



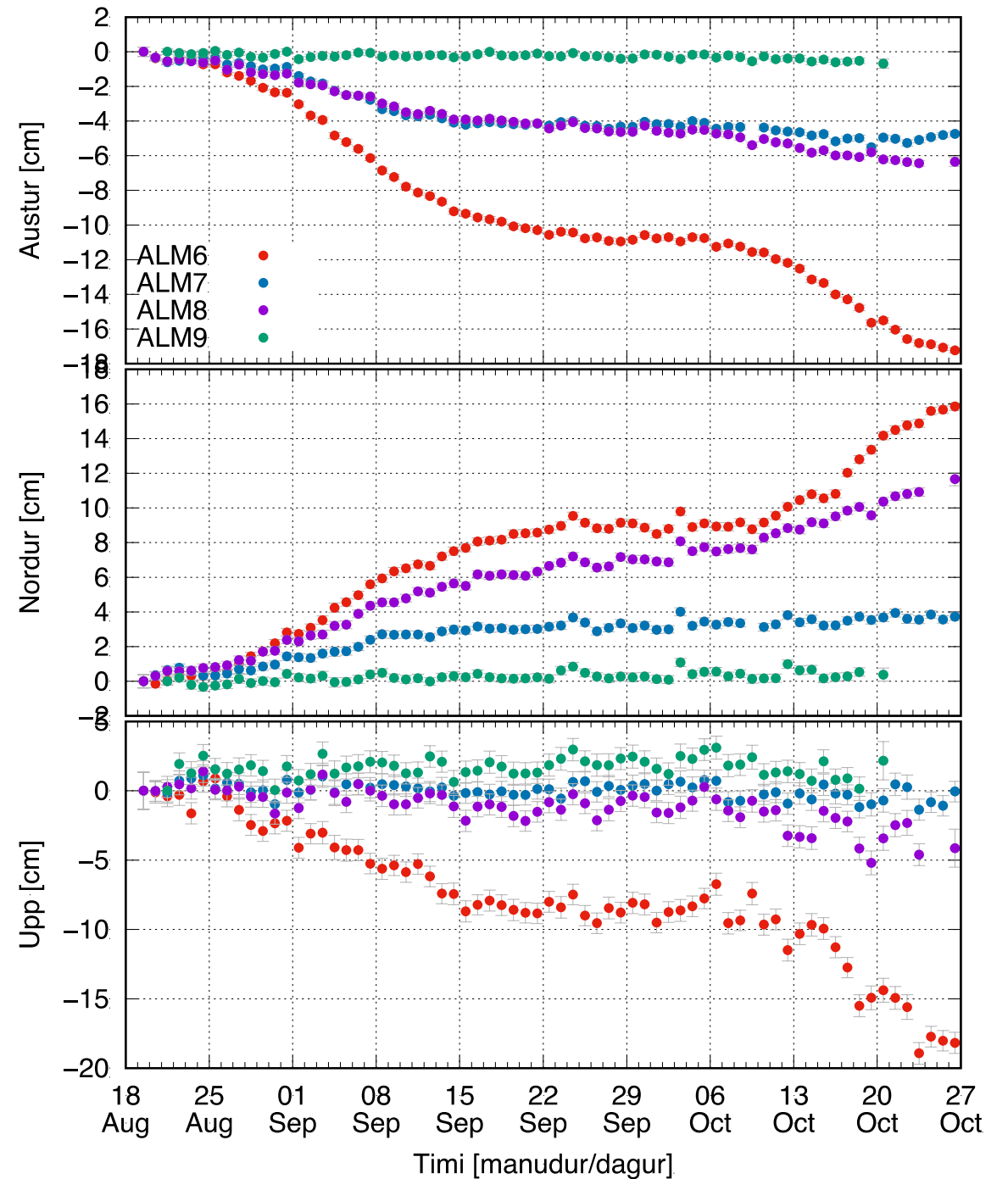
- Færslur verða á afmörkuðum tímabilum
- Tvö færslutímabil
- 18. ágúst – 15. september
- 5. október – amk núna !
- Mesti færsluhraði um 25 mm á dag



