

Icelandic Met Office



When hurricanes make it to Iceland

Using ECMWF data to support impact based warnings at
IMO

Elín Björk Jónasdóttir, with contributions from Bolli Pálmason,
Halldór Björnsson and Matthew Roberts

Using ECMWF forecasts Meeting

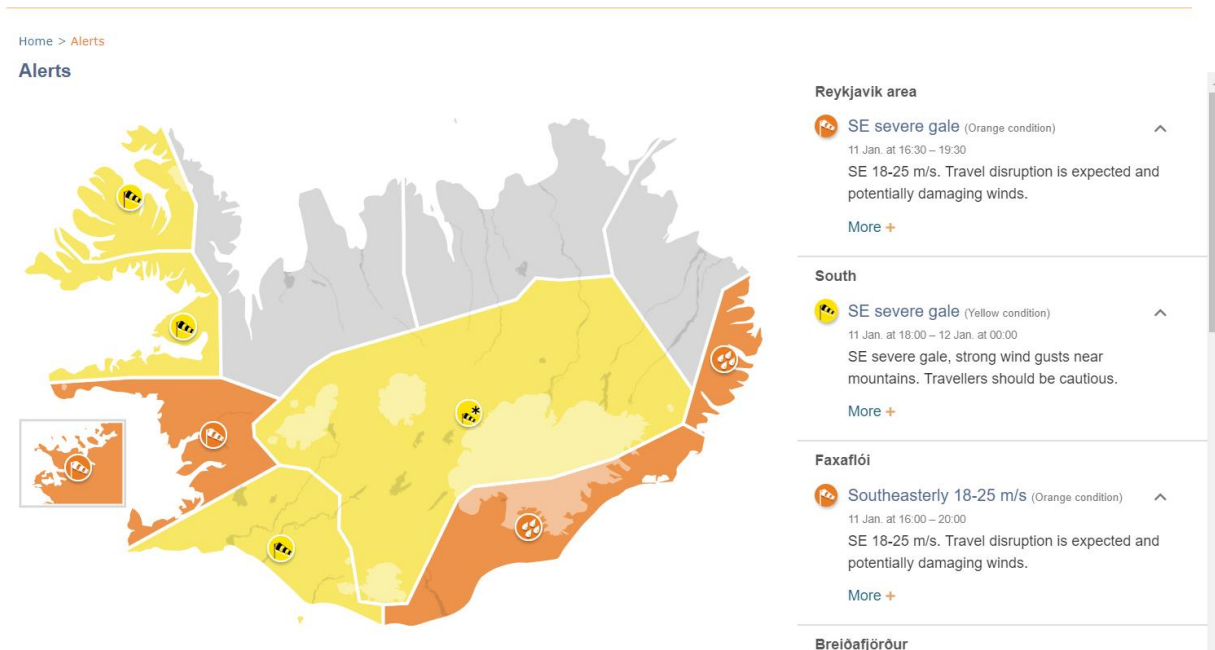
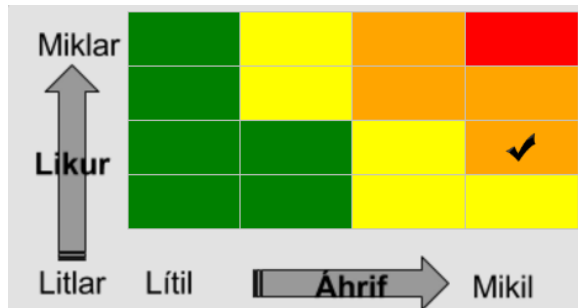
Reading, 4. to 8. June 2018

The Basics of IMO

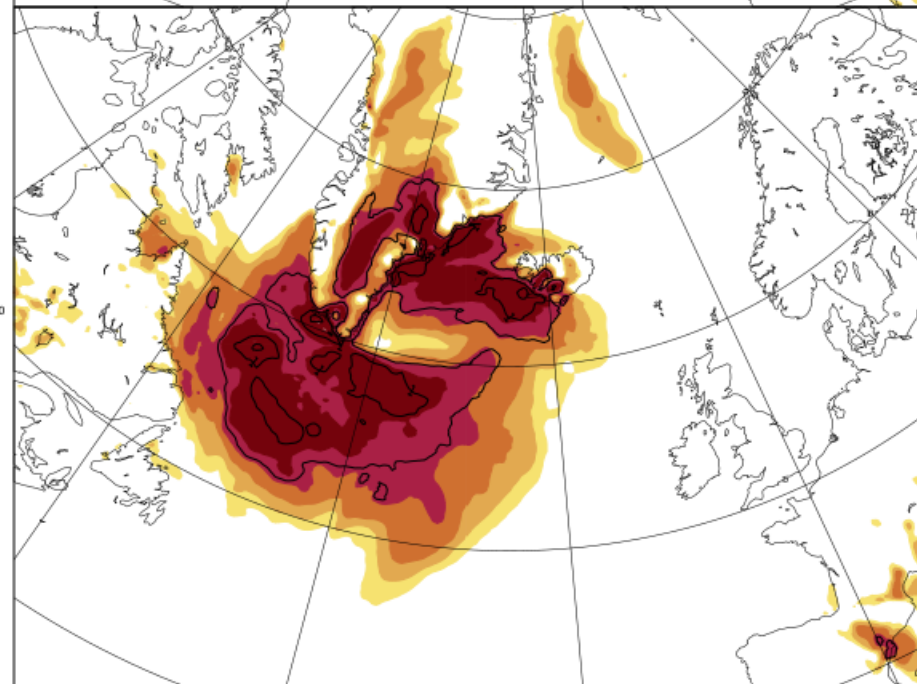
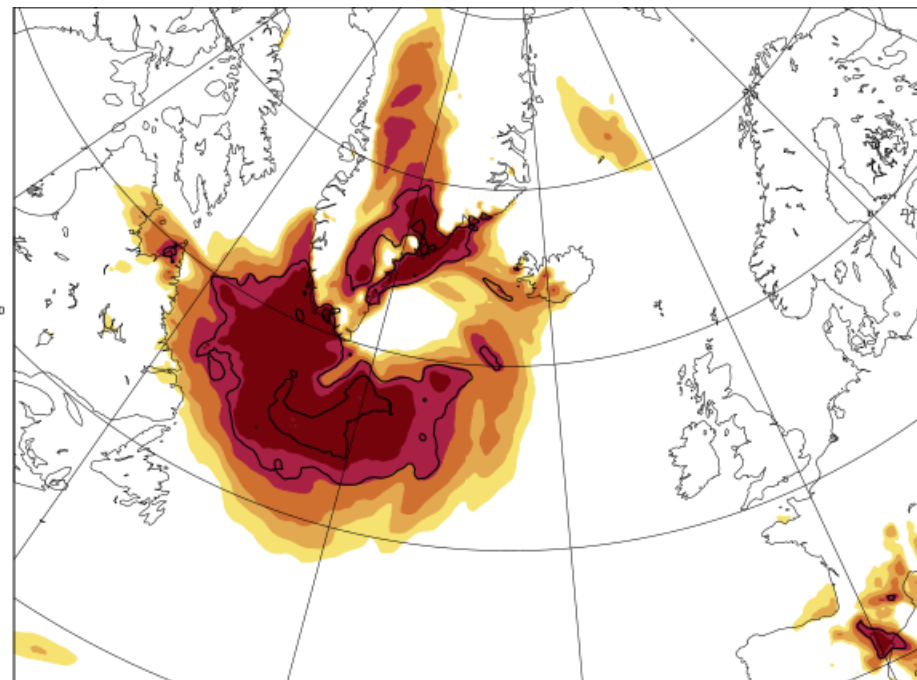
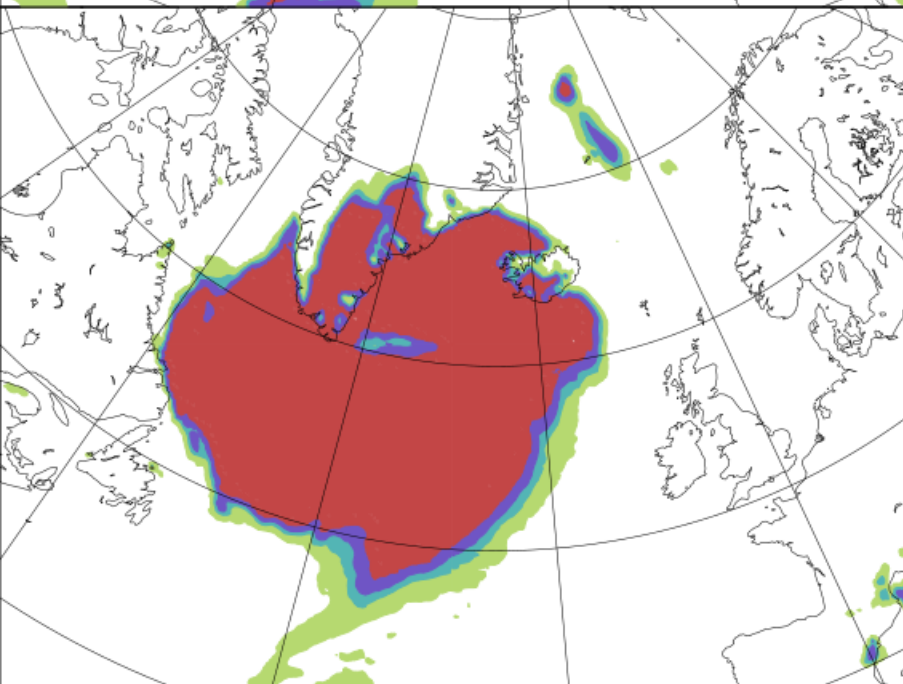
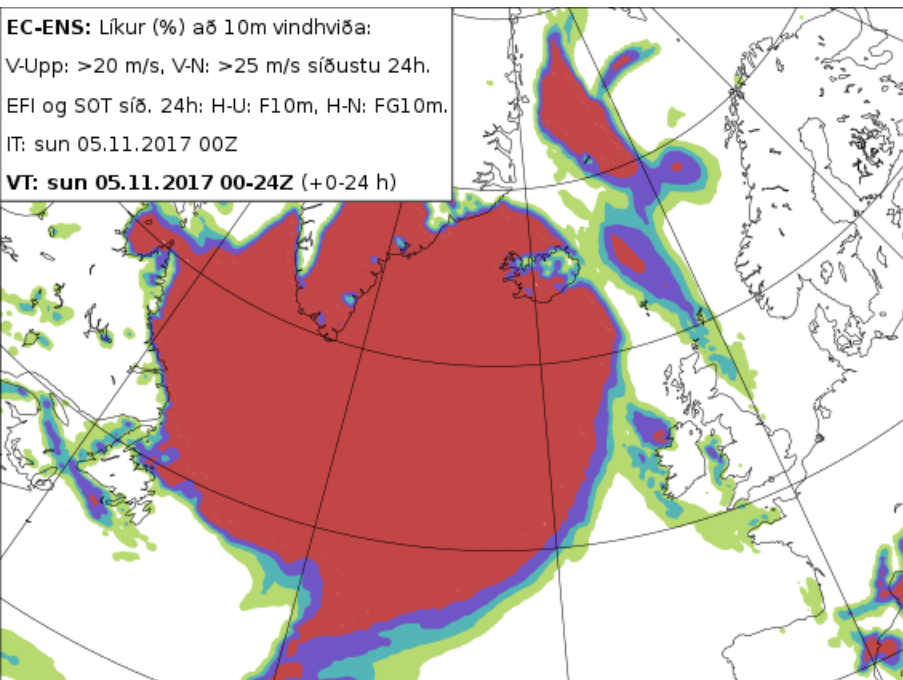
-
- **Icelandic Meteorological Office in Reykjavík, with an avalanche forecasting and research centre in Ísafjörður, NW Iceland**
 - **A multi-hazard monitoring and research institute, with meteorological, hydrological, vulcanological and geophysical monitoring 24/7**
 - **12 forecasters, 6 full time – all do aviation, marine, general forecasting and warnings**
 - **Population of ~380.000**
 - **Tourists ~2.000.000**

