VEÐURFRÆÐIÞING FEBRÚAR 2025

Veðurmælingar á íslenskum jöklum

Icelandic Glaciers Automatic Weather Station Network (ICE-GAWS)

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Landsvirkjun

HÍ JARÐVÍSINDASTOFNUN

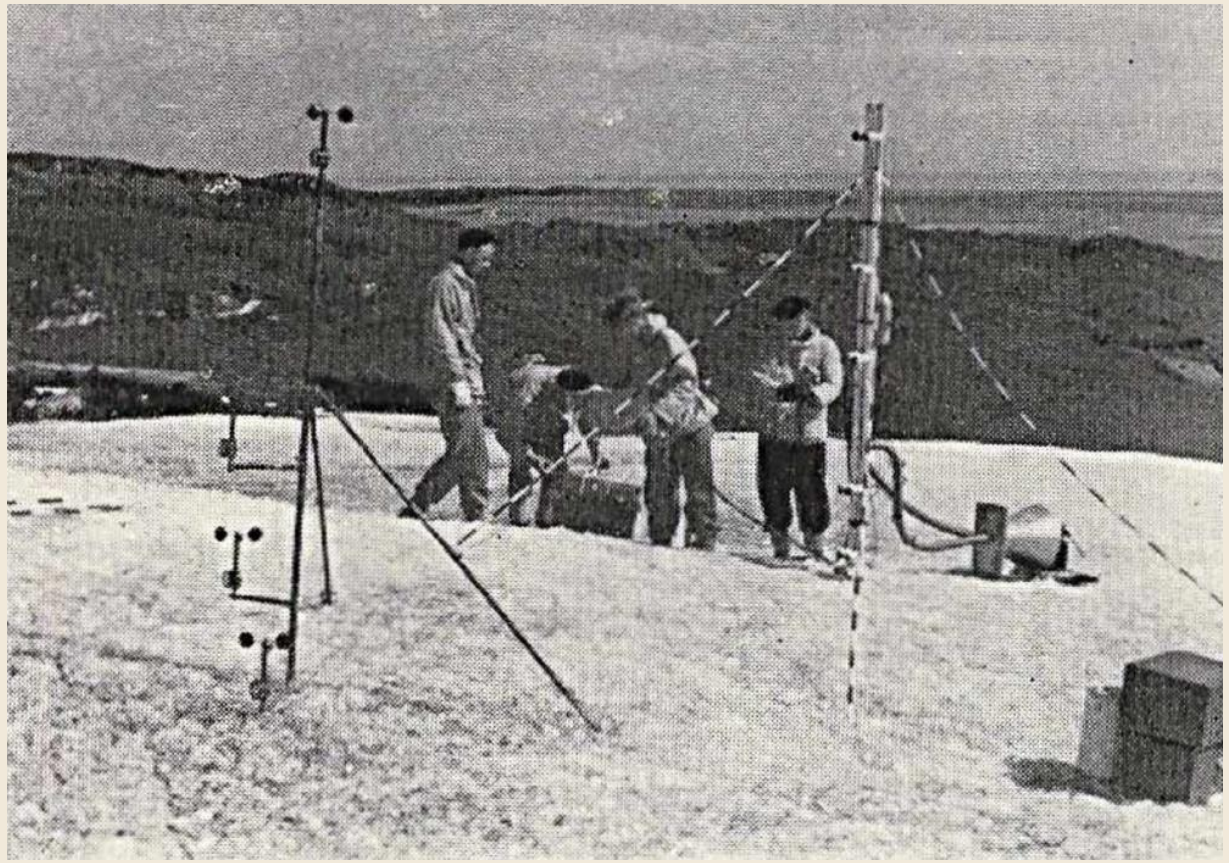
Veðurathuganir á íslenskum jöklum

- Veður á jöklum lítið þekkt nema í ferðalýsingum jöklafara
- 1932-1933 mælingar á Jökulhálsi við Snæfellsjökul
- Sænsk/Fransk íslenski leiðangurinn
- Ýmiss önnur verkefni

Micro Meterology over Dirt Coned Ice
(Lister et al, 1959)

- Mæla hita, raka og gufuþrýsting á sniðum
- Reikna orkuflæði til yfirborðs
- Meta áhrif óhreininda á yfirborð og orkubúkap

Area / Surface		I Clean Ice	II Medium Dirt Cones	III Small Dirt Cones
Total valid tests		13	16	11
Tests with sun obscured		11	9	1
Heat Available	Net Radiation	50.22%	78.65%	80.75%
	Condensation	22.17%	7.18%	3.33%
	Convective heat	27.61%	14.17%	15.92%
Heat Used	Melting	98.25%	97.36%	97.22%
	Evaporation	1.75%	2.64%	2.78%