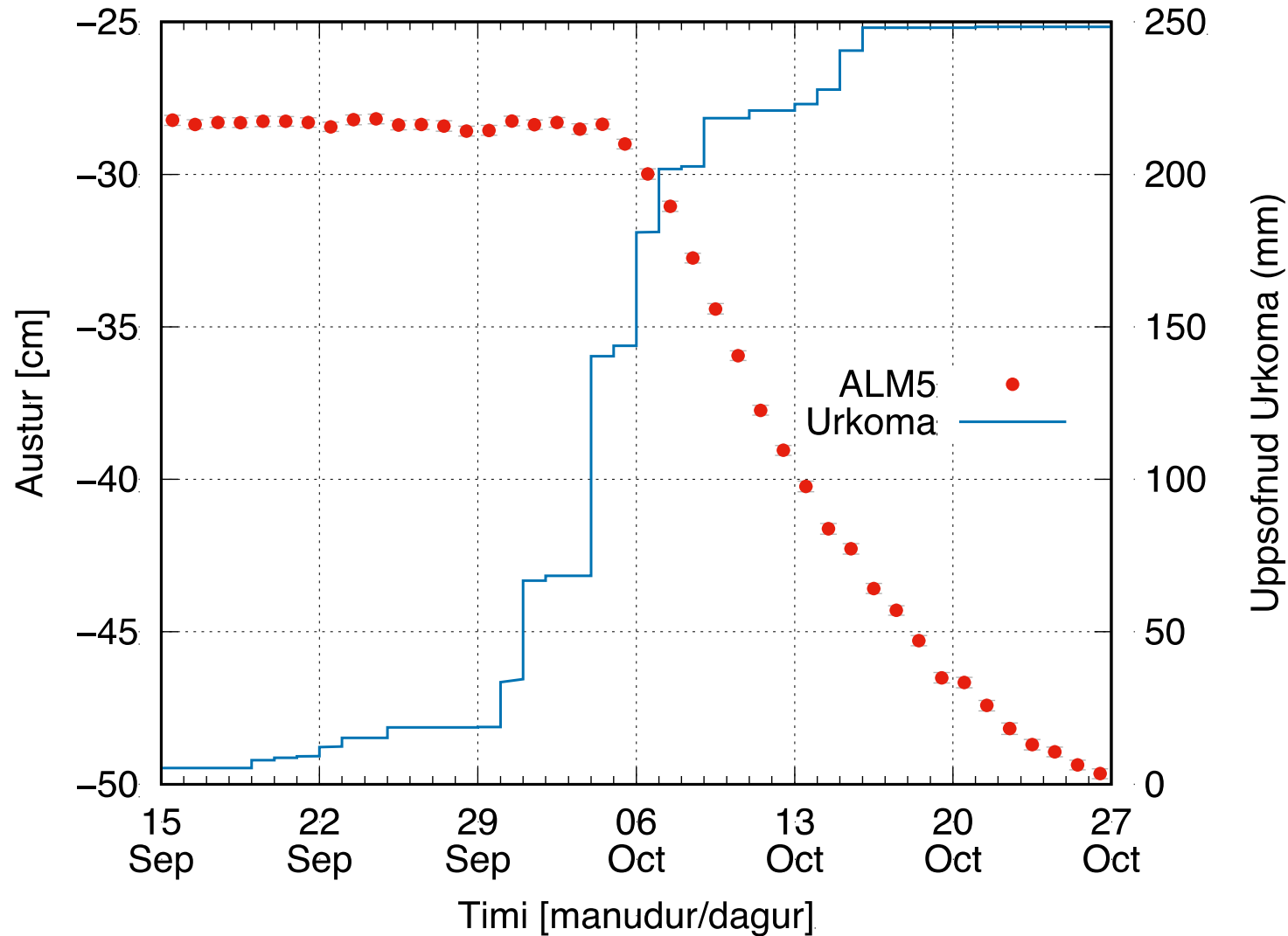
# Kónsnef – Almenningsnöf



- Töluvert mismunandi færslur milli nálægra stöðva
- ALM6 færir mest; mismunandi hlutfall láréttra og lóðréttra færslna
- ALM7 tekur lítinn þátt í “seinni” færslupúlvi í okt.



# Samanburður við úrkomumælingar



- Nýr úrkomumælir í Vegagerðarinnar í Almenningum
- Hreyfingar hefjast eftir að töluverð úrkoma hefur fallið.
- Úrkomuþröskuldur?
- Úrkomuákefð?

# Stjórnar vatnsþrýstingur við botn skriðhreyfingum? Og/eða heildarmassi berghlaupsins? Gætu berghlaupin skipt úr hægu skriði yfir í hrun?

