

HYMO in Iceland

Options, problems and possible approach

Icelandic Met
Office



MARINE & FRESHWATER
RESEARCH INSTITUTE



ORKUSTOFNUN
National Energy Authority



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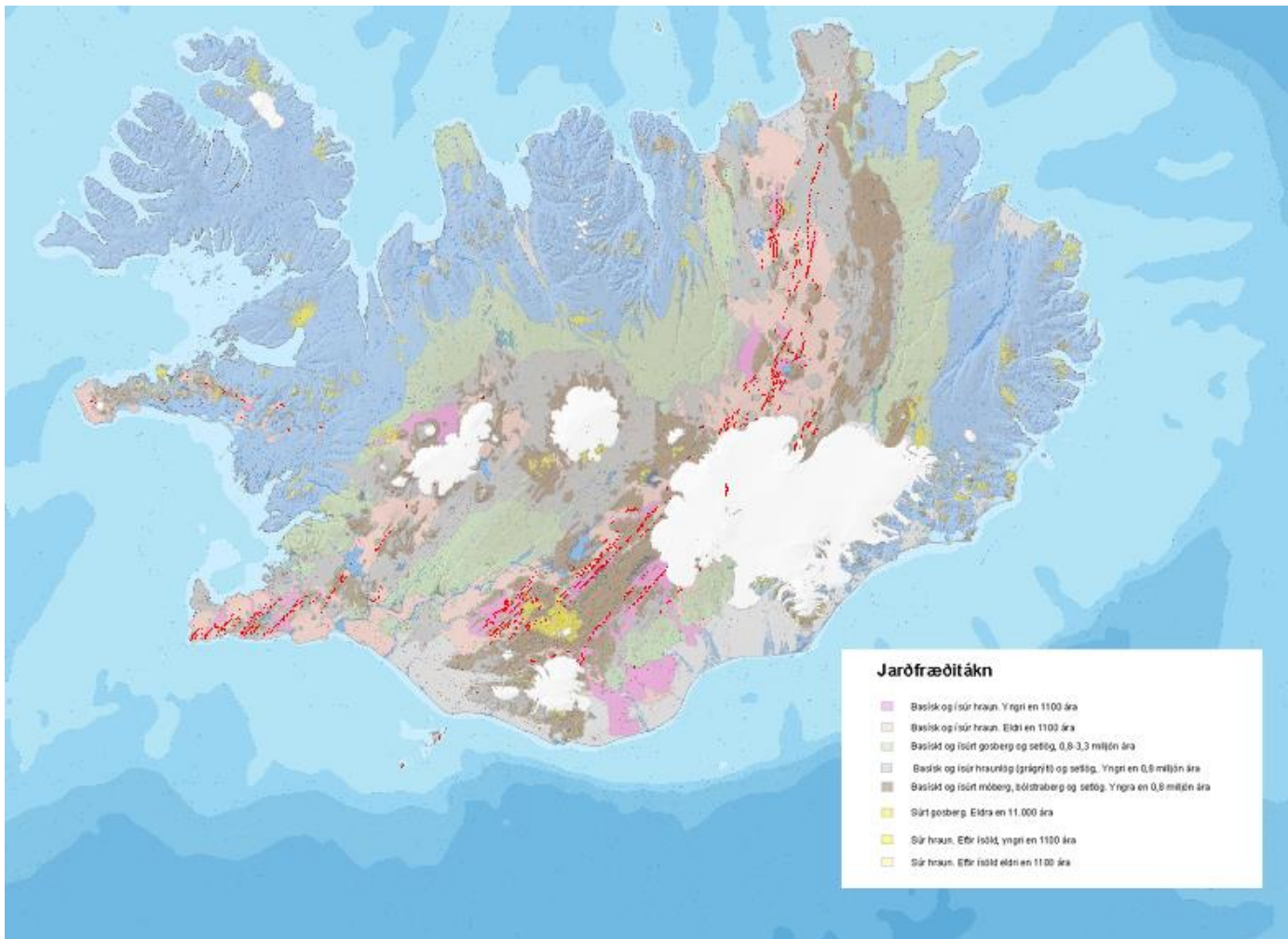
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Kære nordiske venner