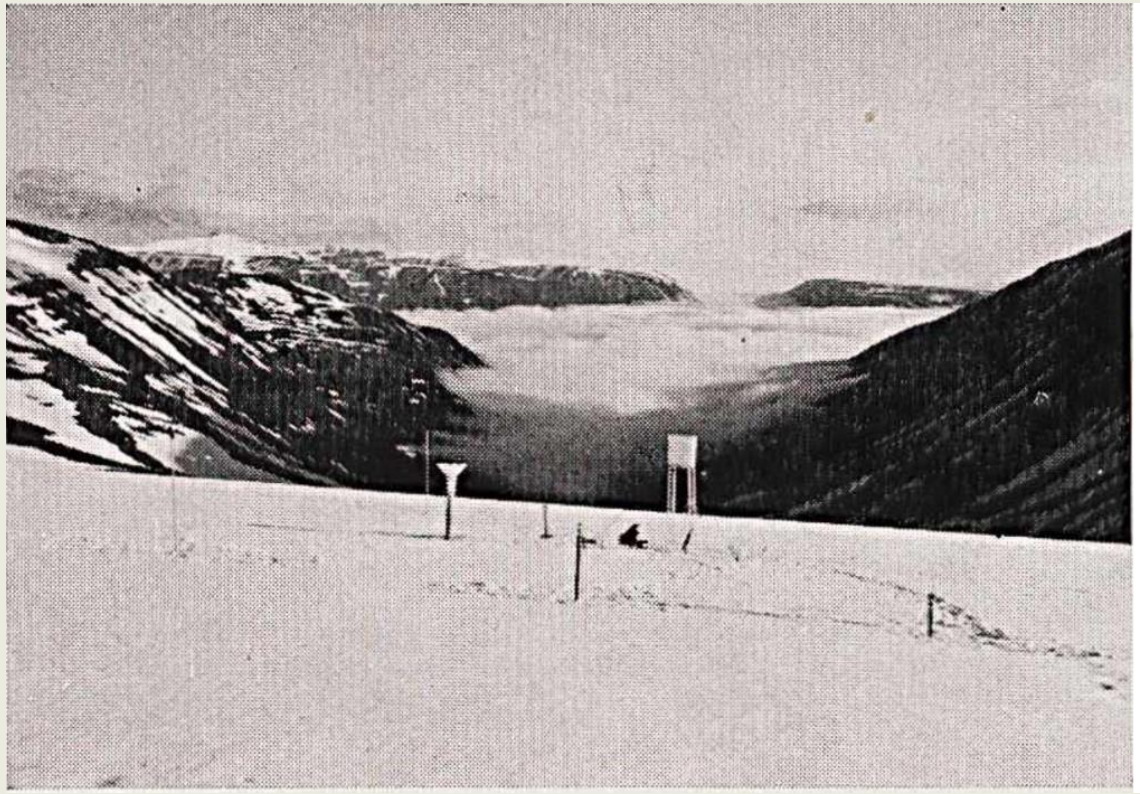


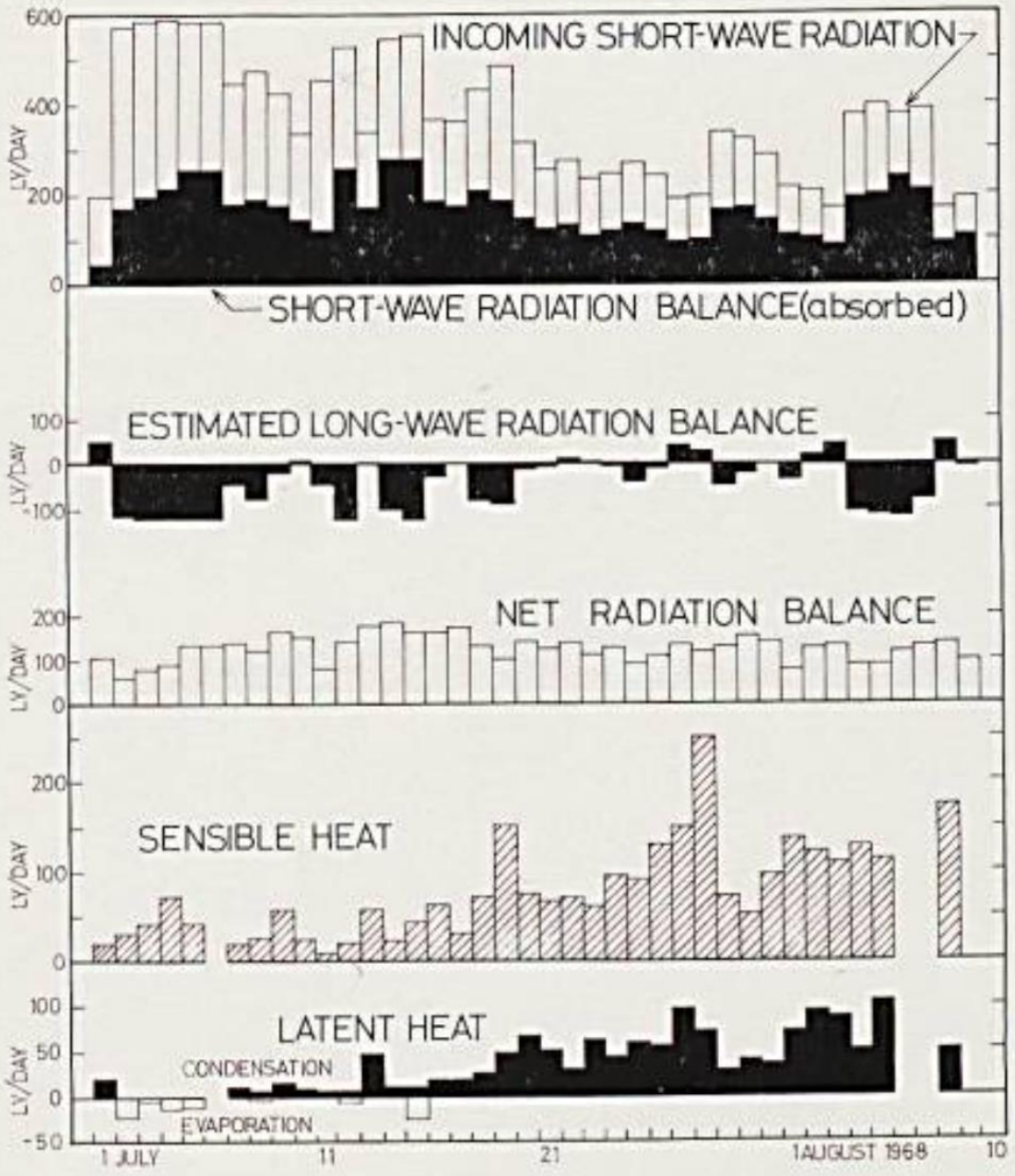
Lister og félagar við mælingar á Breiðamerkurjökli.

