Tromsø Geophysical Observatory
Faculty of Science and Technology
UiT – The Arctic University of Norway

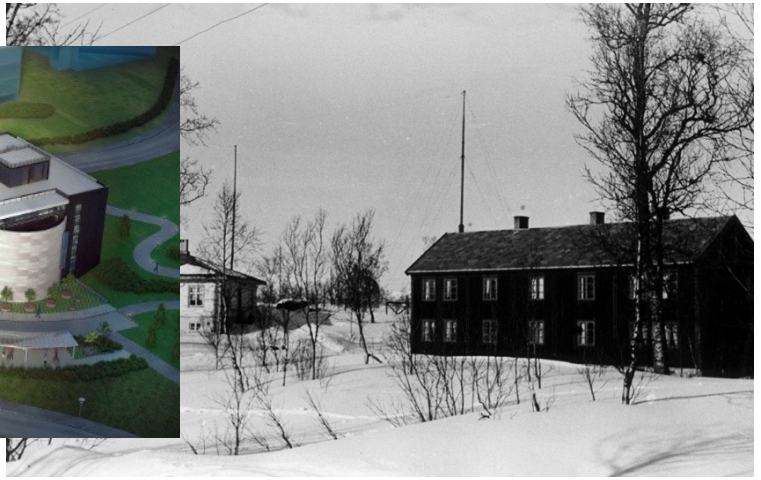
Tromsø Geophysical Observatory - magnetometer status

Magnar Gullikstad Johnsen

IMAGE meeting, Uppsala, September 2019

Tromsø Geophysical Observatory (TGO)

- Unit directly under the Faculty of Science and Technology at UiT the Arctic Unviersity of Norway
- At present 9-10 employees
  - New observer at Dombås (Mali Tungen)
  - New IT engineer (Thomas Bye Nilsen)
- Currently 2 (with one planned) positions dedicated to Space Weather projects



http://www.tgo.uit.no/

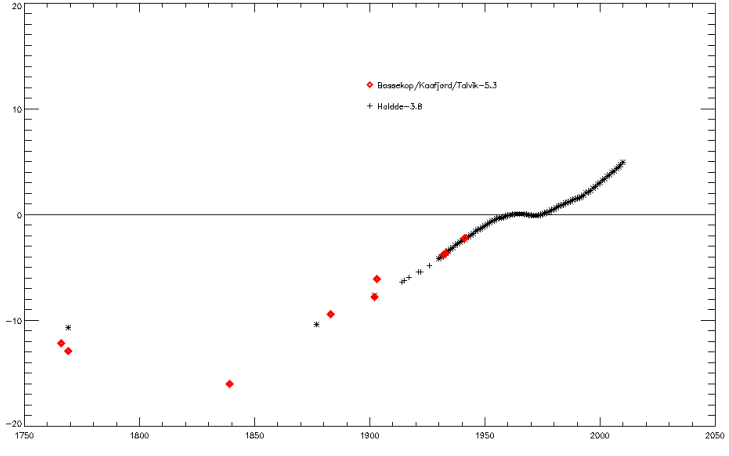
IAGA Long Service Award to Martin Berg at DOB

We are very proud!

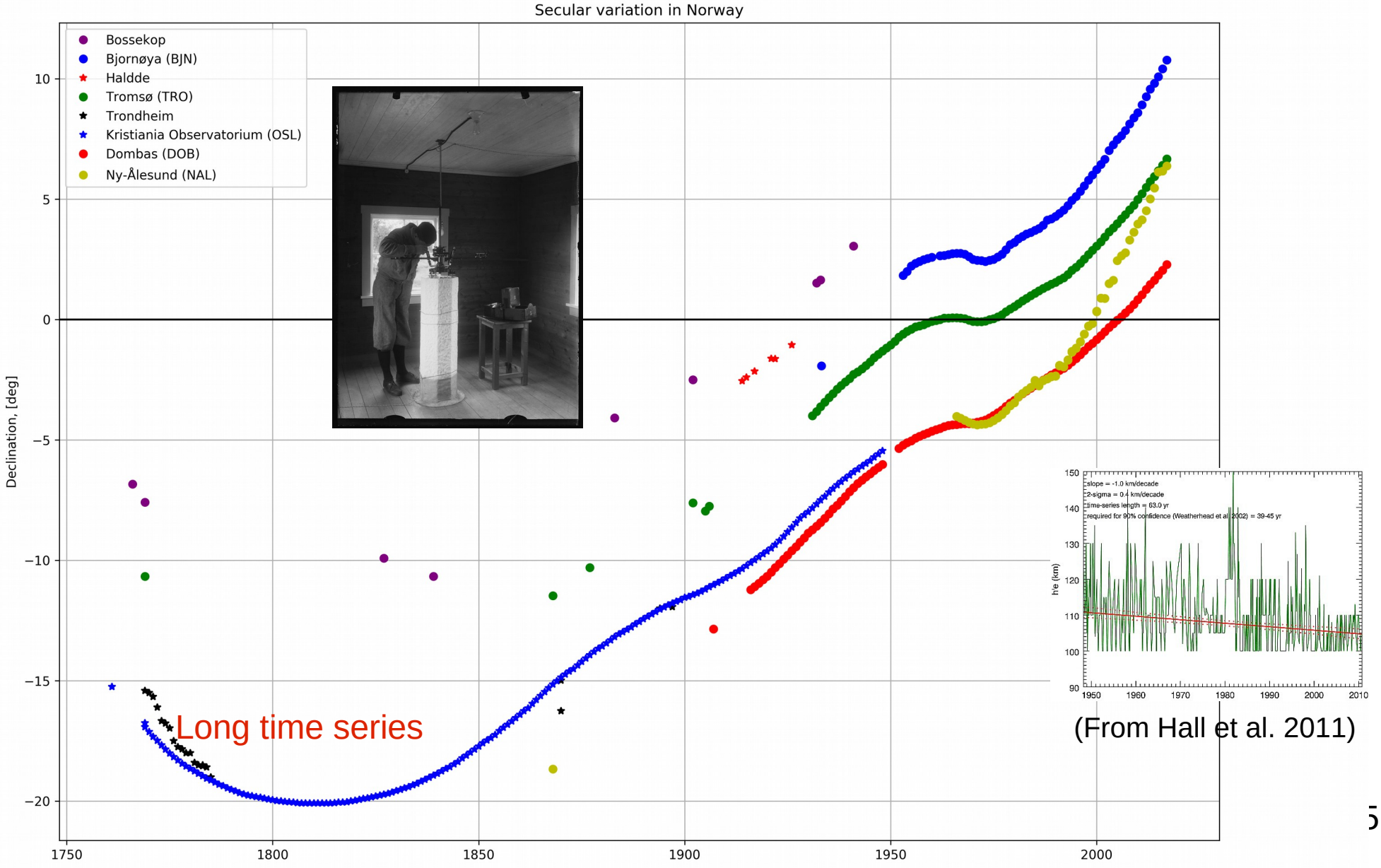
He has been serving us very well since 1980