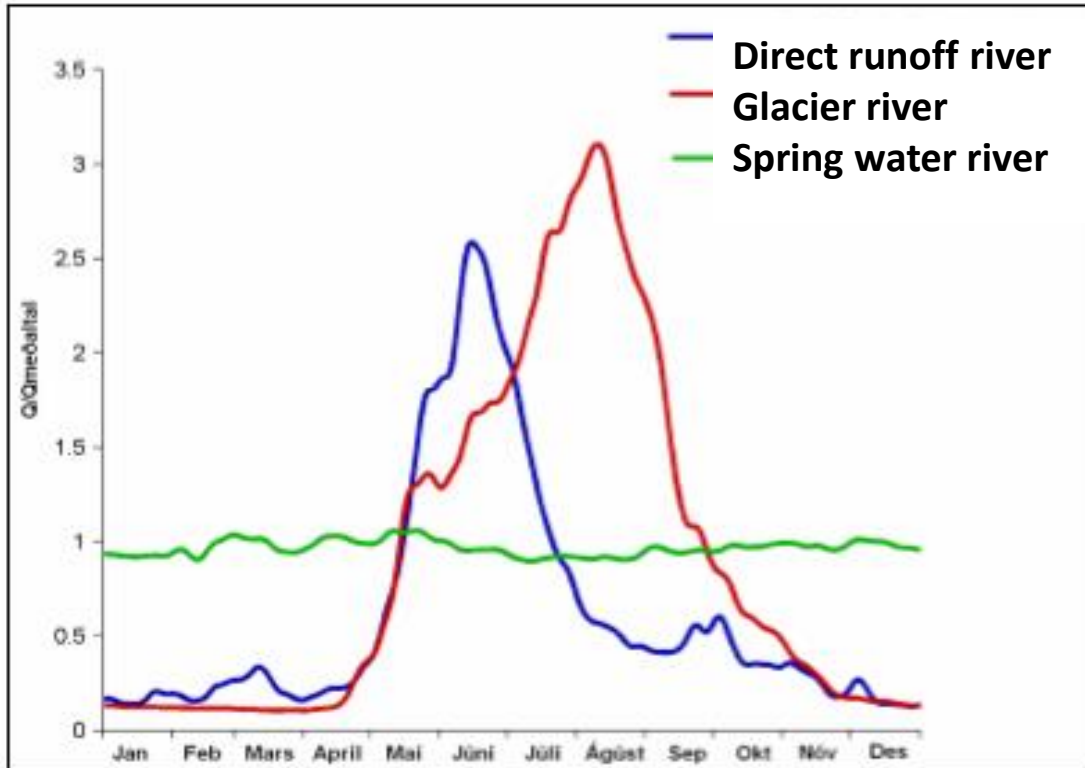
For Iceland to be able to implement the WFD in such a limited time frame it is important to use the experience and knowledge from our neighbor countries when possible.

The natural conditions in Norway is in some way quite similar to the situation in Iceland. Norway has kindly given us the possibility to base the methodology of our approach on the HYMO classification of Norway.