Bægisárjökull, North Iceland,

Afkoma, veðurfar og orkubúskapur (Björnsson, 1971, 1972)

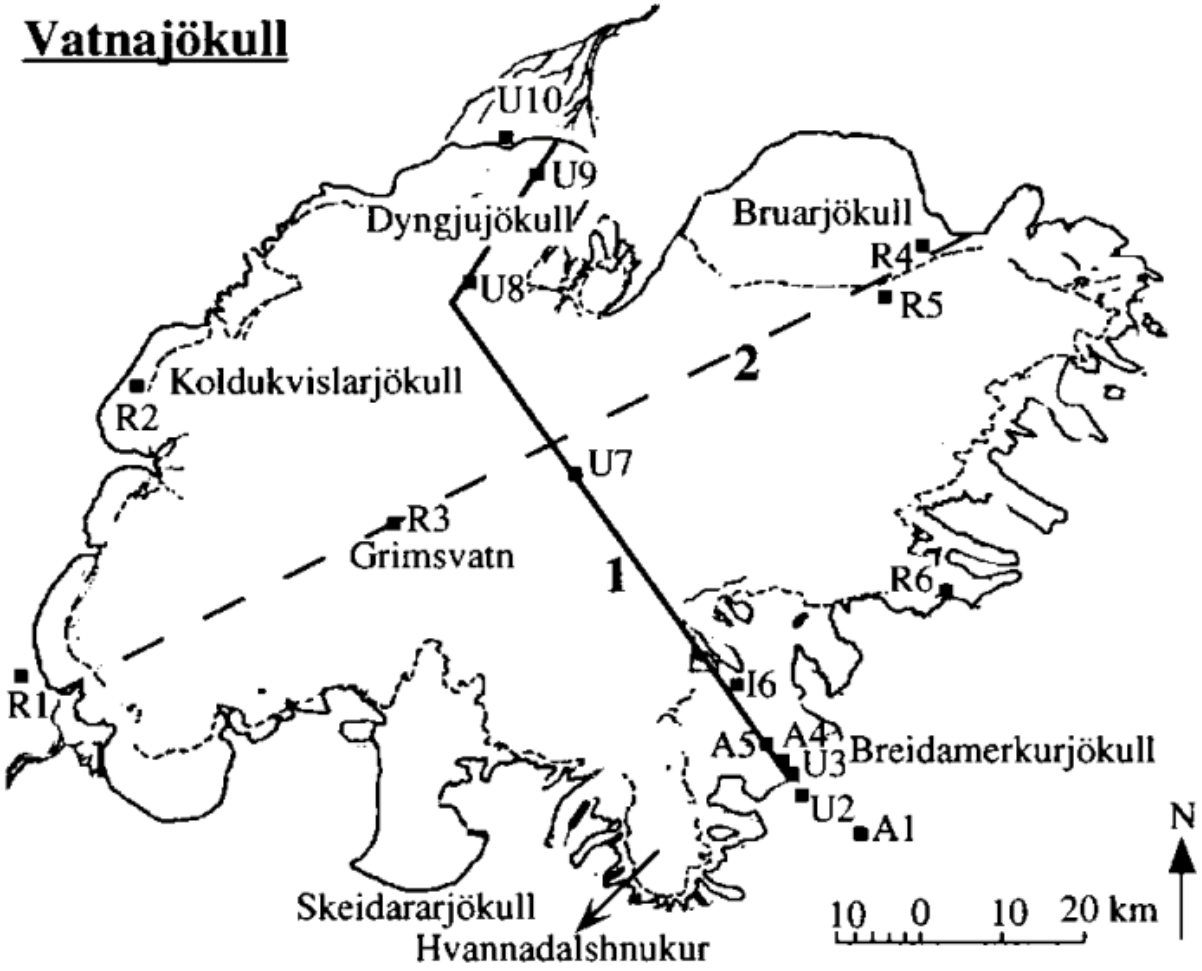
- Vinna unnin 1967-68
- Mælingar á afkomu og veðurþáttum
- Heilt leysingar tímabil mælt