An impact based warning system

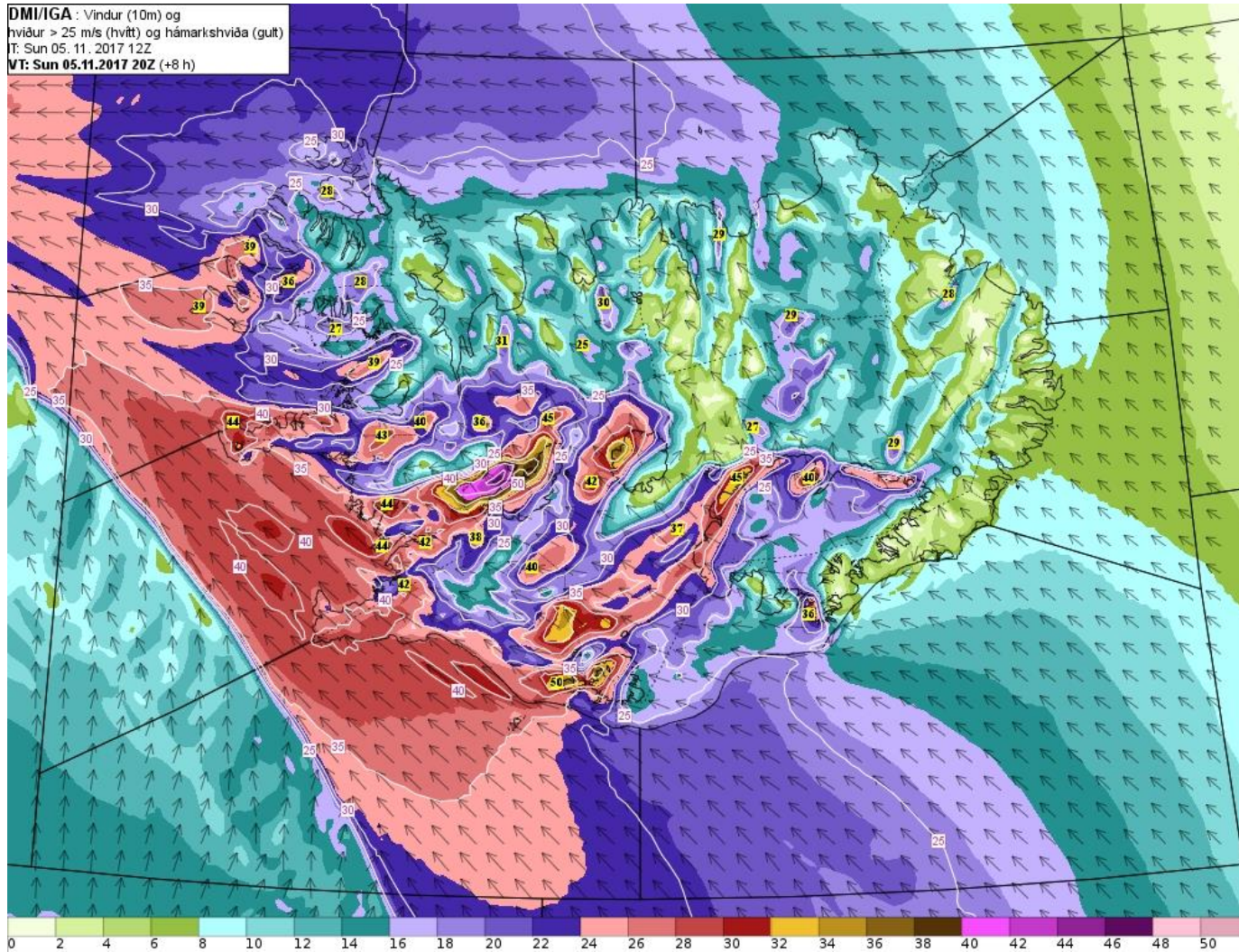
- Introduced to the public on 1. November 2017
- On the first day we issued yellow warnings for day 5



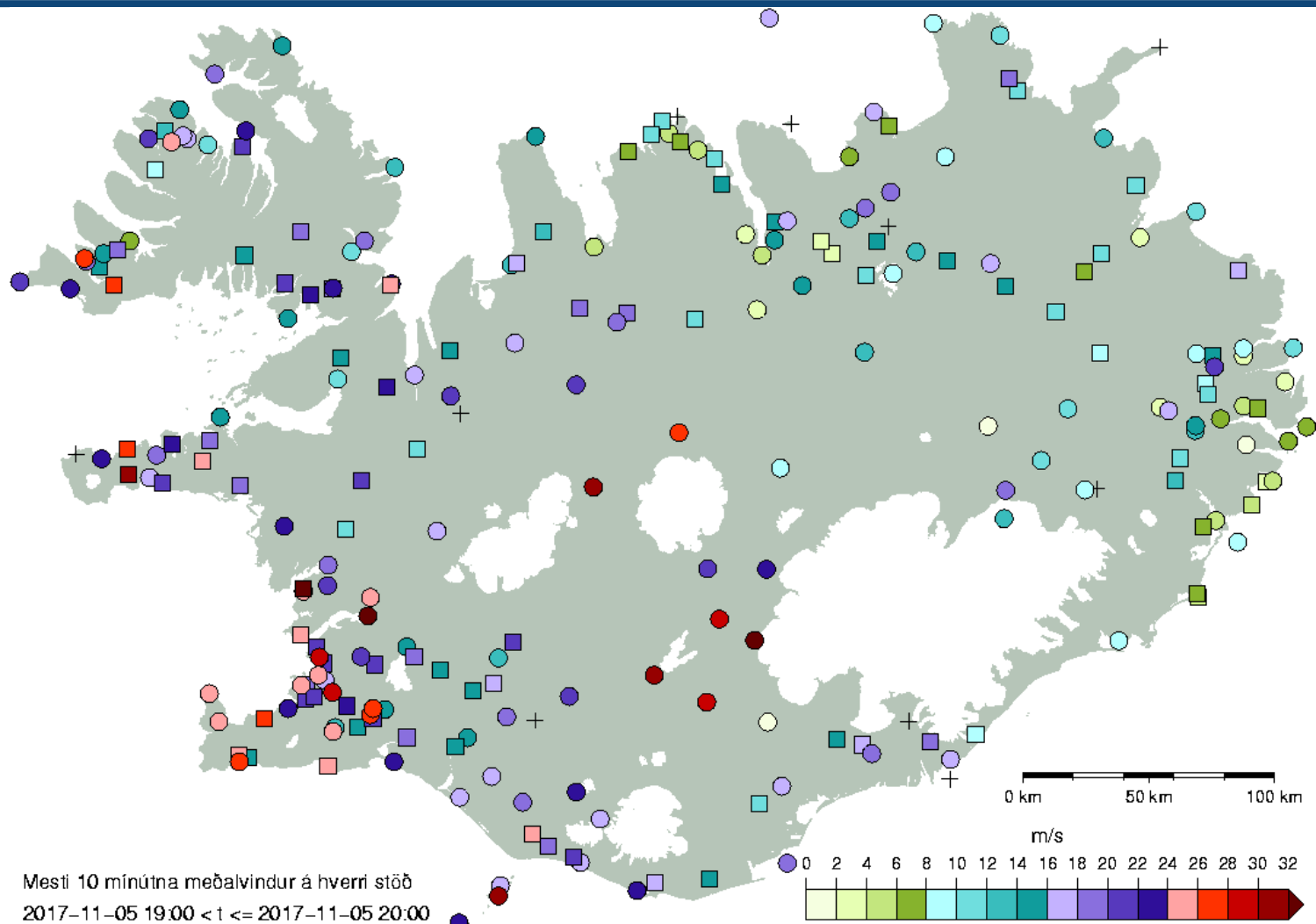
EC-ENS: Líkur (%) að 10m vindhviða:
V-Upp: >20 m/s, V-N: >25 m/s síðustu 24h.
EFI og SOT síð. 24h: H-U: F10m, H-N: FG10m.
IT: sun 05.11.2017 00Z
VT: sun 05.11.2017 00-24Z (+0-24 h)



Wind forecast – 10 m winds



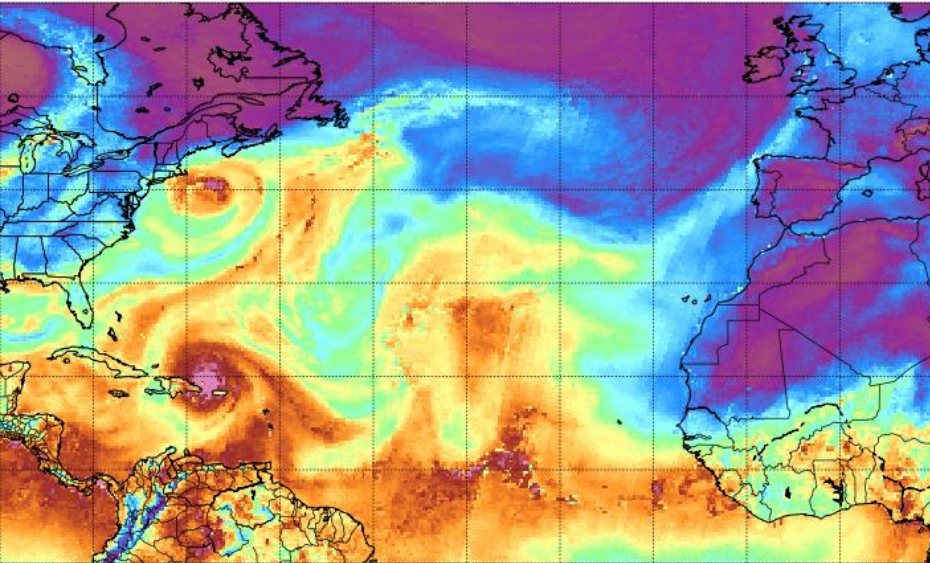
10 minute max winds



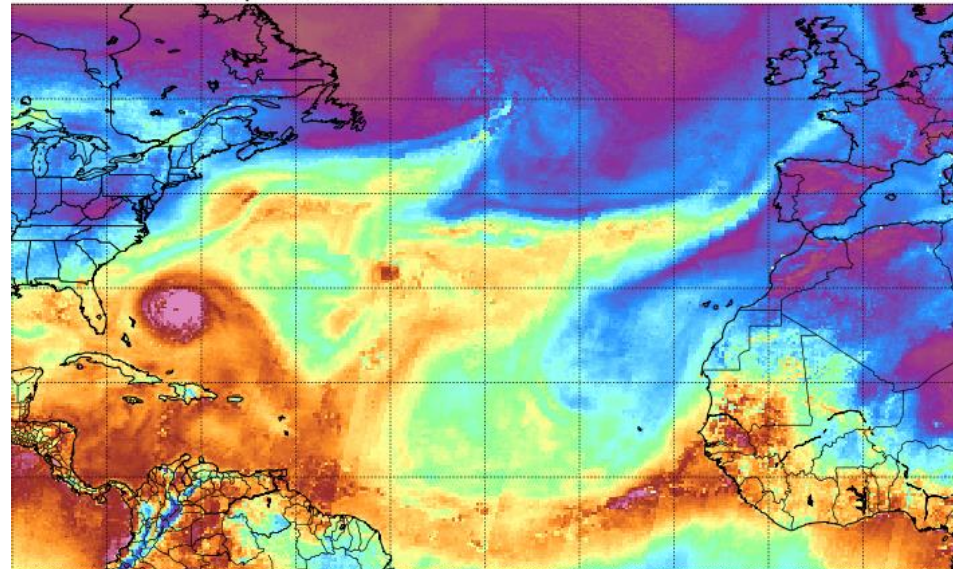
Impact based warnings

- **While in beta testing we had the most severe impact weather of the winter – affecting the impact assessment all winter long**
- **Flooding due to tropical moisture from Hurricanes Irma and Jose**