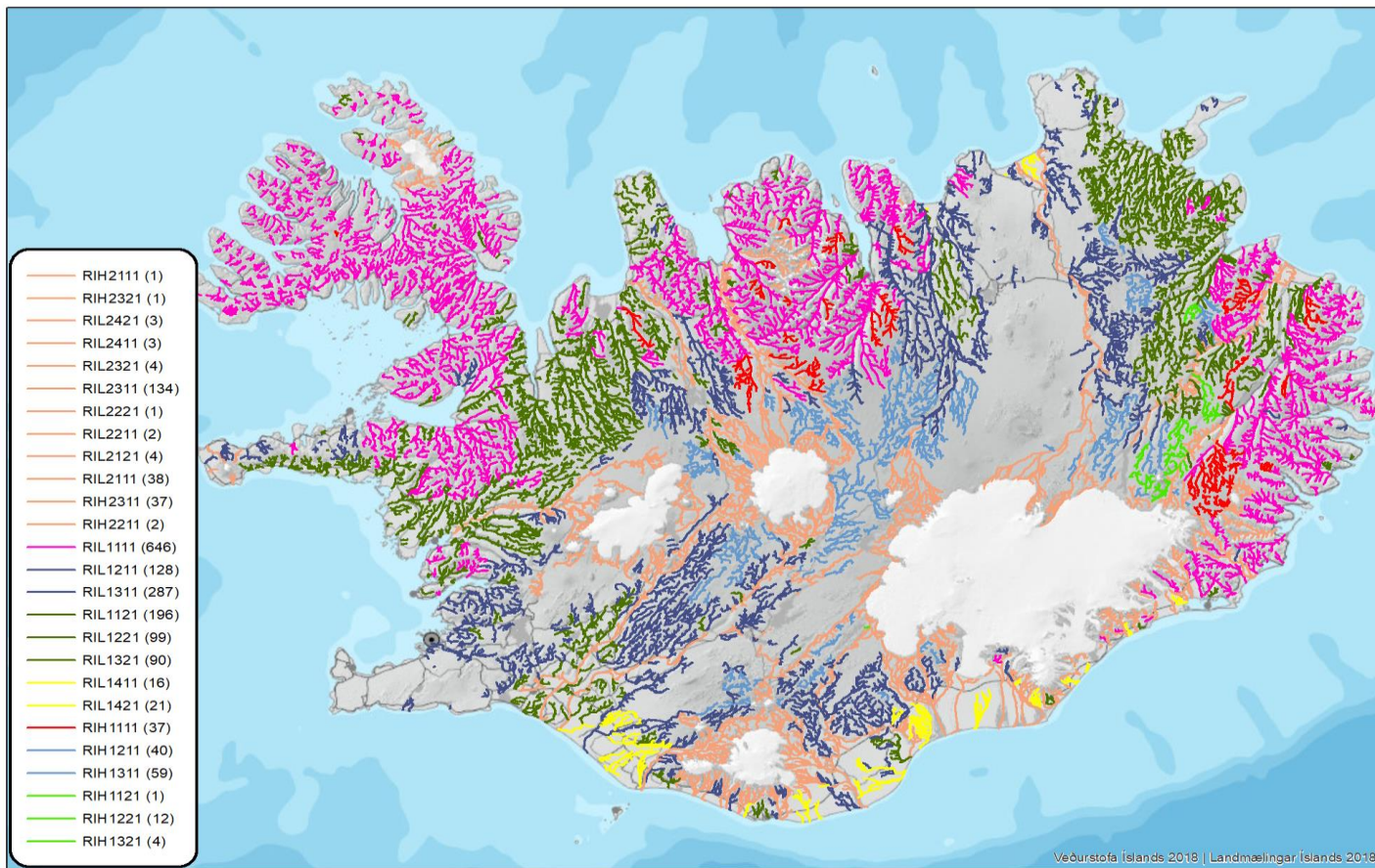


Discharge pattern - three main discharge types of rivers



Jóna Finndís

River types – revised suggestions in phase of approval

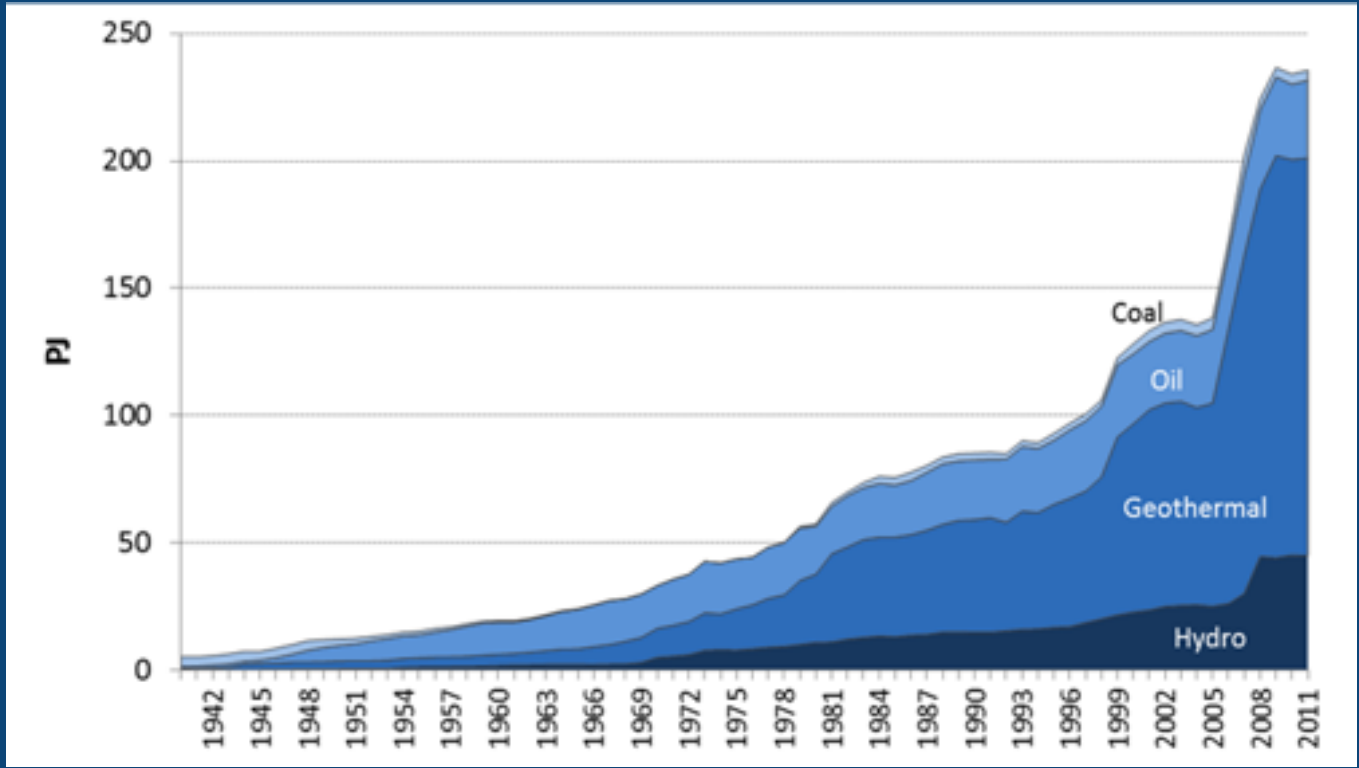


Glacial rivers





Energy production is the main Hymo pressure in Iceland



Ref: Icelandic National Energy Authority

Tafla 1 : Uppsett rafafli og raforkuframleiðsla á Íslandi árið 2017 skipt eftir uppruna

Table 1: Installed electrical capacity in power plants and electricity production in Iceland 2017 by energy source

Uppruni	Uppsett rafafli [kW]	Hlutfallsleg skipting	Raforkuframleiðsla [MWh]	Hlutfallsleg skipting
Source	Installed electrical capacity [kW]	Electricity production [MWh]	Electricity production [MWh]	Electricity production [MWh]
Vatnsafl / Hydro	1.984.079	71,71%	14.058.722	73,08%
Jarðhiti / Geothermal	707.600	25,58%	5.169.599	26,87%
Vindur / Wind	3.030	0,11%	8.127	0,04%
Eldsneyti / Fuel	71.971	2,60%	2.085	0,01%
Samtals / Total	2.766.680	100%	19.238.533	100%

In 2015, the total electricity consumption in Iceland was 18,798 GWh. Renewable energy provided almost 100% of production of electricity, with about 73% coming from hydropower and 27% from geothermal power.