Veðurmælingar á jöklum í dag
Kerfisbundnar mælingar frá 1994

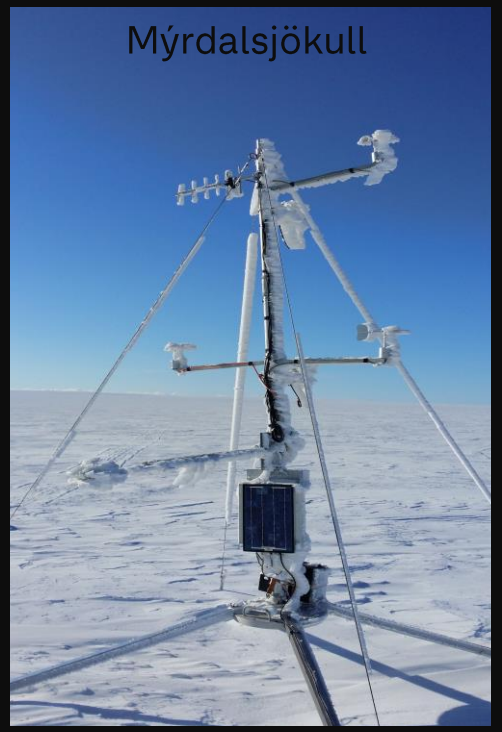
- Fyrstu sjálfvirku veðurstöðvarnar voru settar upp á Vatnajökli leysingartímabilið 1994 (1) og 1995 (3).
- Árið 1996 var fjöldi stöðva aukinn í 12 með stuðningi TEMBA verkefnisins og Landsvirkjunar.
- Kerfið hefur síðan verið þróað áfram og nú eru reknar 8–14 stöðvar á Vatnajökli, Langjökli (frá 2001), Hofsjökli (frá 2016) og Mýrdalsjökli (frá 2015).
- Verkefnið er samstarf Jarðvísindastofnunar Háskóla Íslands og Landsvirkjunar og er enn í fullum rekstri.
- Verkefnareknarstöðvar / vöktunarstöðvar



TEMBA (Climate sensitivity of glacier mass balance: the effect of topographic barriers)