Tromsø Geophysical Observatory

- Main Responsibility: Maintain observational time series (1928/32 – future) of the geomagnetic field in Norway (magnetometers) and electron density profile above Tromsø (ionosonde).
- Responsible for the Ramfjordmoen Research Station outside Tromsø (co-located with the EISCAT Incoherent Scatter Radar)
- Space Weather



Tromsø Geophysical Observatory main responsibilitiy in a nutshell:



Long time series

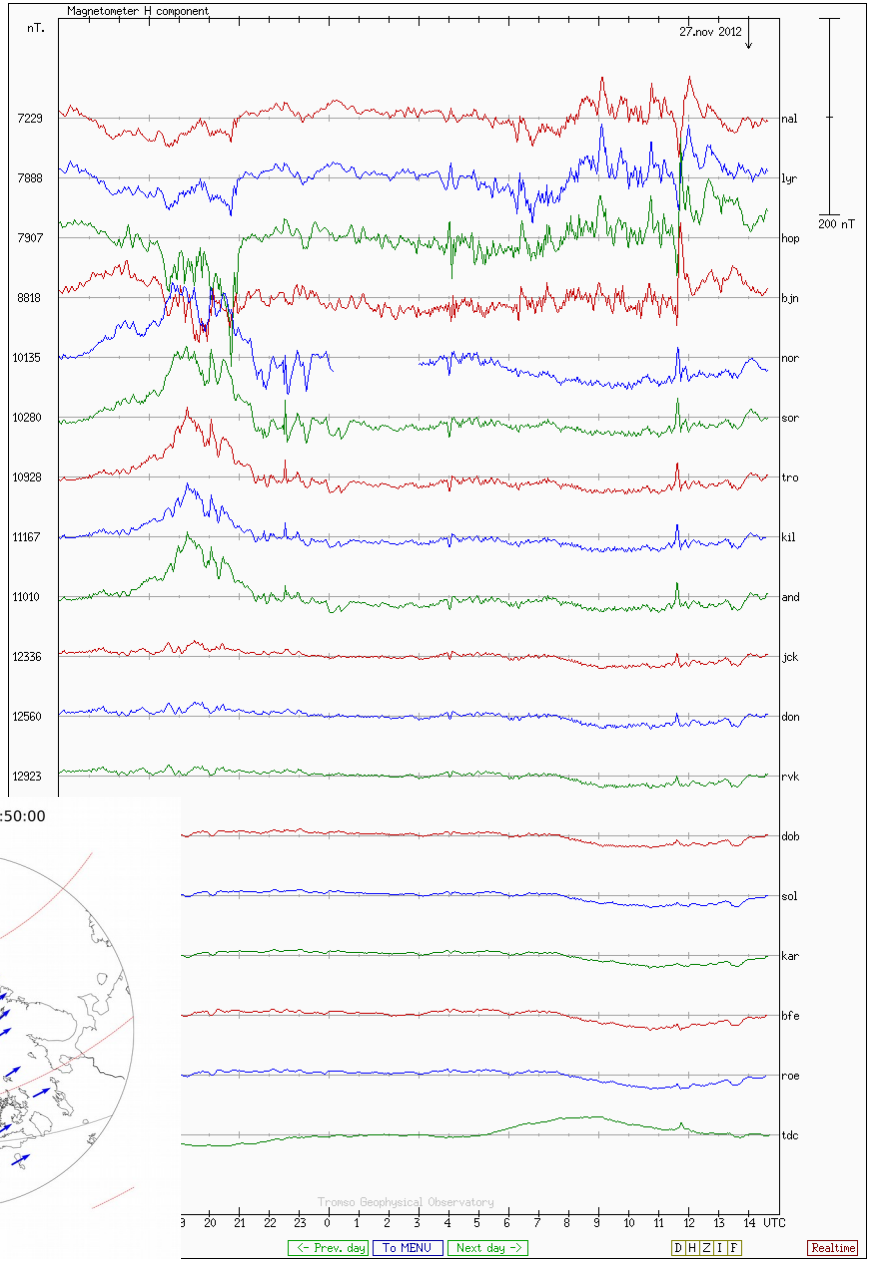
(From Hall et al. 2011)

TGO - Instrumentation

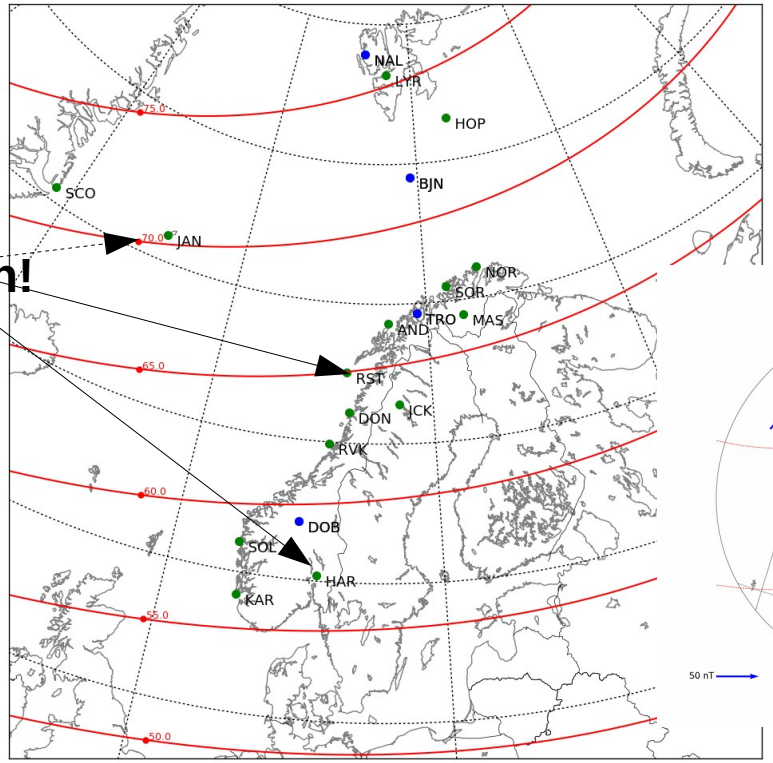
- 19 magnetometers distributed across mainland Norway, Sweden, Barents Sea, Greenland.
    - Greenland currently not operational
    - TDC ended
- Ionosonde outside Tromsø
- SOUSY MST radar on Svalbard
- MF radar and Meteor radars in cooperation with other institutes
- Riometers at Skibotn and Ny-Ålesund
- Colour All-sky imager in Skibotn
- Hosting a wide range of other instruments such as GPS receivers, LIDAR, spectrometers, photometers,camera systems, etc.