Glacier rivers – threat or impressive





Glacial rivers

Impact on the society

- Flood hazard
- Isolation of local communities
- Natural resource

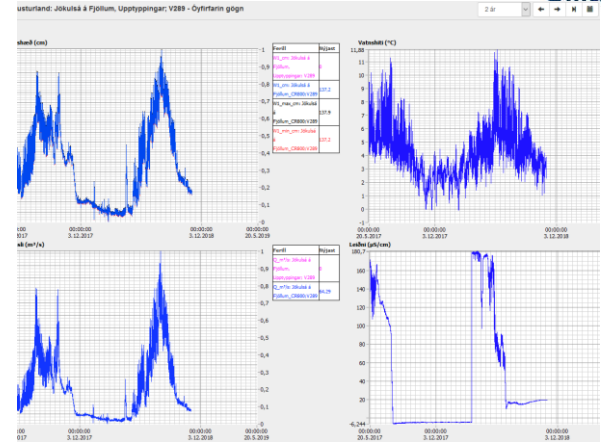
Glacial rivers as a source of hydropower

- Water quantity
- Glacier and snow storage of water
- Groundwater support



Environmental impact of hydropower dams

- ❖ Sediment transpose reduces
- ❖ Transparency and visibility increases
- ❖ Discharge pattern changes
- ❖ Impacting land development
- ❖ Nutrient concentration decrease
- ❖ Increase in salmon catch
- ❖ Biodiversity increases
- ❖ Change of Icelandic landscape
- ❖




Jökulsá á Dal – before and after damming





Pjórsá river, photo Stefán Sigurðsson

An aerial photograph of a braided river system. The river consists of numerous interconnected channels of varying widths and lengths, separated by sandbars and gravel bars. The water appears light brown or greyish, indicating sediment transport. The surrounding landscape is a mix of brown and green, suggesting a semi-arid or temperate environment. The overall pattern is highly irregular and complex, characteristic of a braided river.

Other possible humo pressures

Morphology

Flood protection

Divergance of water

Definition - natural river channel of glacial rivers

In Norway some of the quality elements are based on the natural river channel e.g. the distance of flood protection and the rivers connection to the surrounding ecosystem .

This is complicated in glacial rivers

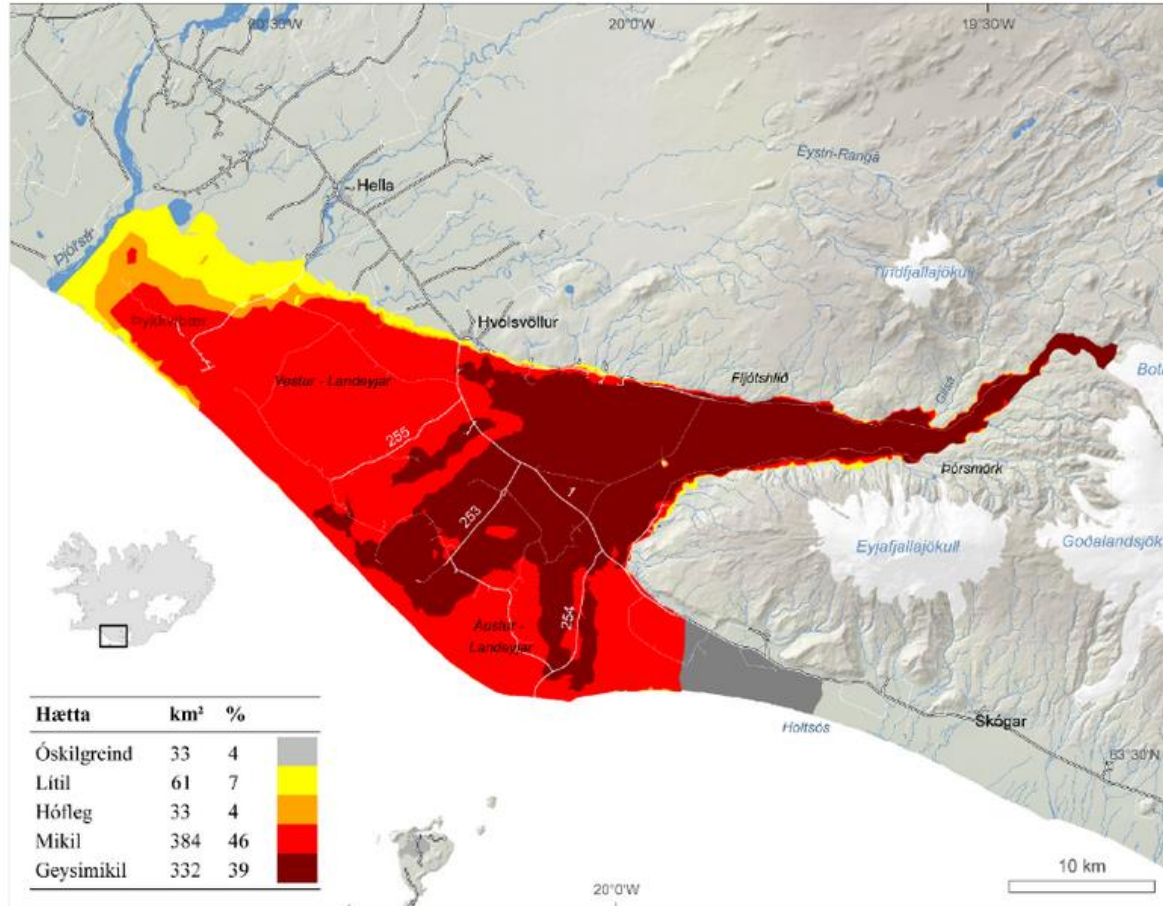
- High flood frequency
- High water quantities in flood events
- Enormous spread of the spread of glacial rivers.