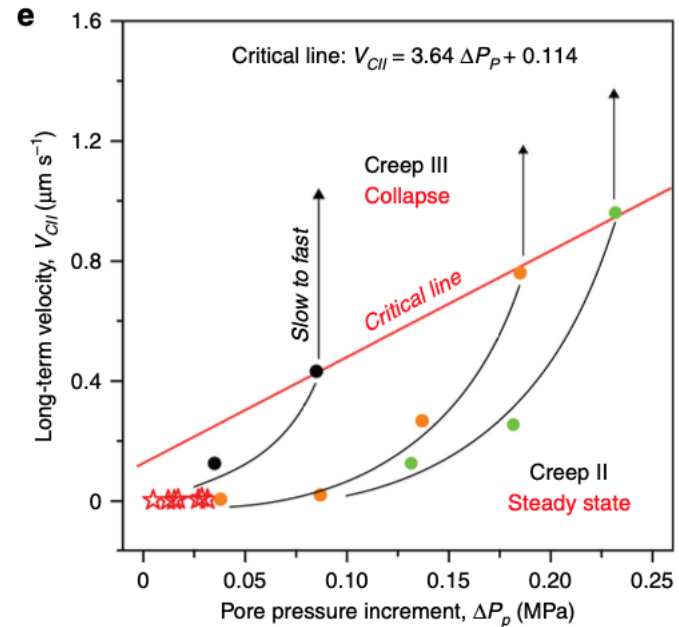
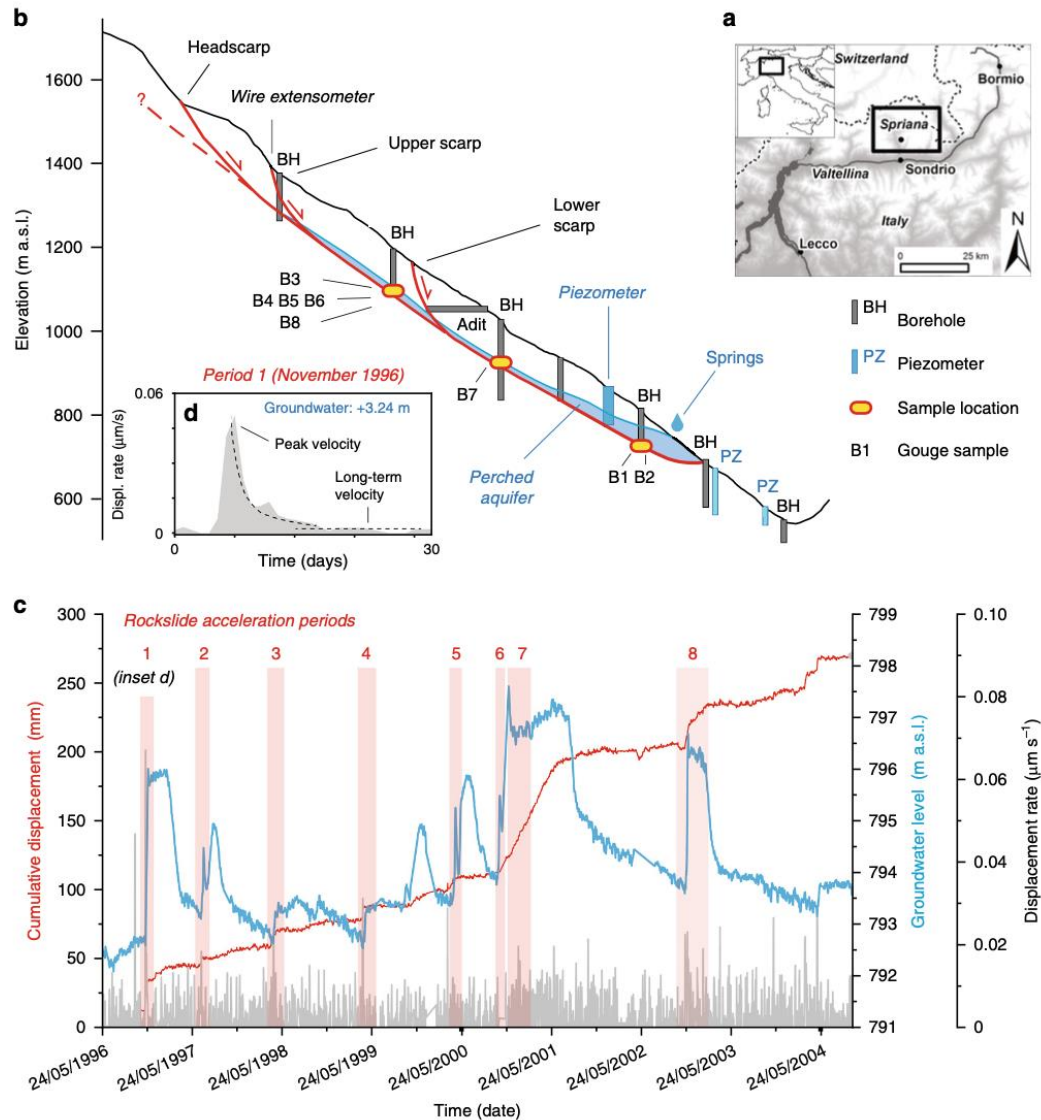
ARTICLE

<https://doi.org/10.1038/s41467-020-15093-3>

OPEN

Slow-to-fast transition of giant creeping rockslides modulated by undrained loading in basal shear zones

Federico Agliardi<sup>1</sup>, Marco M. Scuderi<sup>2</sup>, Nicoletta Fusi<sup>1</sup> & Cristiano Collettini<sup>2,3</sup>



**Fig. 1** Spriana rockslide. **a** Location map; **b** geological and hydrogeological model, with basal shear zone sampling locations, sample numbers and I

# Samantekt

- 9 síritandi GNSS mælistöðvar komust í gagnið í Almenningum í ágúst 2022
- Þarf áframhaldandi þróun úrvinnslu svo að mælingarnar nýtist í vöktun
- Tveir skriðatburðir komnir (ág-sep og okt 2022)
- Skriðatburðirnir fara hægt af stað, herða á sér, og hætta svo smám saman. Koma í kjölfar úrkomutímabila
- Láréttar hreyfingar ráðandi



Takk fyrir !