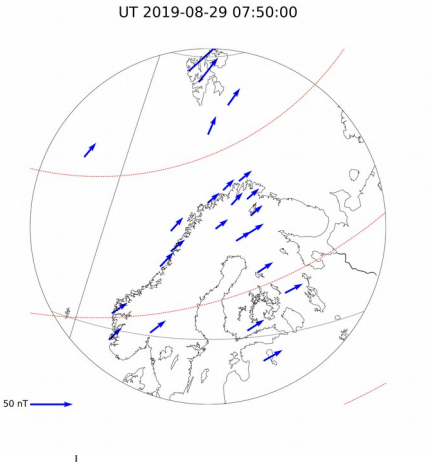
TGO Magnetometers (tgo.uit.no)

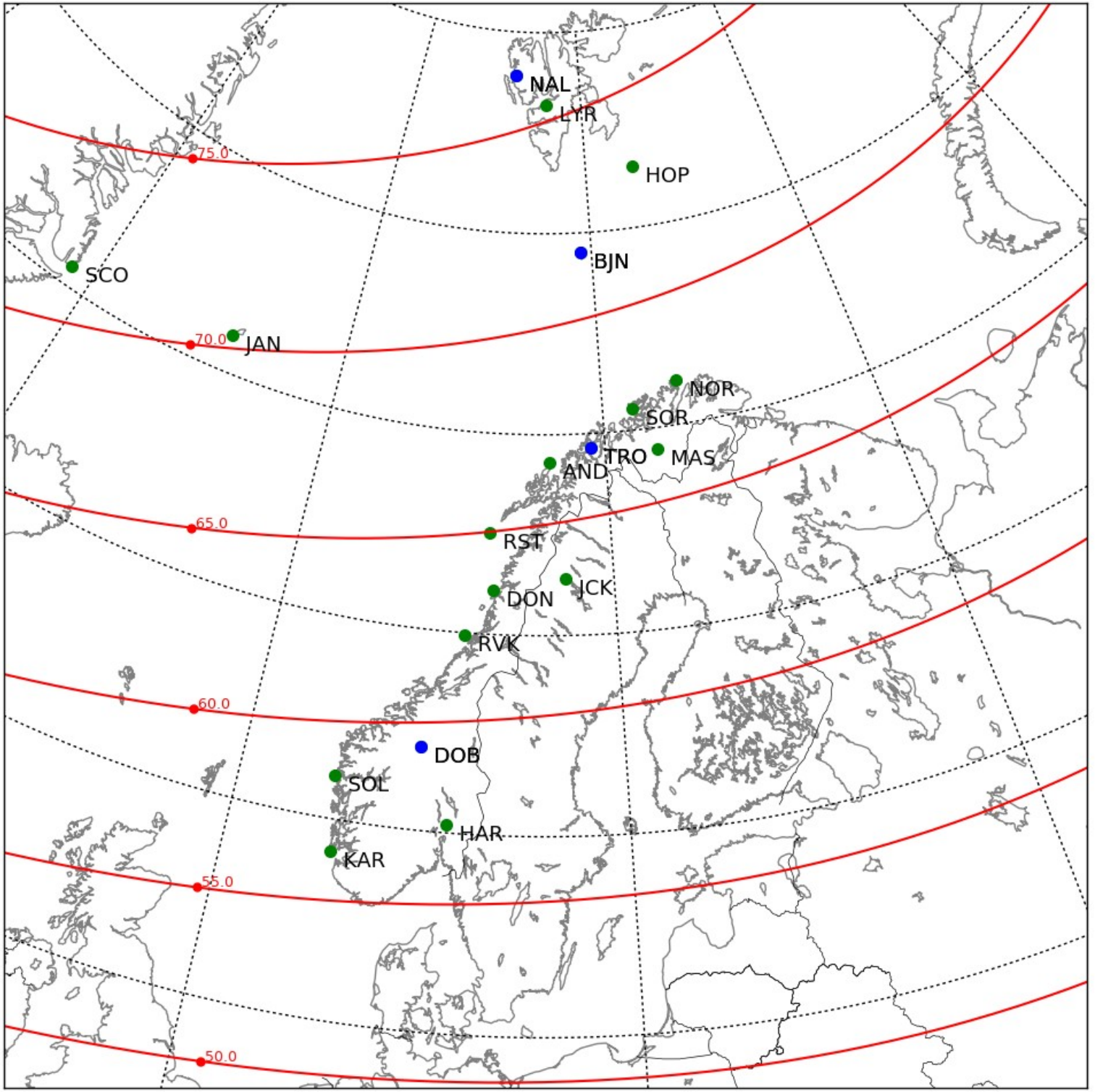
- 16 variometer stations and 3 magnetic observatories
- Real-time data.
- Near real-time data access (within 5 minutes) from >90 magnetometers through TGO web-pages (plots, ascii data only from TGO and DTU after agreement)



Newish!







Re-established:

JAN (Sep 2014)

New:

RST(May 2017)

HAR(May 2017)

Moved NOR sensor 10 meters

No new deployments for a while after this.