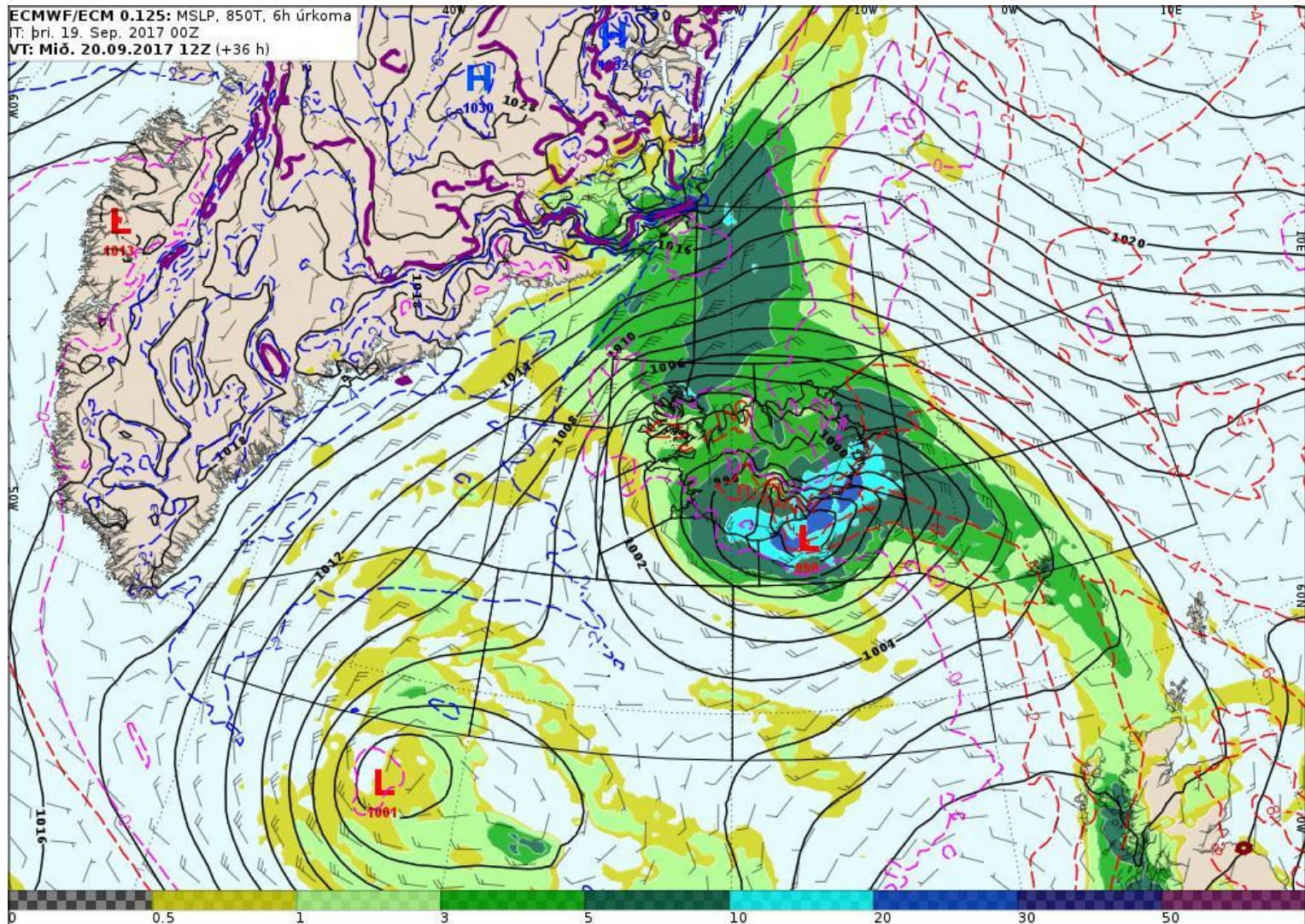
Total Precipitable Water 2017-09-21 0600 UTC



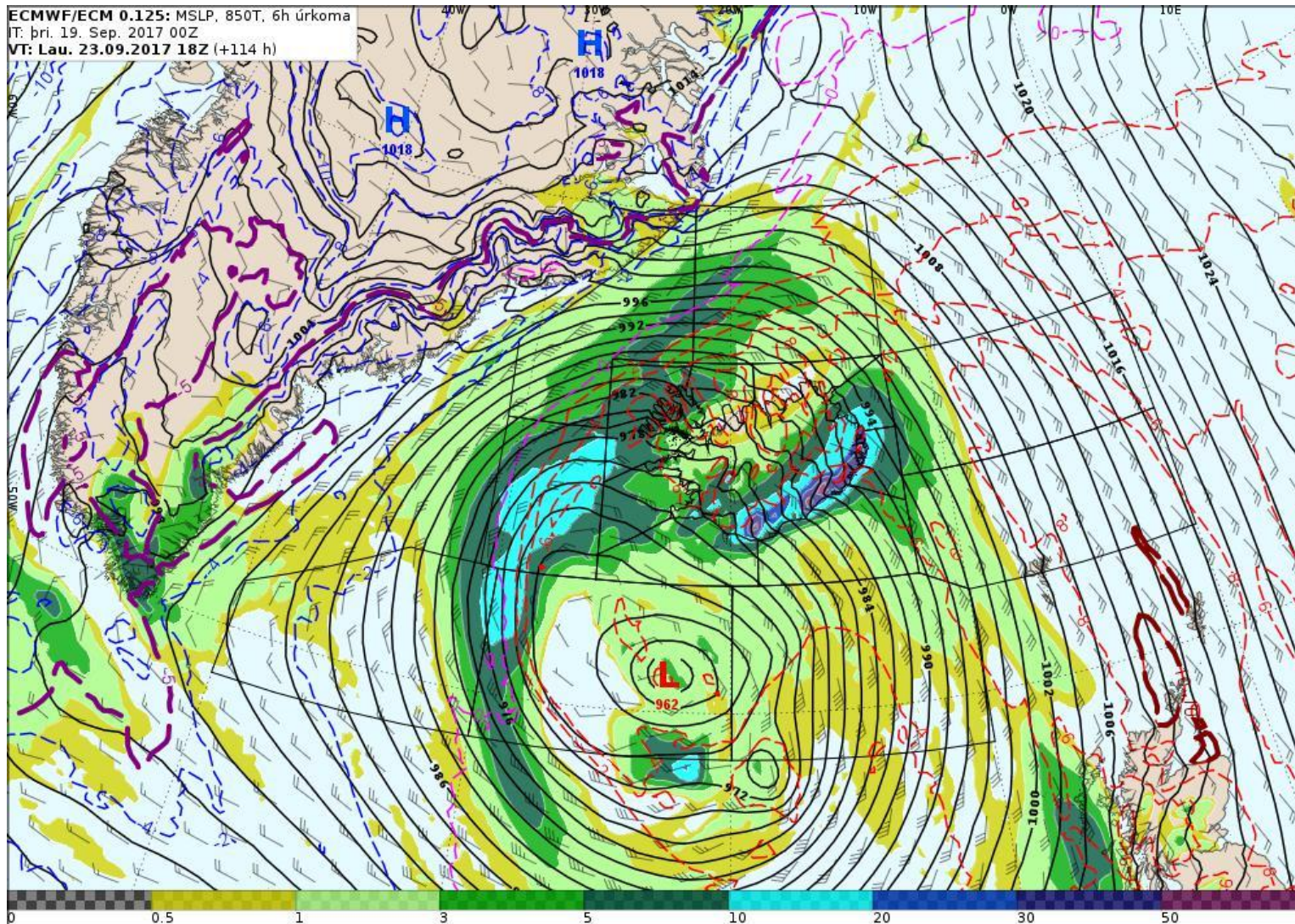
Total Precipitable Water 2017-09-24 0700 UTC