Fyrsta stöðin á Brúarjökli
B13 sumarið 1994

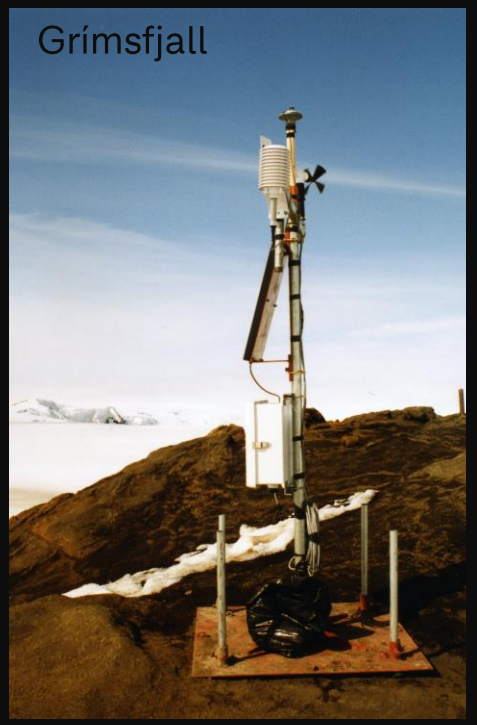
Brúarjökull B13 sumarið 2022


Mýrdalsjökull


Brúarjökull


Breiðamerkurjökull


Grímsvötn

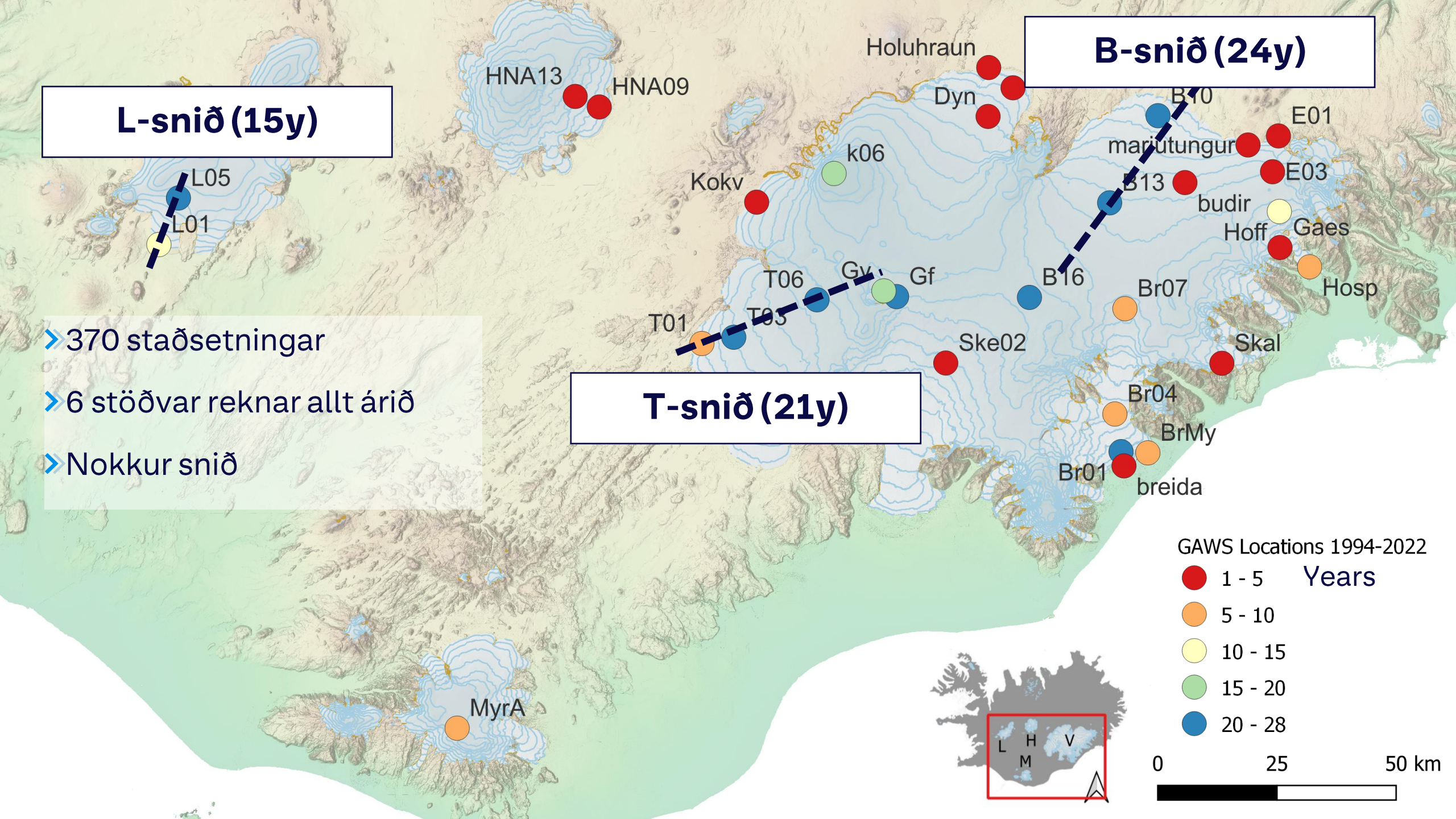

Grímsfjall

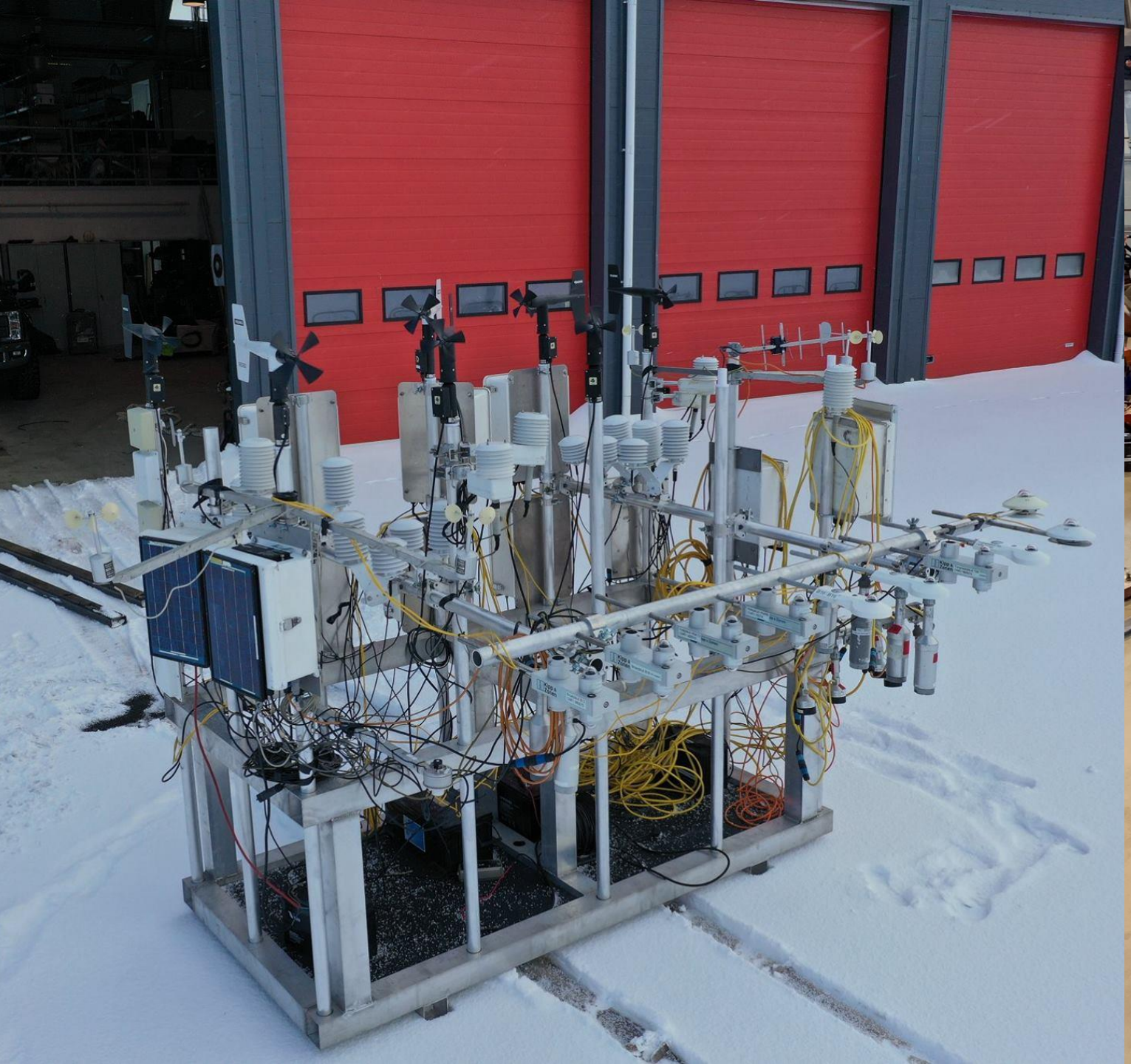

Langjökull


Tungnaárjökull


Hoffelsjökull

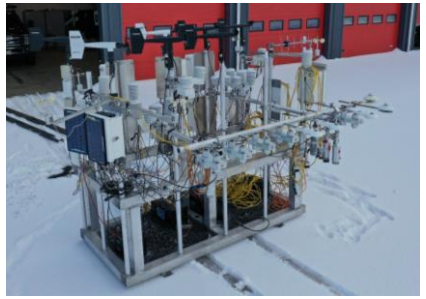

Köldukvíslarjökull


L-snið (15y)
B-snið (24y)
T-snið (21y)
HNA13
HNA09
L05
L01
Holuhraun
Dyn
k06
Kokv
B10
E01
mariutungur
B13
E03
budir
Hoff
Gaes
Hosp
T06
Gv
Gf
T01
T03
B16
Br07
Ske02
Skal
Br04
BrMy
Br01
breida
MyrA
370 staðsetningar
6 stöðvar reknar allt árið
Nokkur snið
GAWS Locations 1994-2022
Years
1 - 5
5 - 10
10 - 15
15 - 20
20 - 28
L
H
V
M
0
25
50 km



Port calibration

Calibration files
Instrument constants



Operation

Manual snow heights
Site location

L0 data stored on logger
or
L0 data transported via modem where connections are available