Definition of river channel of a glacial rivers and how to estimate if and these rivers are HMWB or less impacted

- The maximum known spread of the river
- The average spread of the river in normal year



Markarfljót – flood risk assesment



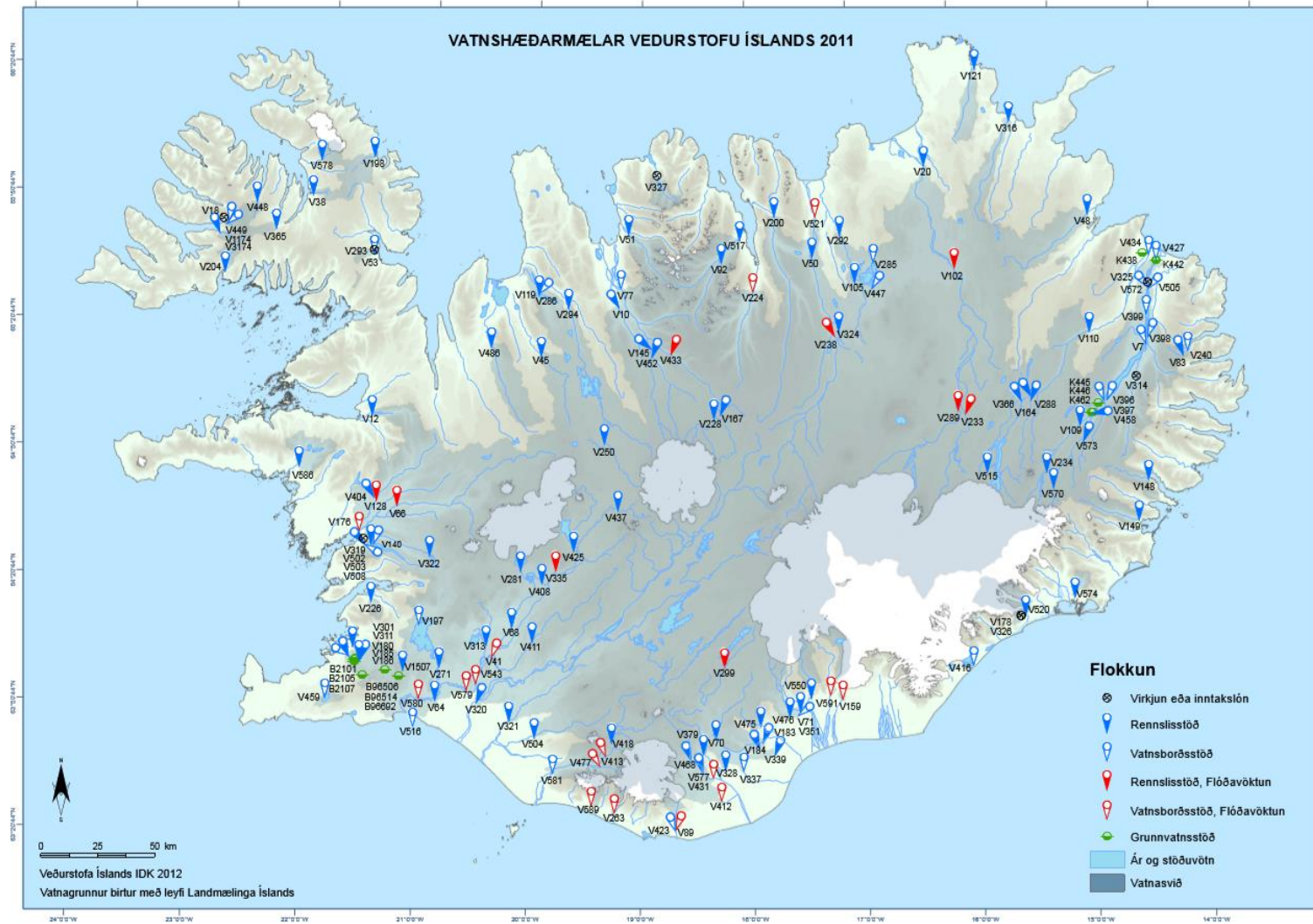


Markarfljót hefur flæmst v



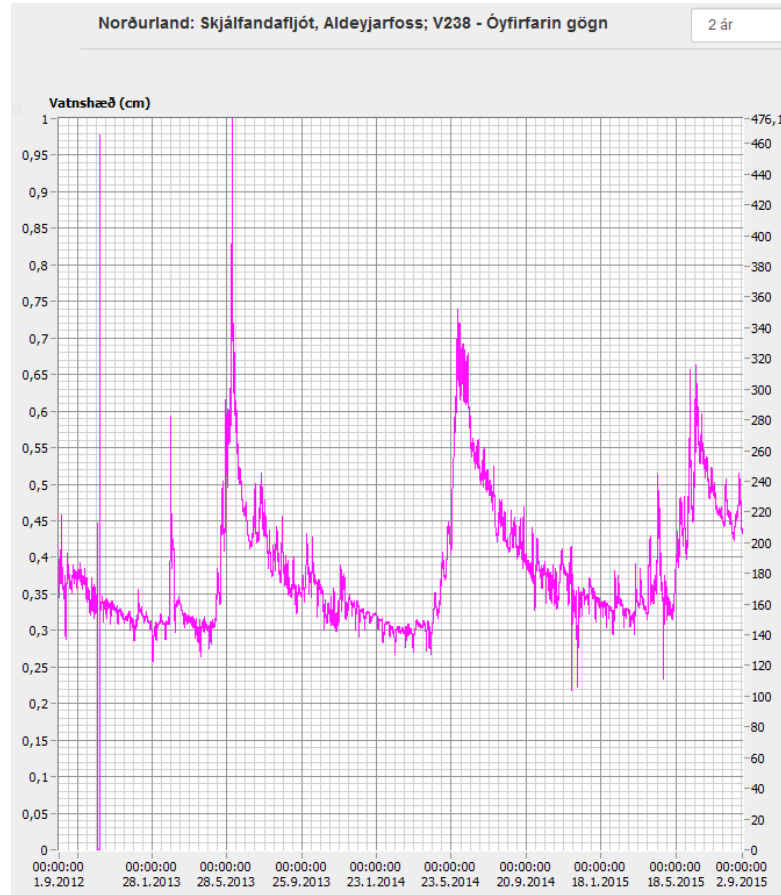
ifingu þess frá því um landnám.