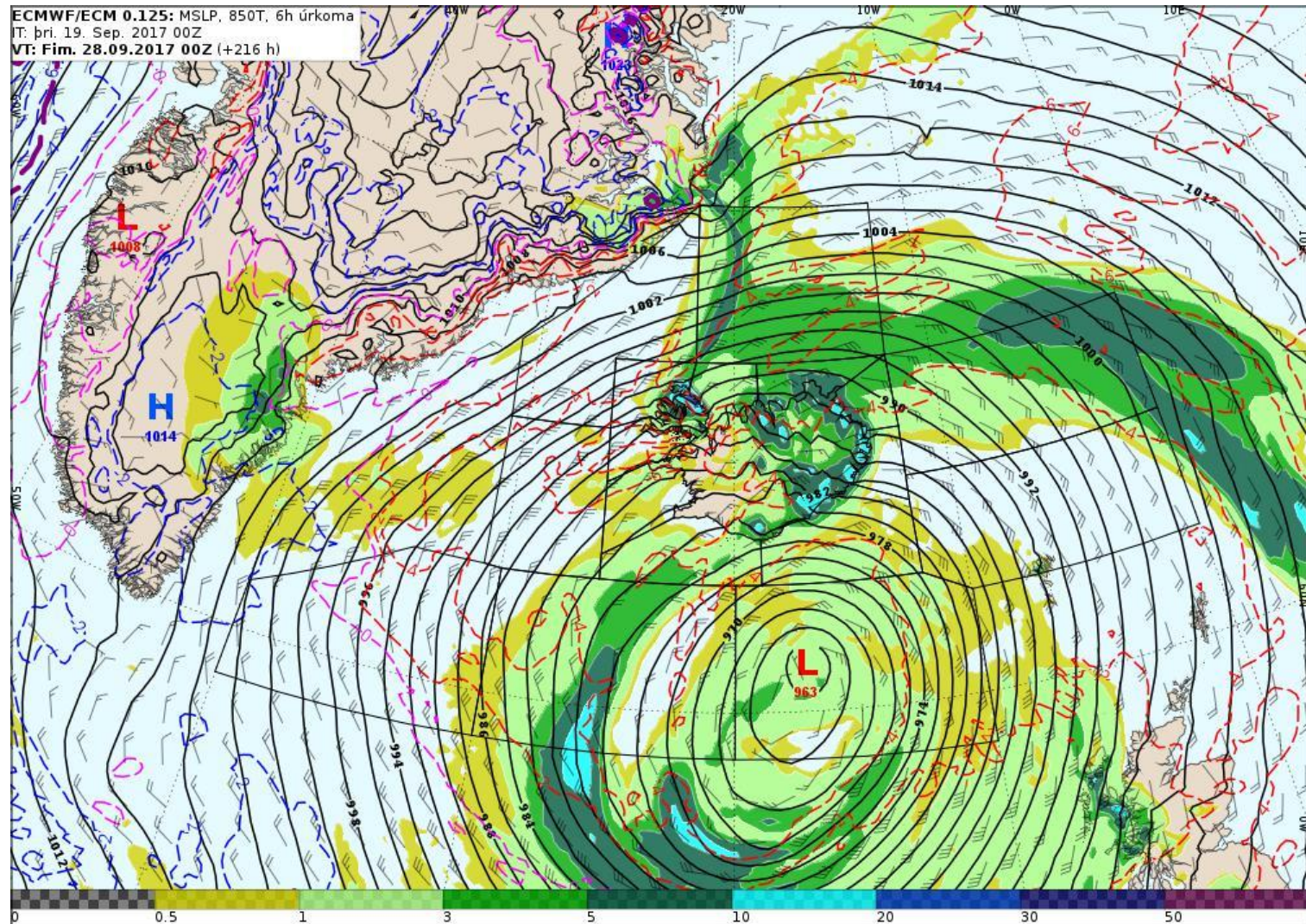
Forecast Tuesday 19 sept. 2017 + 36 h



Forecast Tuesday 19 sept. 2017 + 114 h



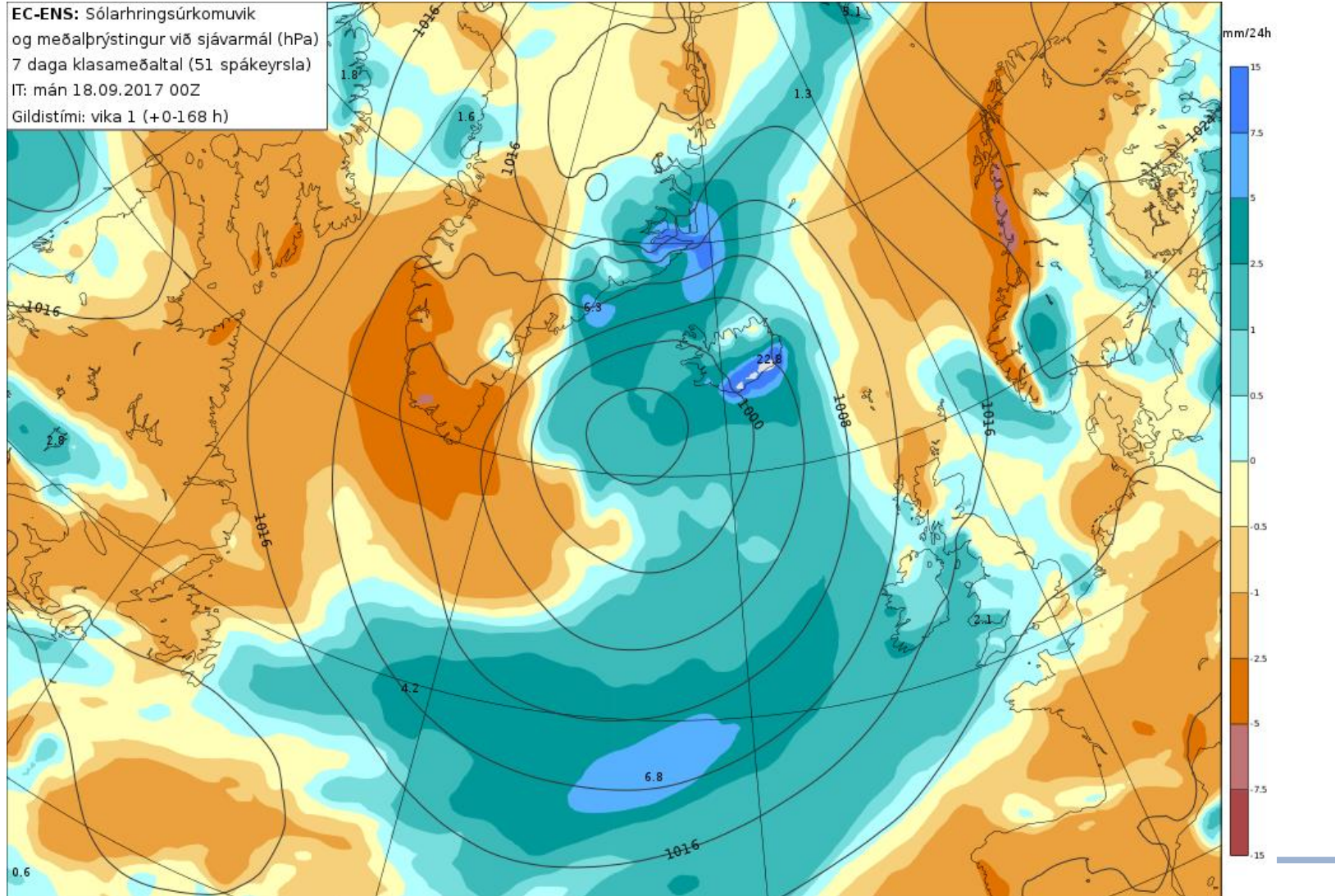
Forecast Tuesday 19 sept. 2017 + 216 h



24h precipitation anomalies

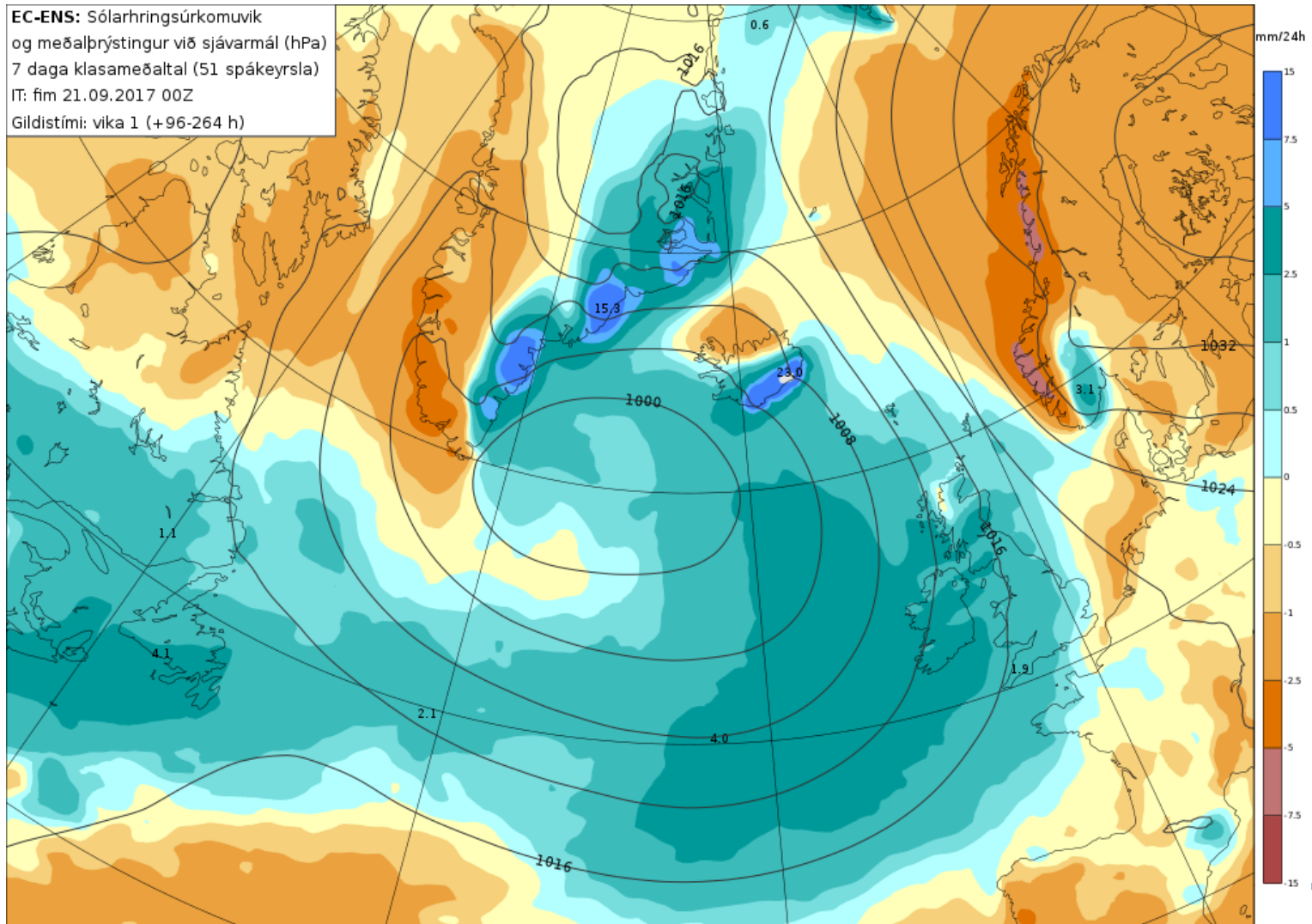
Monday 18th of September 2017

EC-ENS: Sólarhringsúrkomuvik og meðalþrýstingur við sjávarmál (hPa)
7 daga klasameðaltal (51 spákeysla)
IT: mán 18.09.2017 00Z
Gildistími: vika 1 (+0-168 h)