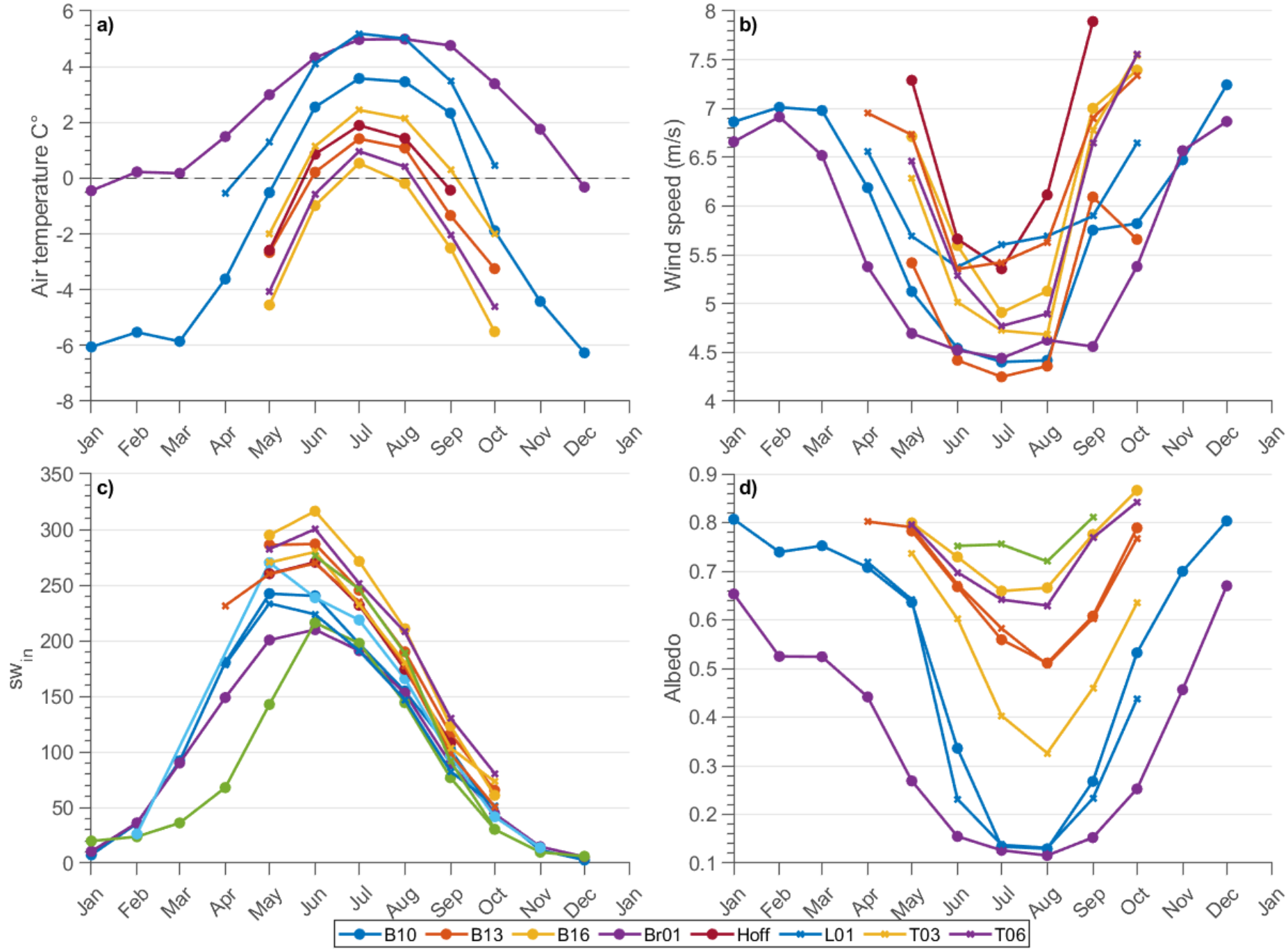
Post-processing

Level 0 to Level 1: Data conversion and structuring
- Structures the files to a common data format
- No data is removed. Includes calibration periods
- At the original timestep (hourly (older files) or 10 min intervals).

Level 1 to Level 2: Data cleaning and filtering
- Timestep checks
- Removes outliers in the data defined for each variable
- removes periods manually containing errors and calibration periods

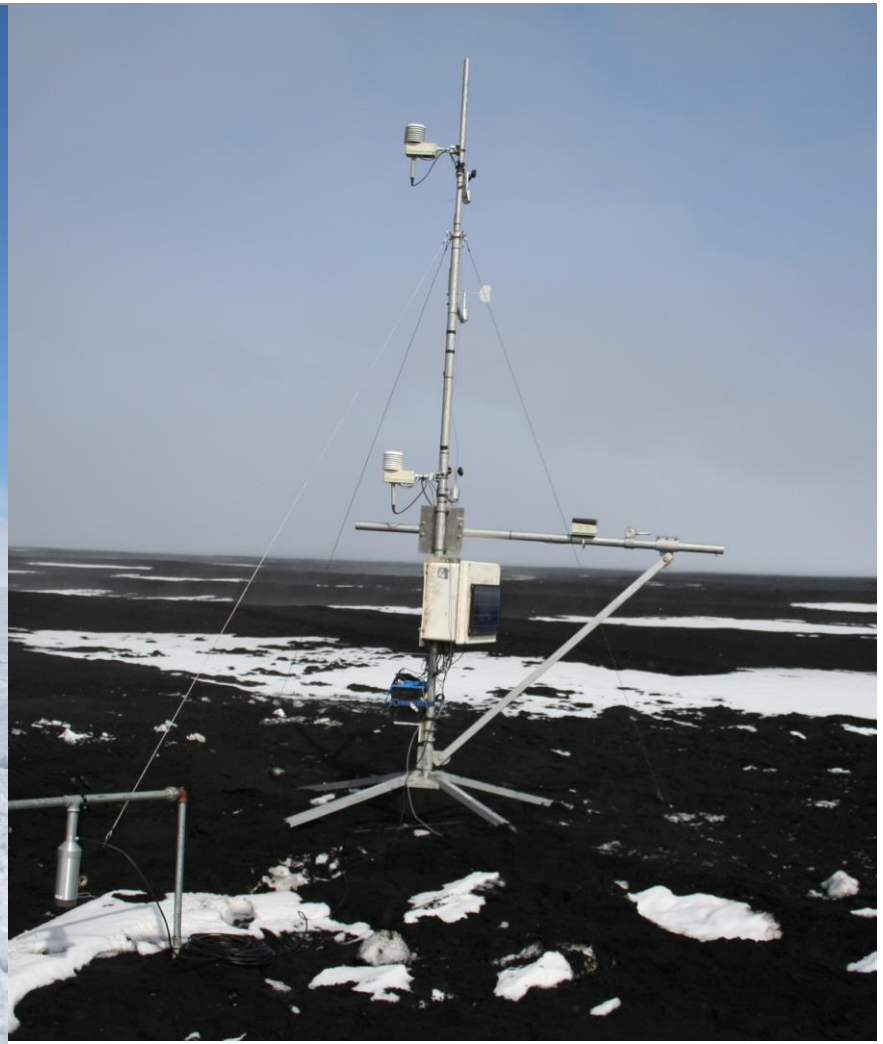
Level 2 to Level 3: Data calculations
- Calculated variables
- Temporal aggregation (hourly, daily, monthly)

Level 3GF: Gap filling of data
- Gap filled with CARRA, RÁVII, IceBox
- Albedo from MOD + MYD


a)
Air temperature C°
6
4
2
0
-2
-4
-6
-8
b)
Wind speed (m/s)
8
7.5
7
6.5
6
5.5
5
4.5
4
c)
SW_{in}
350
300
250
200
150
100
50
0
d)
Albedo
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
B10
B13
B16
Br01
Hoff
L01
T03
T06