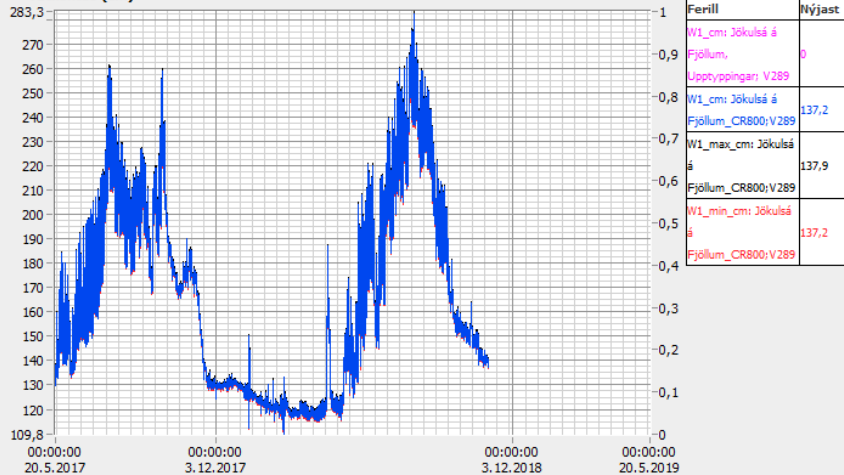


Hydromorphology

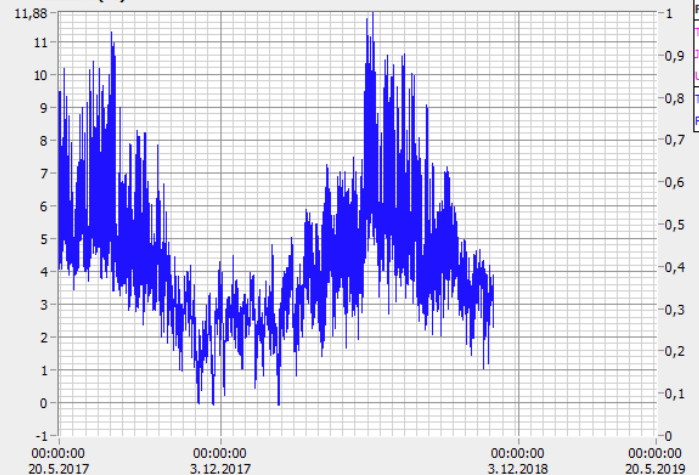




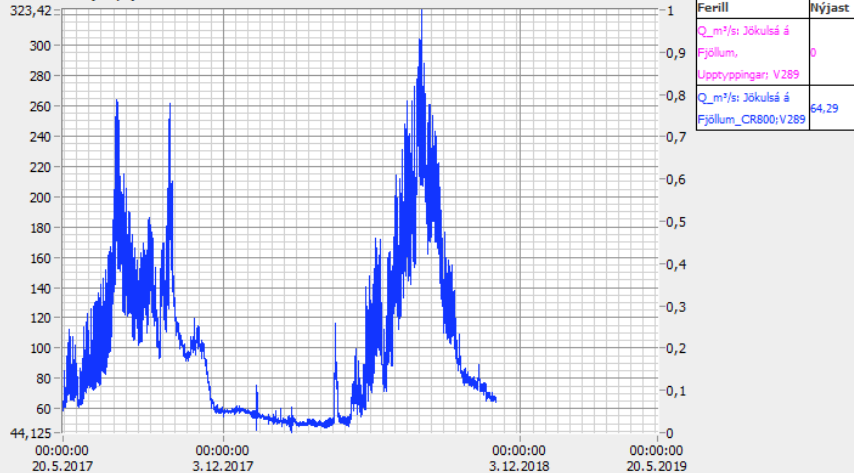
Vatnshæð (cm)



Vatnshiti (°C)



Rennsli (m³/s)



Leiðni (µS/cm)