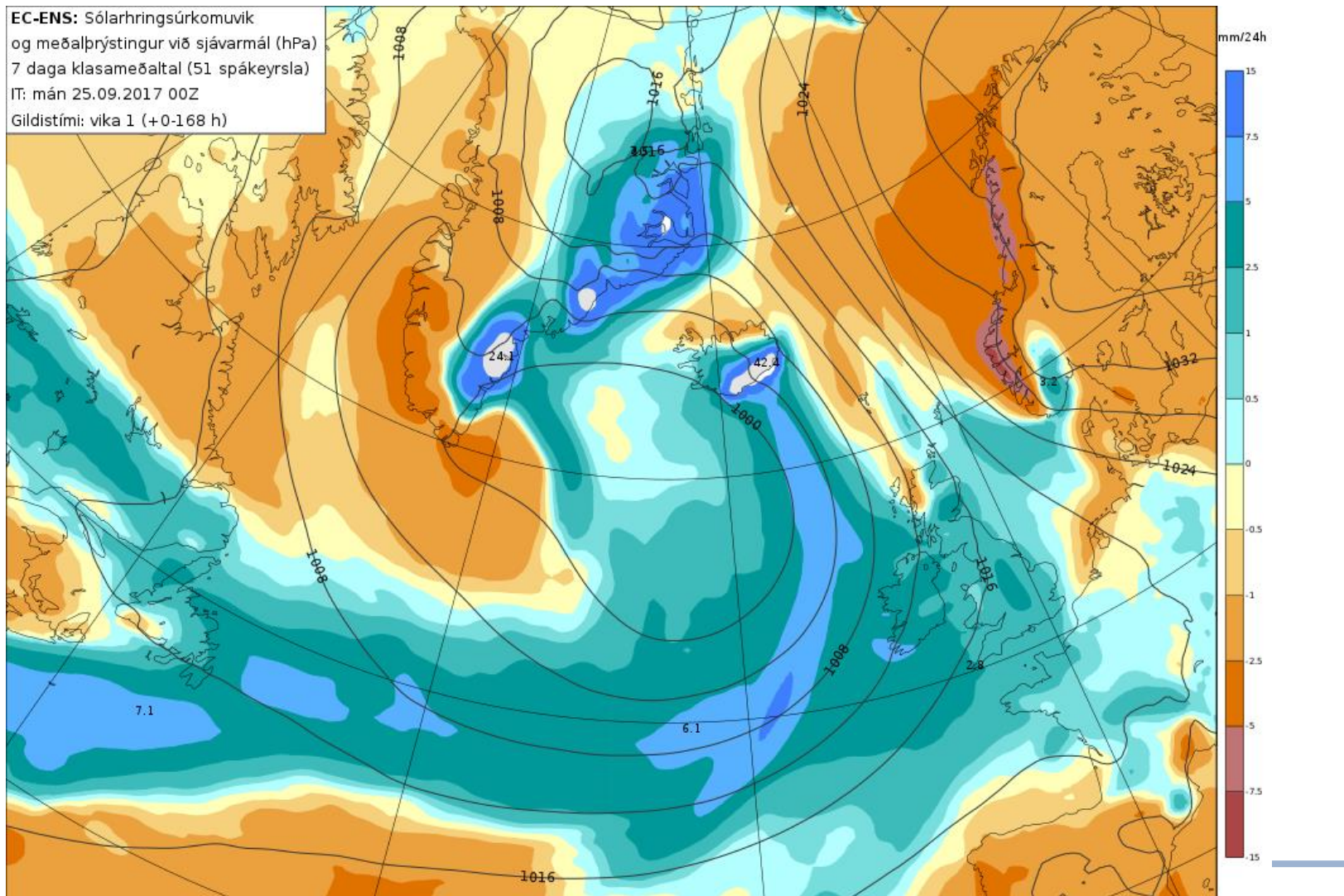


24h precipitation anomalies Thursday 21st of September 2017

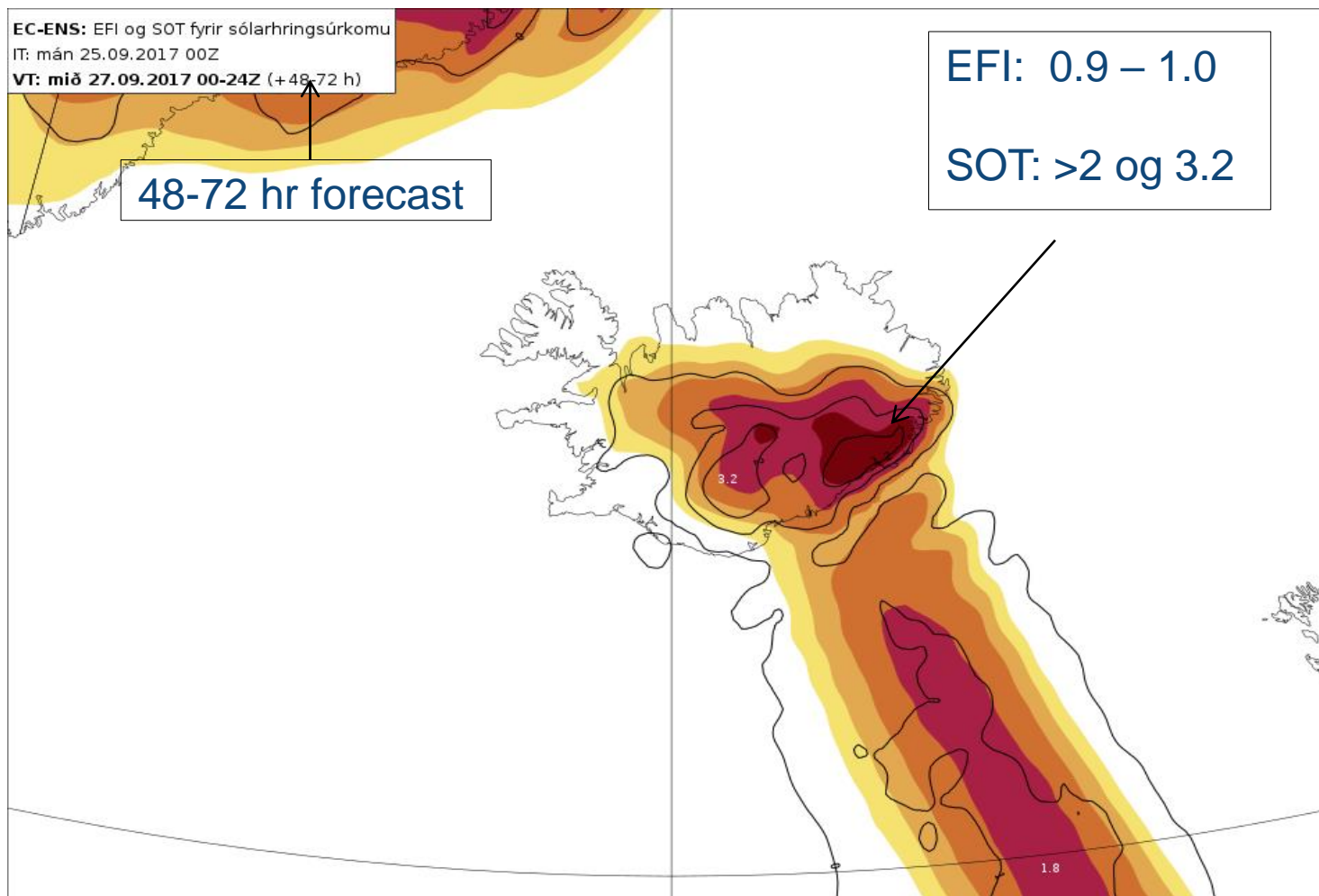
EC-ENS: Sólarhringsúrkomuvík
og meðalþrýstingur við sjávmál (hPa)
7 daga klasameðaltal (51 spákeyrsla)
IT: fim 21.09.2017 00Z
Gildistími: vika 1 (+96-264 h)



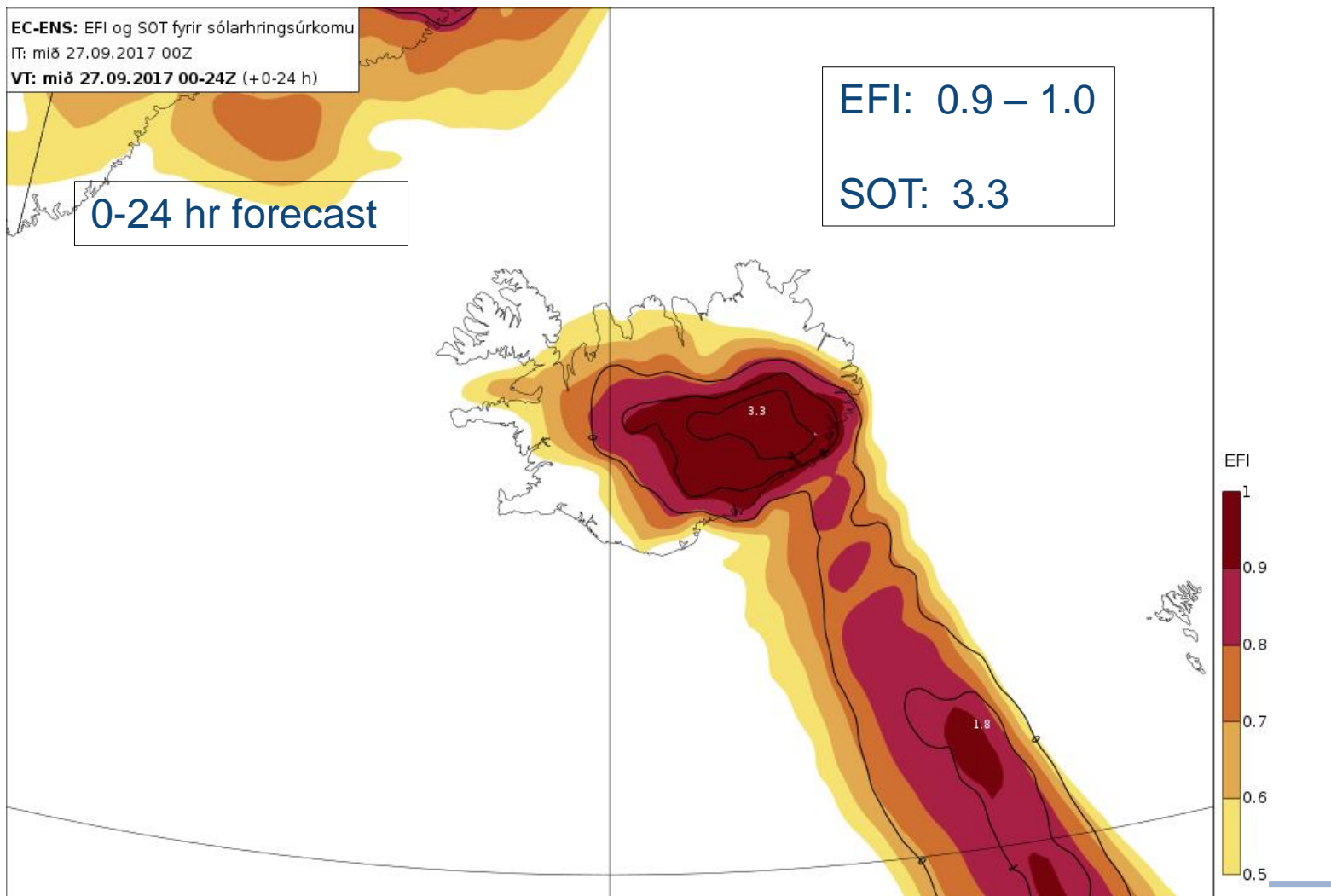
24h precipitation anomalies Monday 25th of September 2017