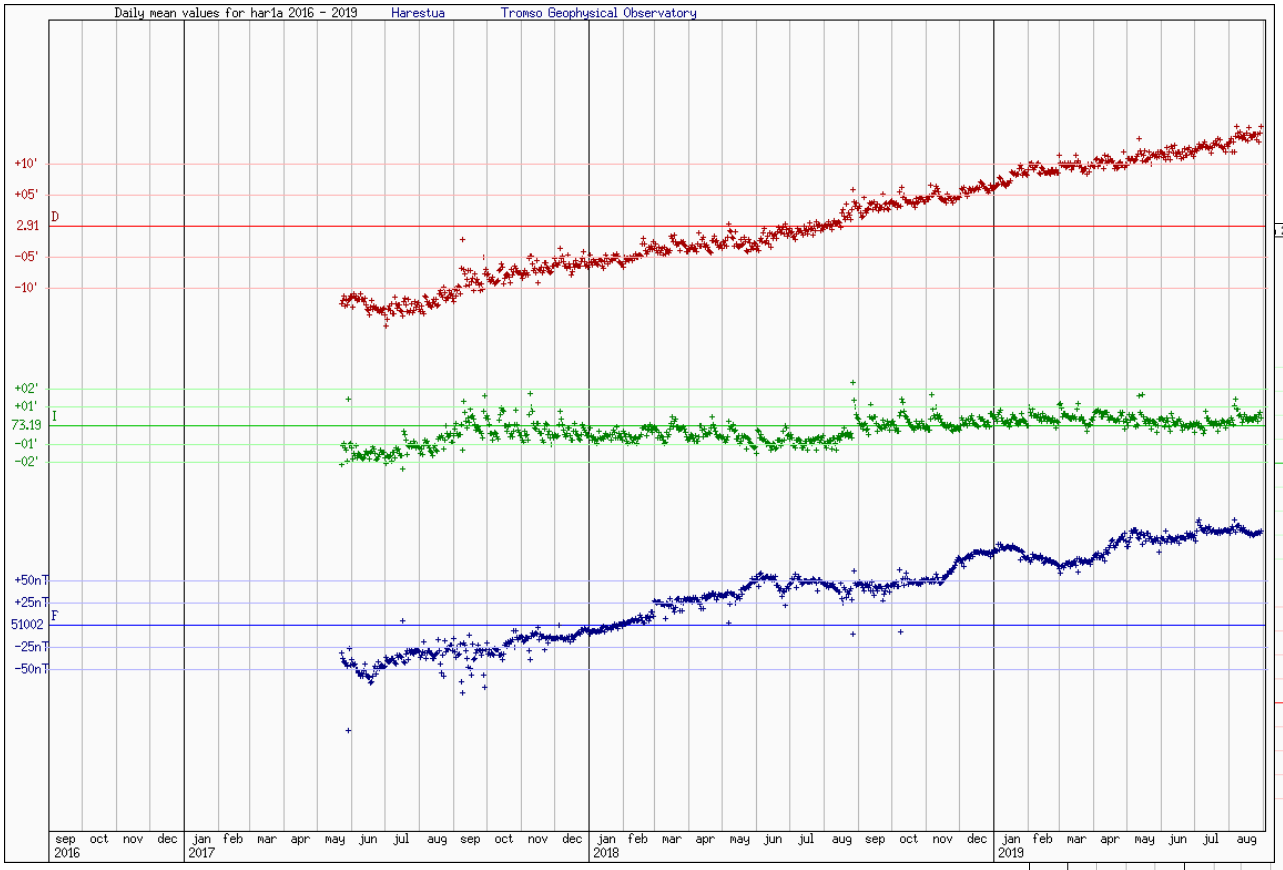
TGO magnetometers

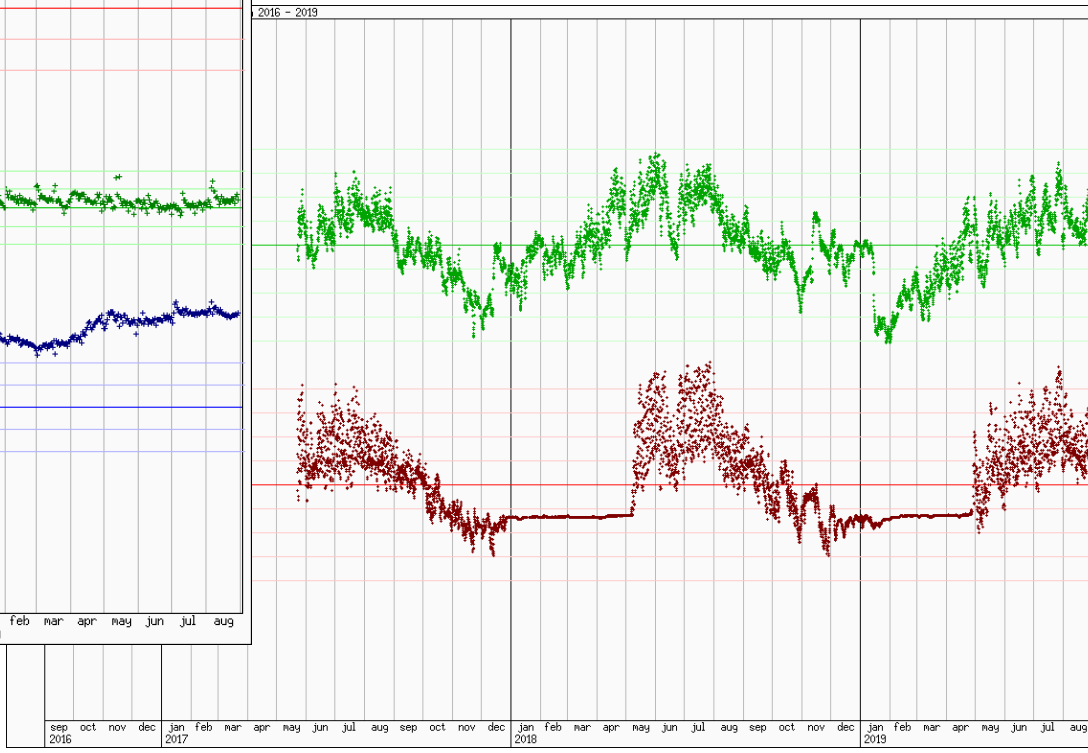
- Flux-gate, own design and development based upon early Danish desing.
- 2 Hz sampling → downsampled to 10 second resolution.
- Sensors:
  - Suspended Danish at DOB
  - Different generations (plastic → aluminum)
  - New DI sensors (TRO, RST and HAR)