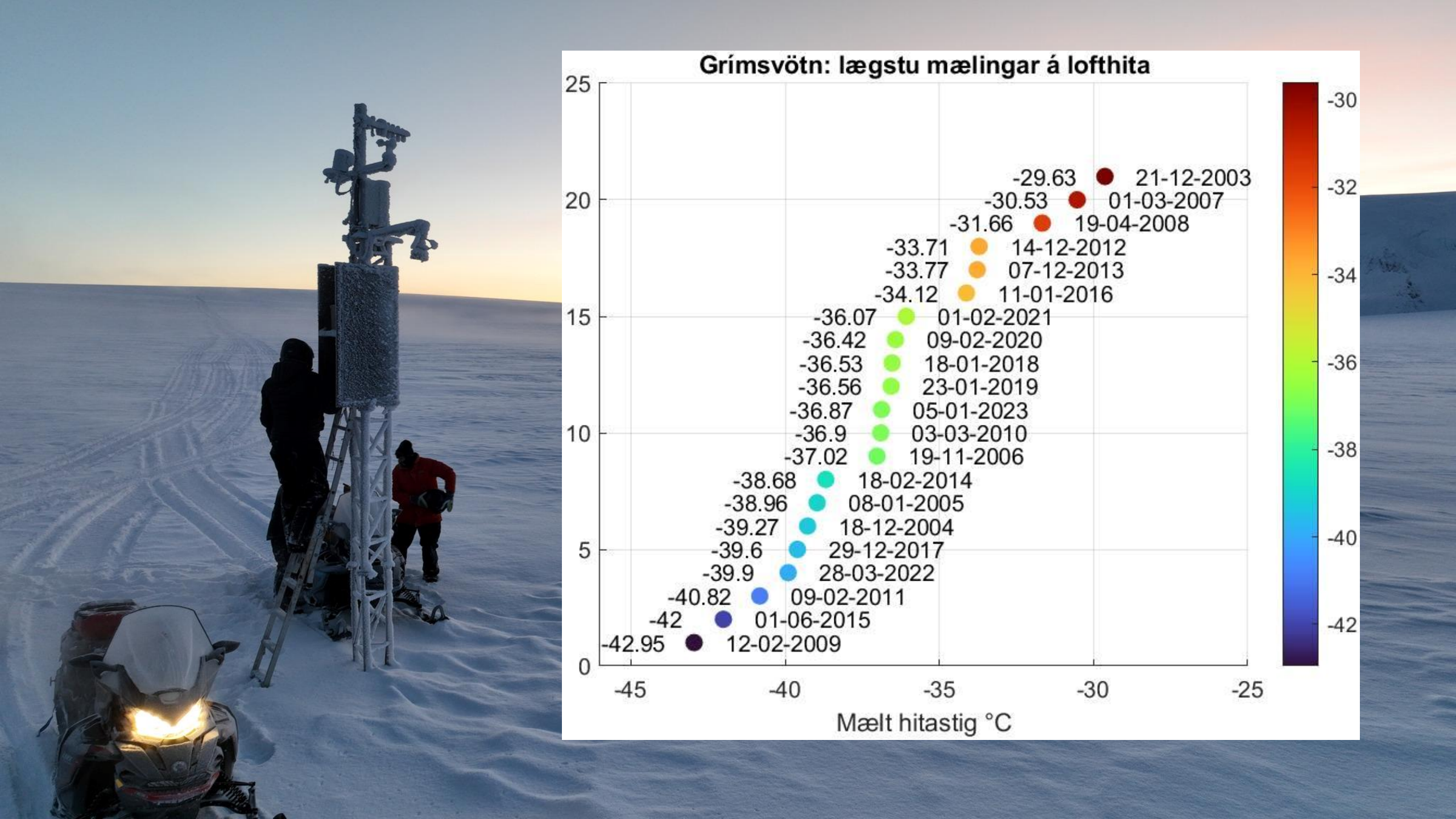
Tungnaárjökull T06
11.May 2011

Tungnaárjökull T06
1.June 2011



MODIS True Color 11.05.2011

MODIS True Color 16.06.2011


Grímsvötn: lægstu mælingar á lofthita
-29.63 21-12-2003
-30.53 01-03-2007
-31.66 19-04-2008
-33.71 14-12-2012
-33.77 07-12-2013
-34.12 11-01-2016
-36.07 01-02-2021
-36.42 09-02-2020
-36.53 18-01-2018
-36.56 23-01-2019
-36.87 05-01-2023
-36.9 03-03-2010
-37.02 19-11-2006
-38.68 18-02-2014
-38.96 08-01-2005
-39.27 18-12-2004
-39.6 29-12-2017
-39.9 28-03-2022
-40.82 09-02-2011
-42 01-06-2015
-42.95 12-02-2009
25
20
15
10
5
0
-45
-40
-35
-30
-25
-30
-32
-34
-36
-38
-40
-42
Mælt hitastig °C

Surface climatology of glaciers in Iceland:
Icelandic Glaciers Automatic Weather Station Network (ICE-GAWS)

- Samantekt allra veðurgagna á jökli frá 1994
- Kerfisbundin yfirferð með úrvinnsluskrefum
  - Frá frumgögnum að “gap-filled” samfelldum röðum
  - IceBox og Carra endurgreiningar
- Uppfært árlega með nýjum gögnum í opnu safni
  - Verið að leita að endanlegum vistunarstað
- Grein til útgáfu
- Unnið að orkuskiptareikningum

Surface climatology of glaciers in Iceland: Icelandic Glaciers Automatic Weather Station Network (ICE-GAWS)

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