EFI and SOT – Monday run

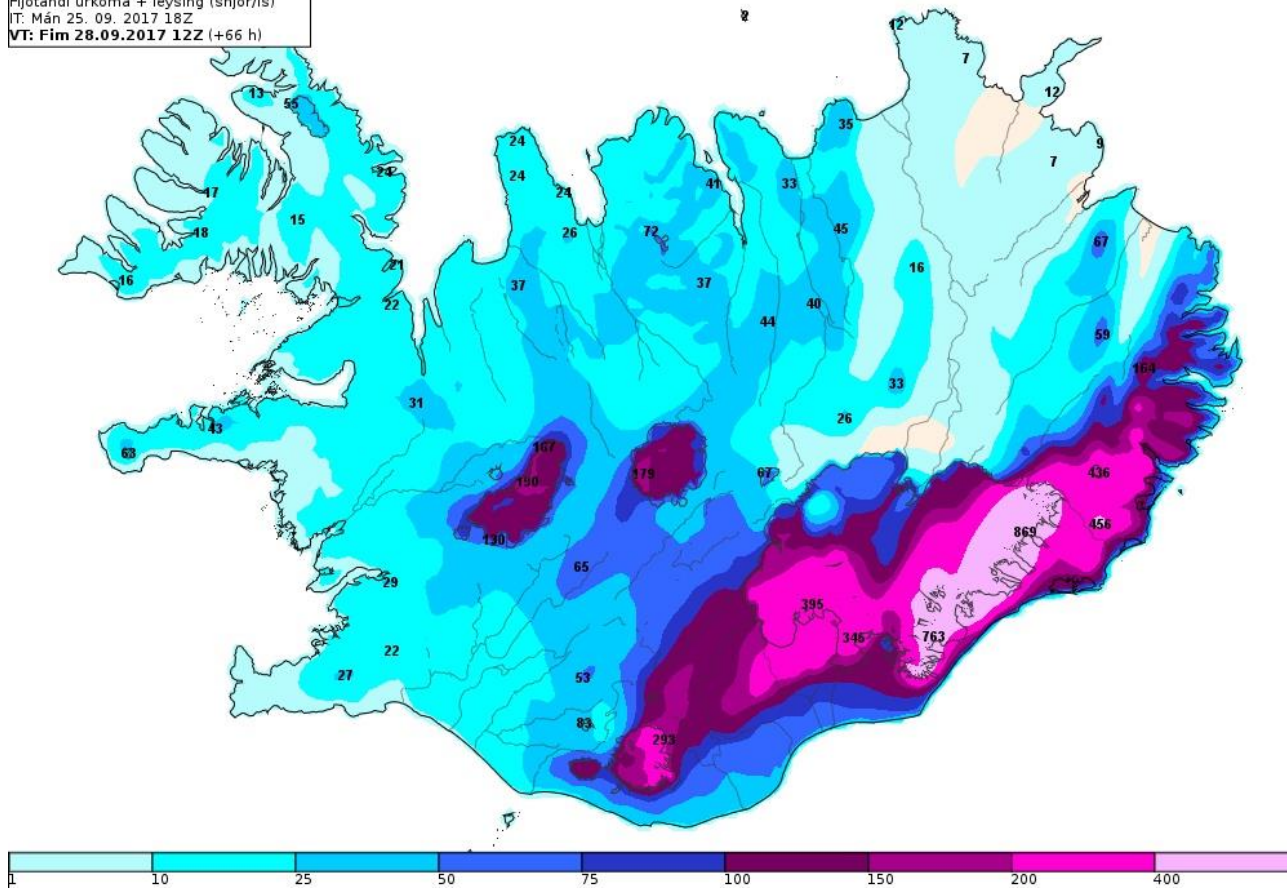


EFI and SOT for 24 hour precipitation, Wednesday run

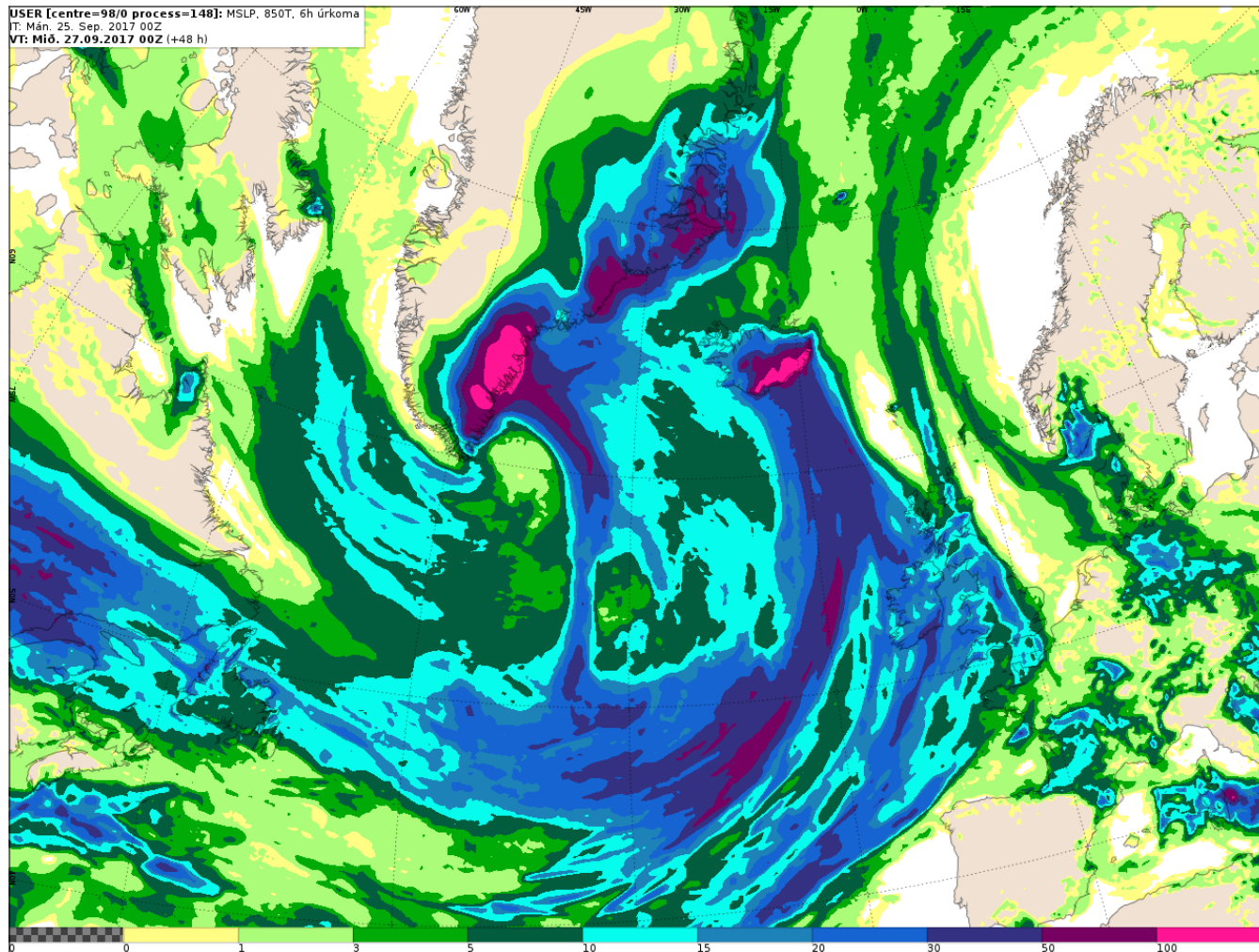


Harmonie-Arome Total Runoff , 66 hour forecast

Harmonie: Uppsafnað afrennsli (mm)
Fljótandi úrkoma + leysing (snjór/ís)
T: Mán 25. 09. 2017 18Z
VT: Fim 28.09.2017 12Z (+66 h)



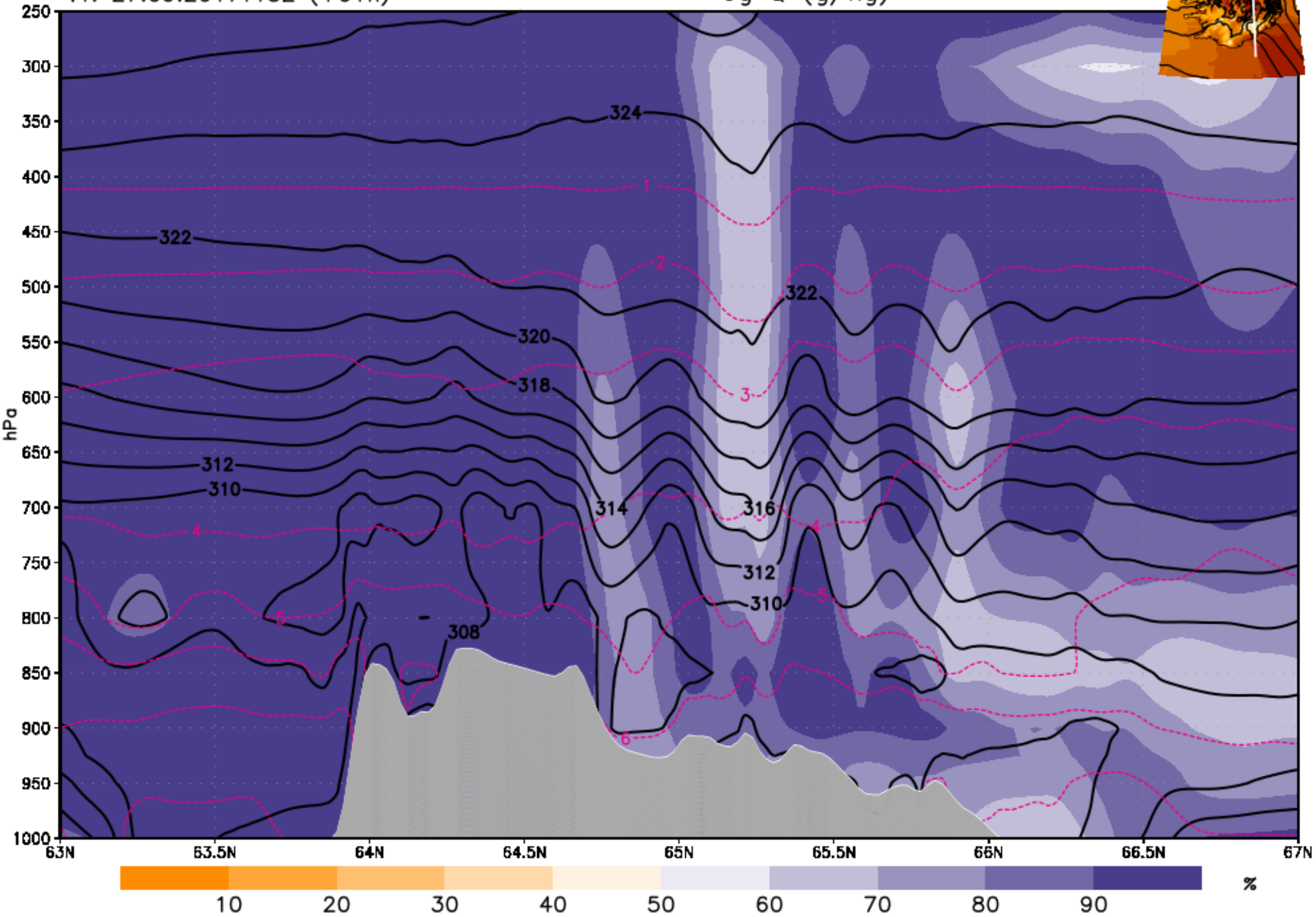
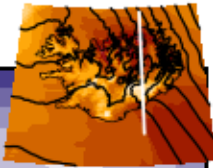
Accumulated Precipitation 48 hrs, 25th to 27th of September