Dombås Observatory

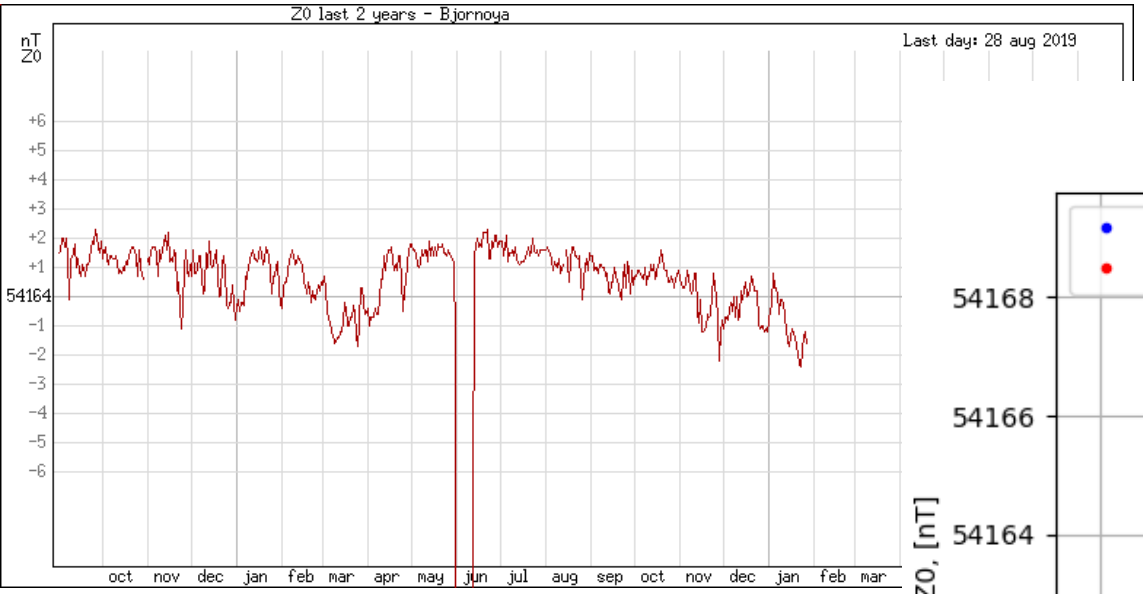
Nordkapp

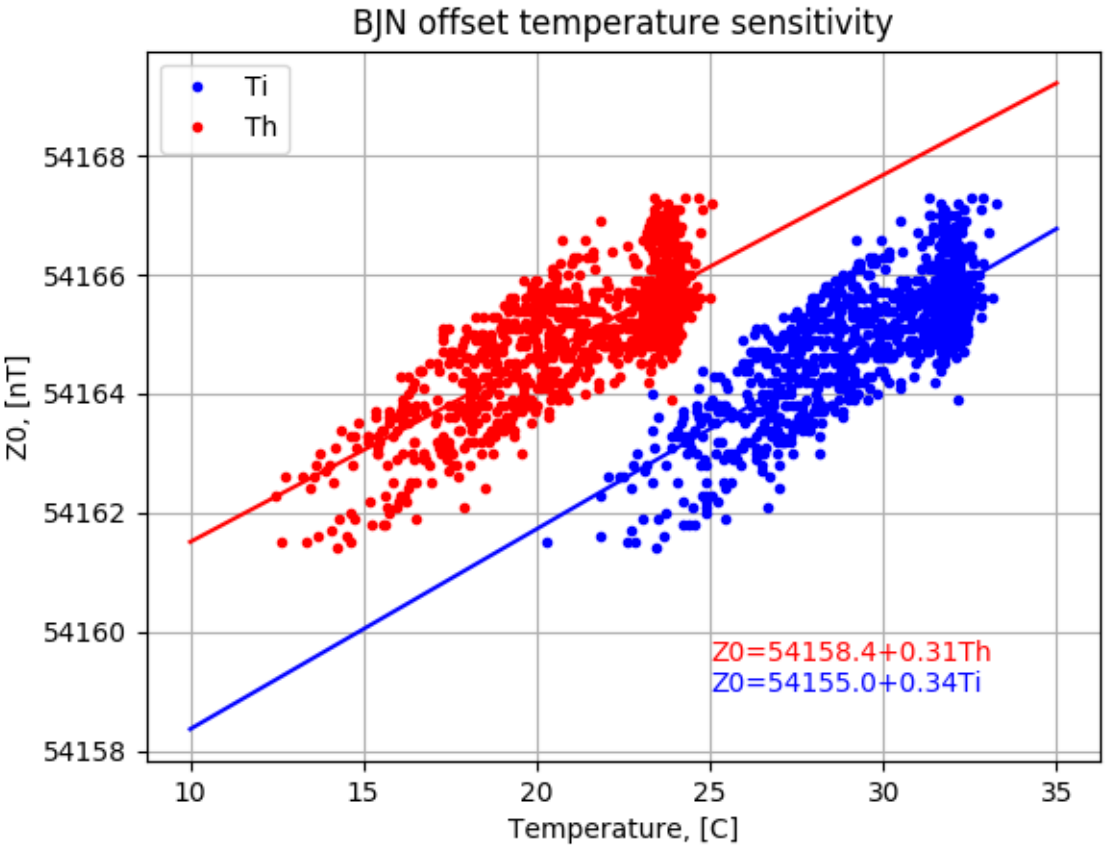
Temperature sensitivity





Temperature sensitivity

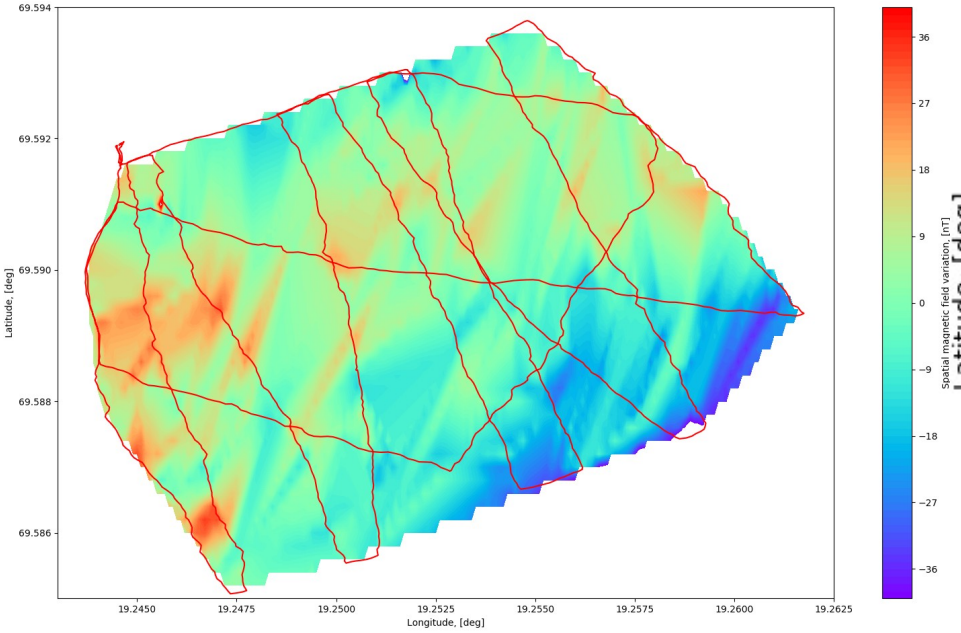


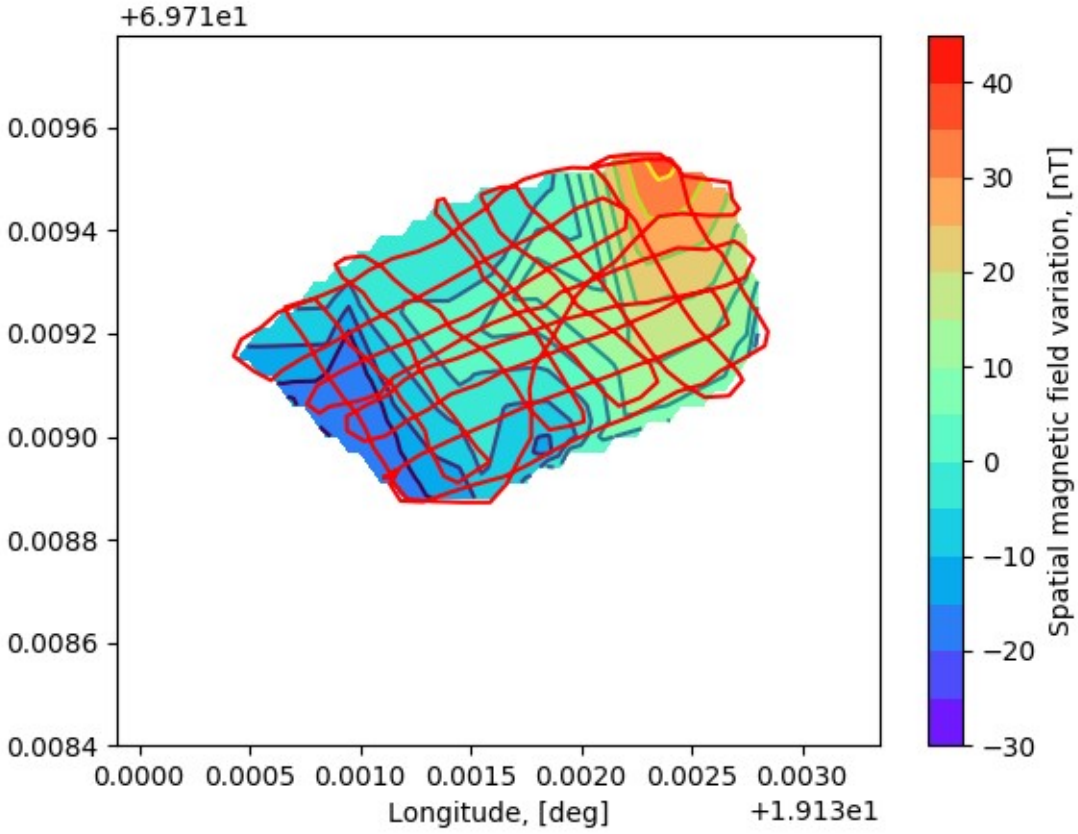


- Looking into insulated and heated box around sensor solution
- Lowered temerature in room hoping for smaller fluctuations

Magnetic surveying around Tromsø

- Have done surveys at two locations outside Tromsø for potential new observatory location
- Pro active since our neighbor Kongsberg Satellite Service (Coo-coo) tries to push us out.
- Difficult to find good locations that are close enough





Absolute mesurements

- We have ordered an AutoDIF
  - Test in Tromsø
  - Deploy at BJN
- IF EPOS-N application is secured (will know around Sept 6.):
  - ➔ More AutoDIFs (2 or 3)
  - ➔ Maybe work towards Intermagnet membership?