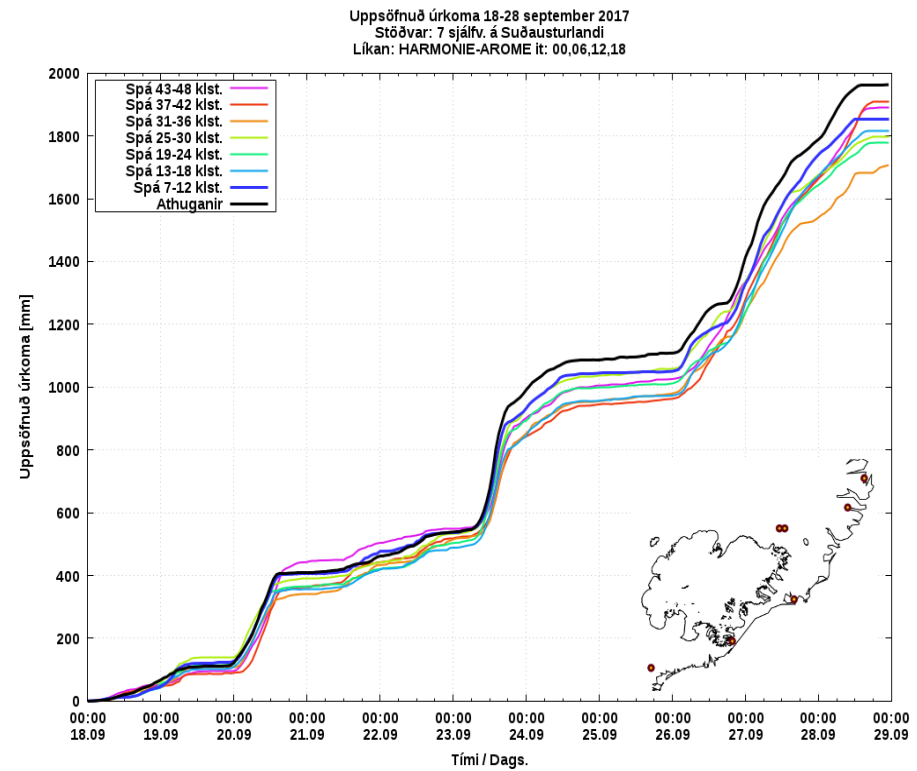
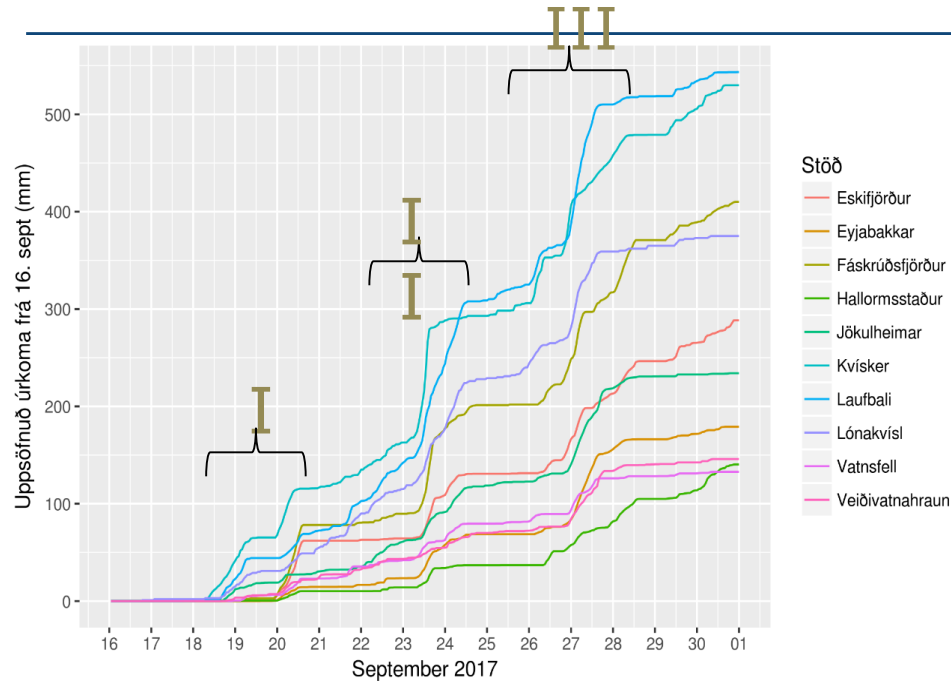
IT: 27.09.2017T12Z
VT: 27.09.2017T13Z (+01h)

Harmonie: RH, EQPT (K)
og Q (g/kg)

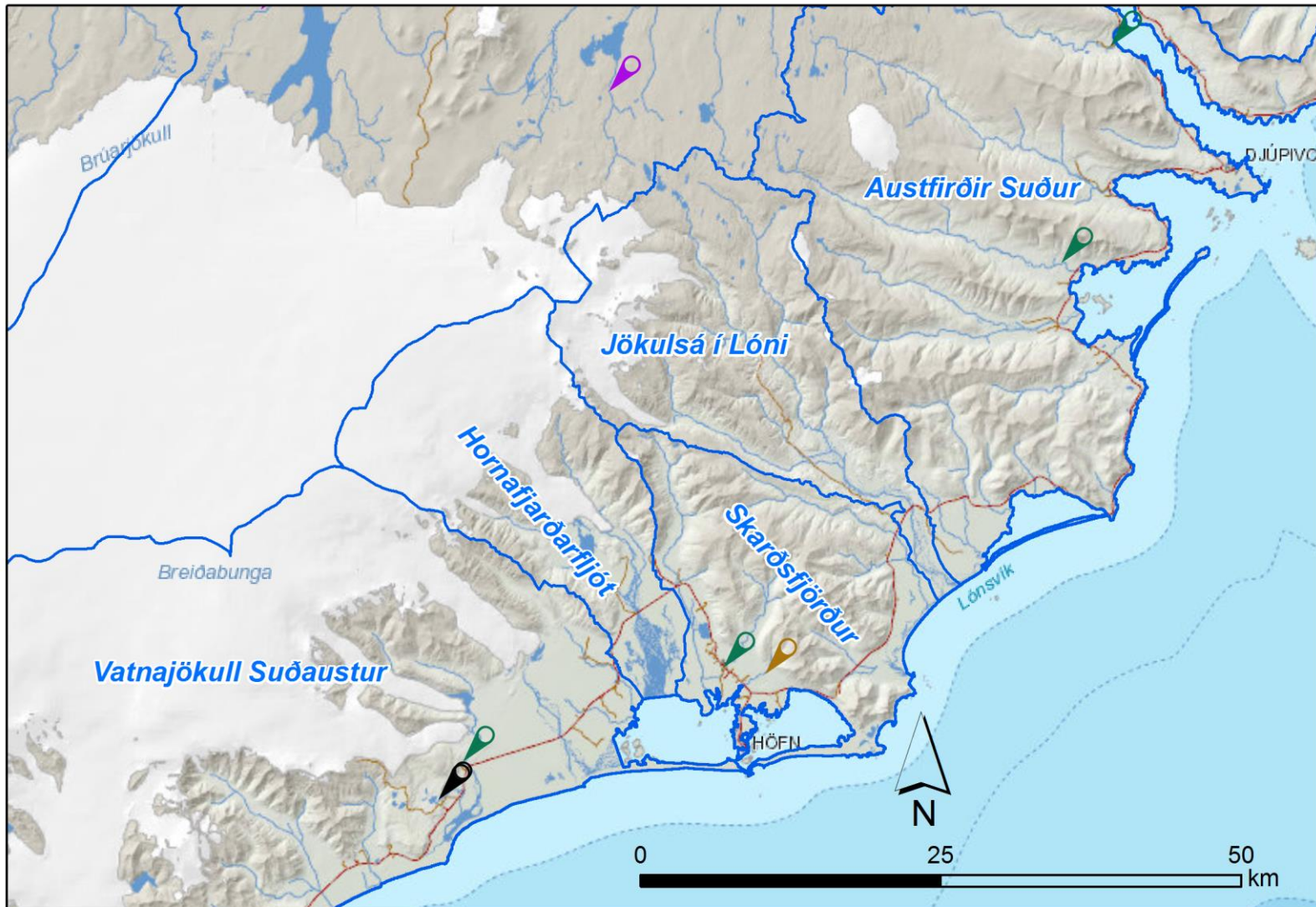
(Lon: -16.6)



Accumulated precipitation in SE-Iceland



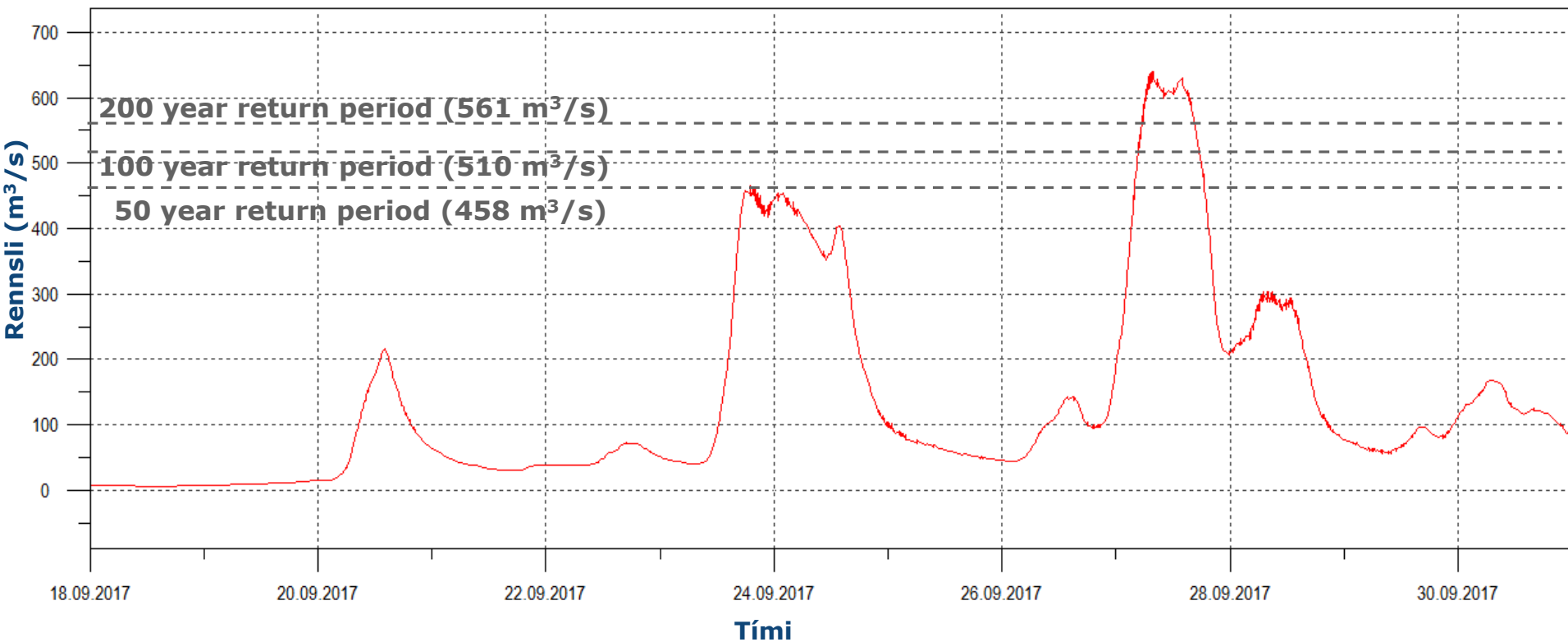
Main rivers and catchments in the southeast



Geithellnaá river – a mixed river fed in part by glacial melt

47 yeas of data, with 26 missing.

Three maximum discharge events from 20th to 29th of September



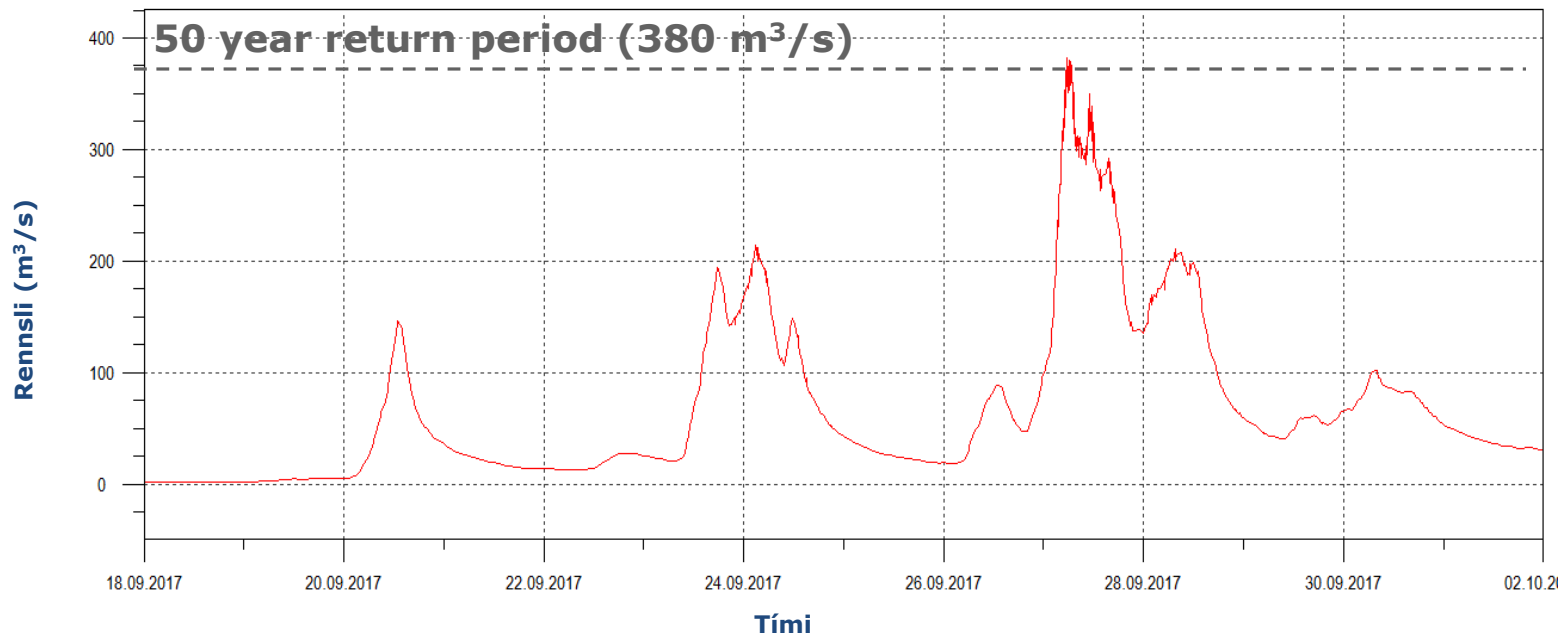
Geithellnaá river – max discharge 600 m³/s



Picture from 27th Sep 2017 at 10:45.
Hrafnhildur Kristjánsdóttir

Fossá river – not fed by glacial melt

- Continuous measurements from 1970
- Highest discharge levels from the beginning of measurements
- Estimated return period 50-100 years



Damages to roads, bridges, landslides, floods



... and sheep

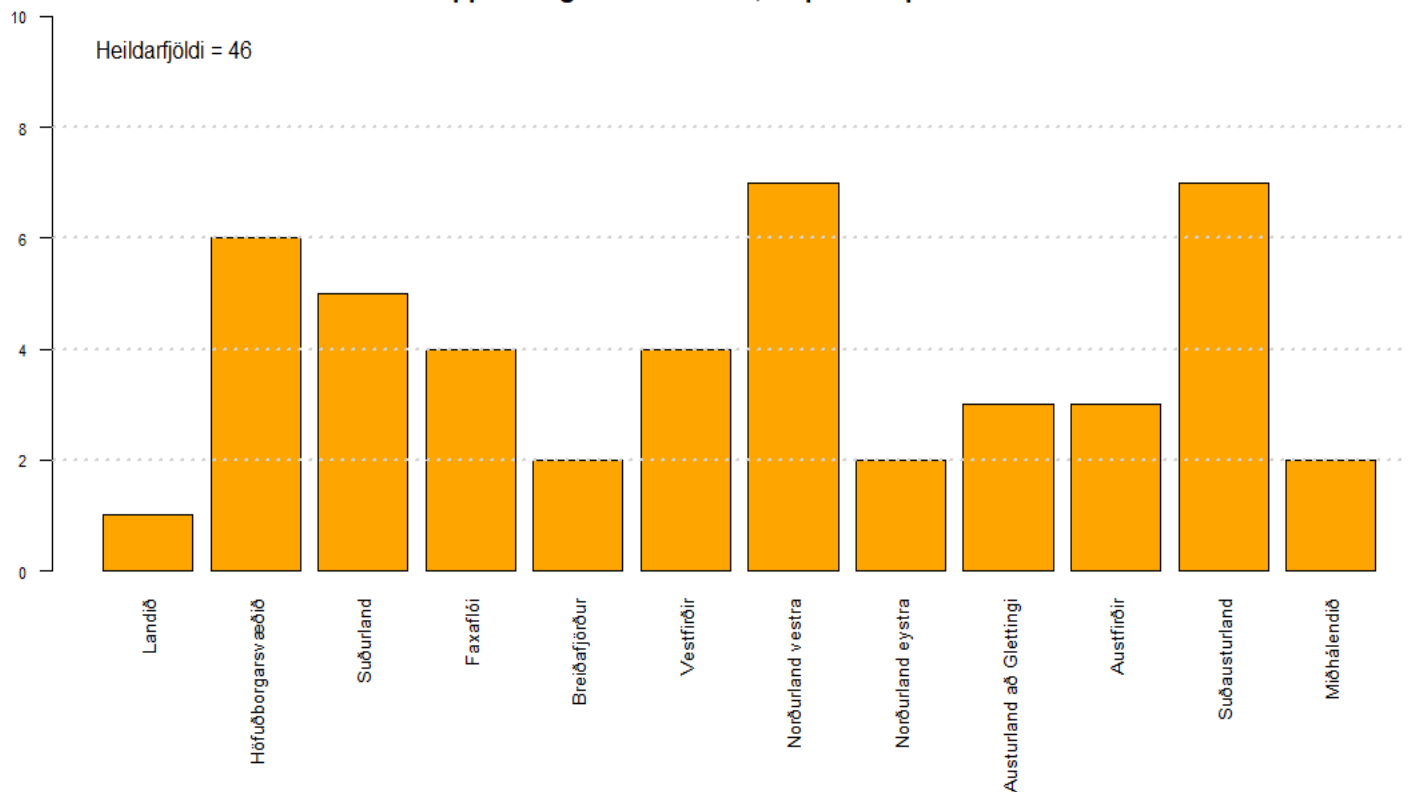


Regarding the warning system

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- **The system has been well received by the public and stakeholders**
 - **Difficult to get messages to tourists, especially those who travel by themselves**
 - **Yellow fatigue started materializing fairly soon**
 - **Hard to communicate likelihood**
 - **System will be fixed for bugs and minor issues during the summer and forecasters will get more training**

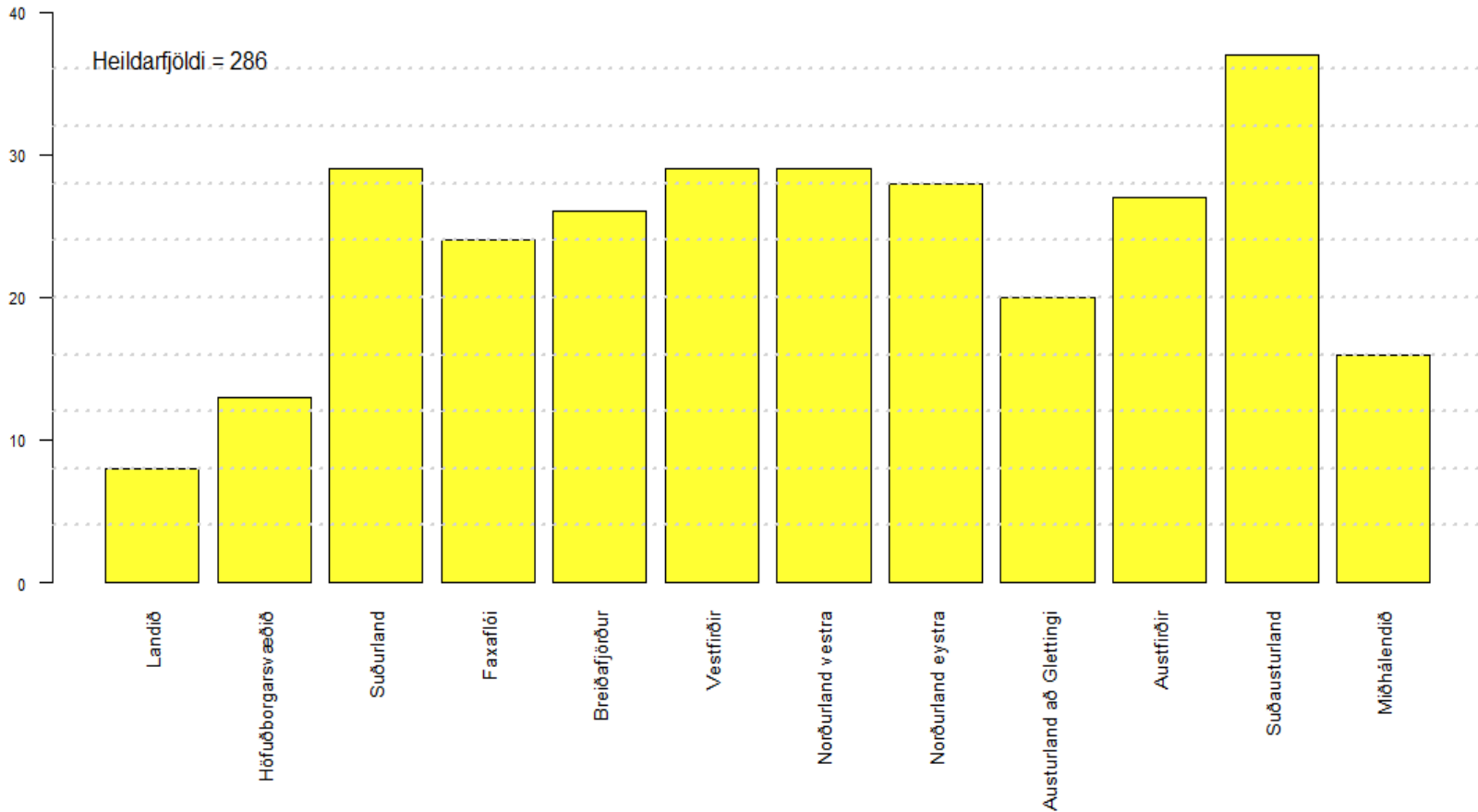
Orange warnings by forecast regions

Appelsínugular viðvaranir, skipt eftir spásvæðum



Yellow warnings by forecast regions

Gular viðvaranir, skipt eftir spásvæðum



Thank you for your attention – for
comments or questions email me at
elin@vedur.is