Photo: Kakioka magnetic observatory

Ny-Ålesund Magnetic Observatory

IAGA code: NAL

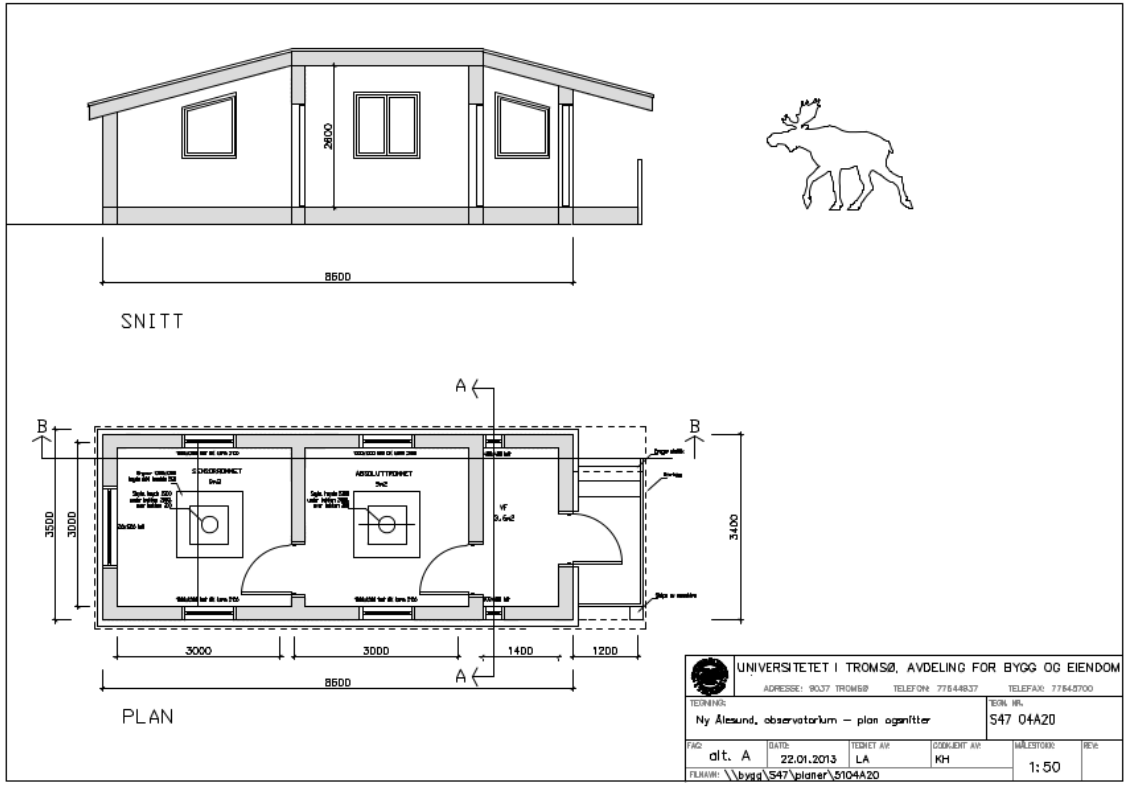
1966 – 2000

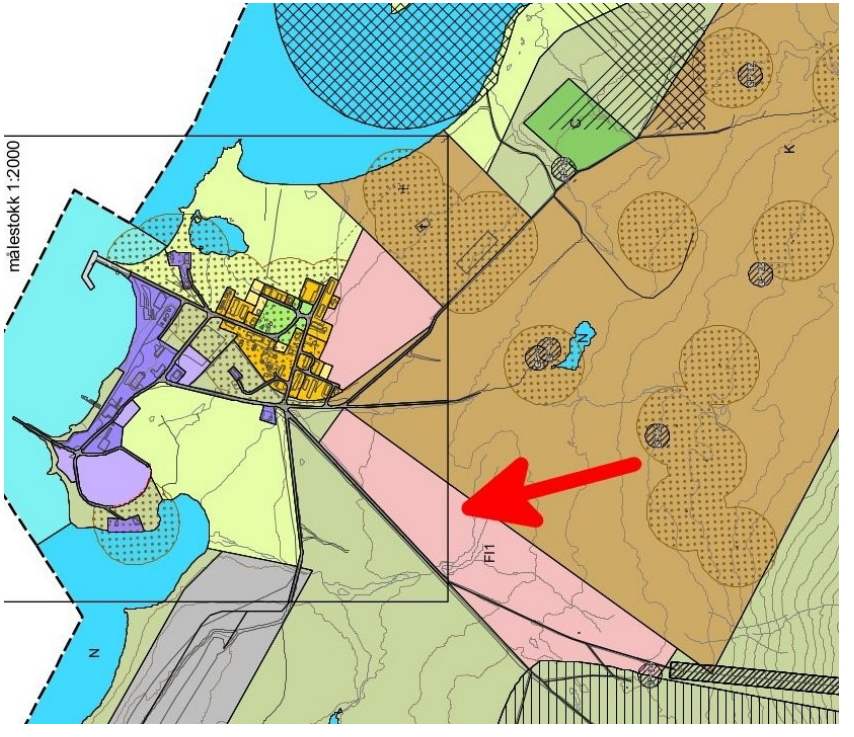
Degraded to variometer owing to poor stability

Working to get new building, slowed by bureaucracy

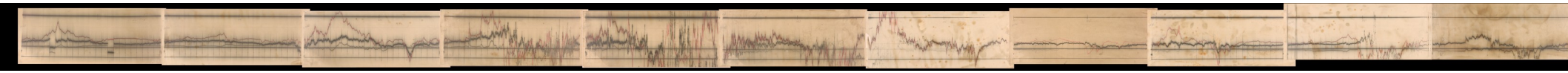
Ny-Ålesund (NAL)

- Work is going on for a new site and building in Ny-Ålesund
- Funding is secured, but process is slow.
- New Land Use plan, might give new oportunities for better site





Digitization

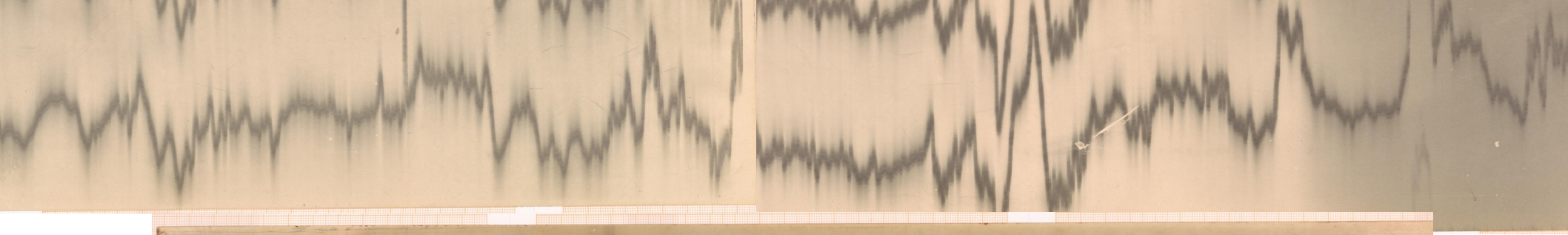


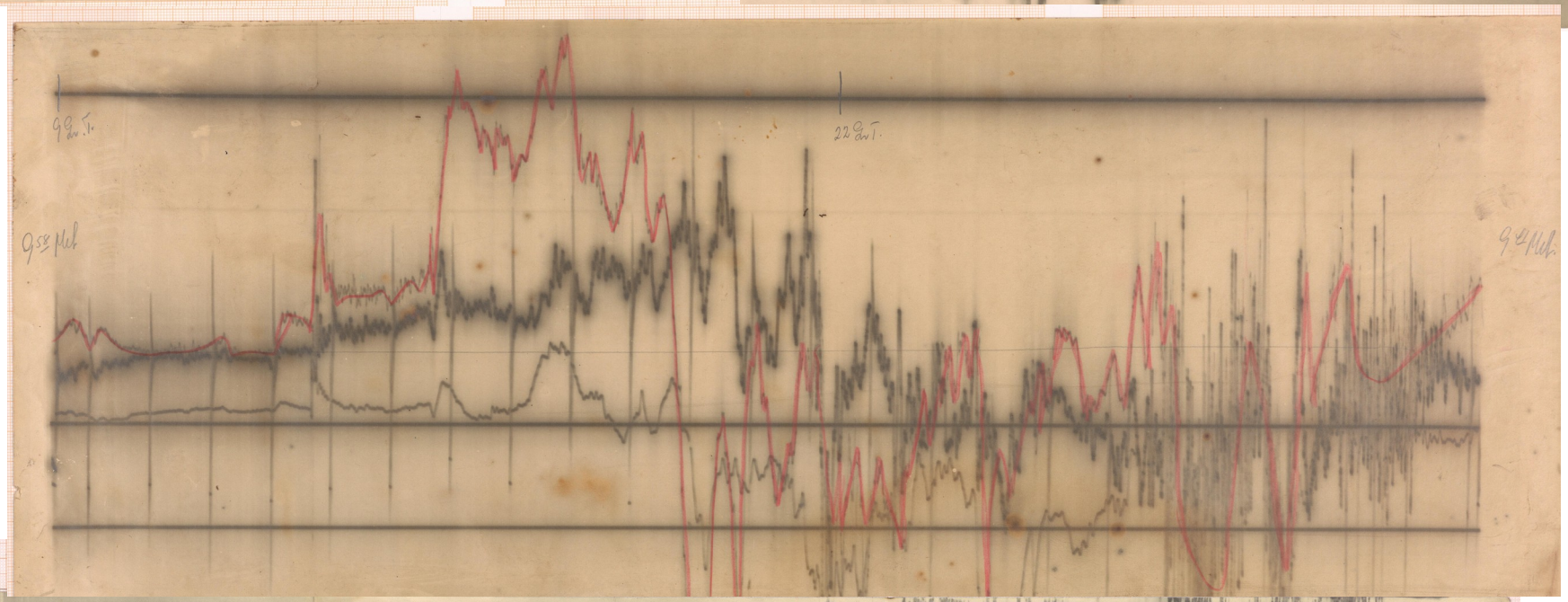
May 1921 event magnetograms:

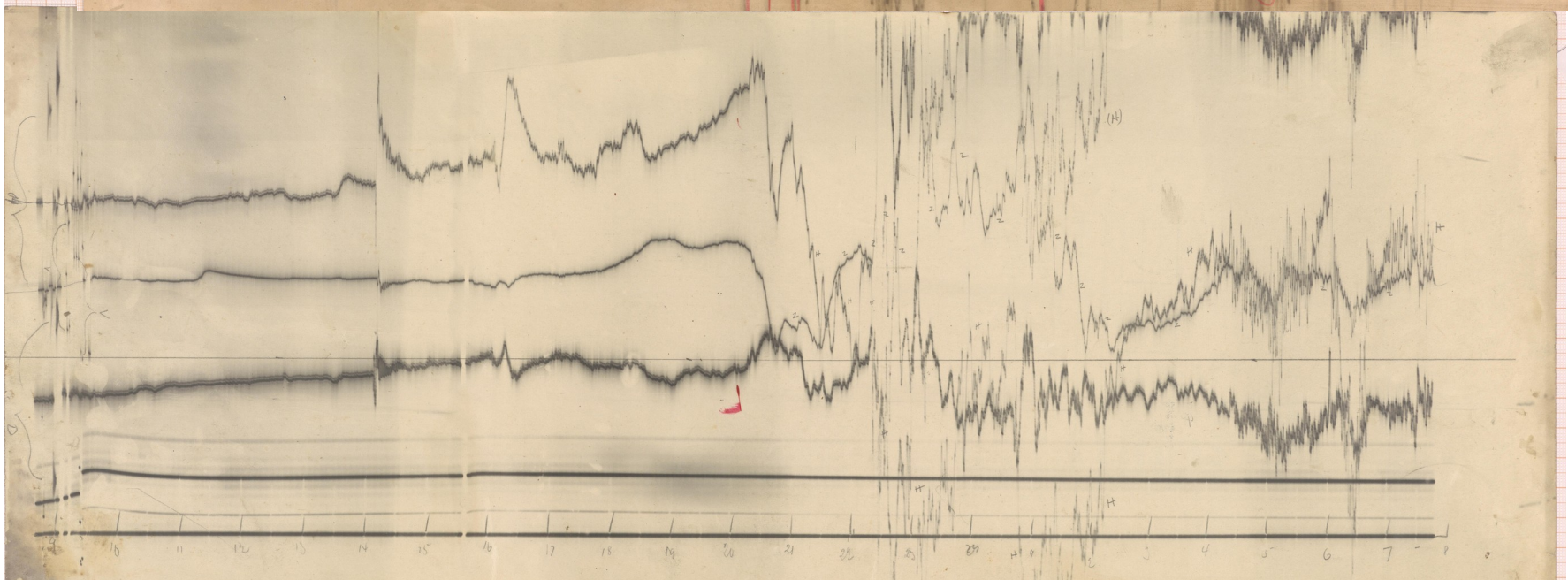
- Quade Hook (Svalbard)
- Haldde
- Dombås

Vagabond currents (GIC):

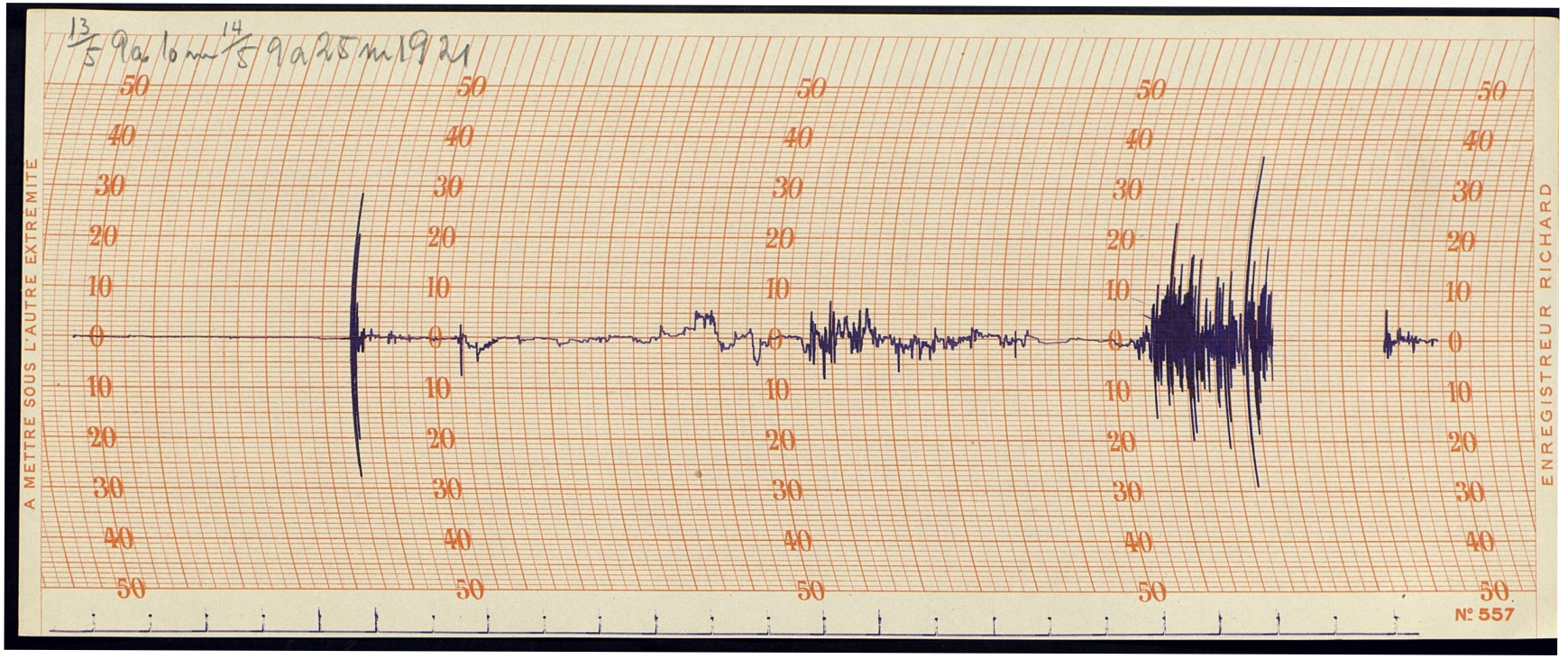
- Alta

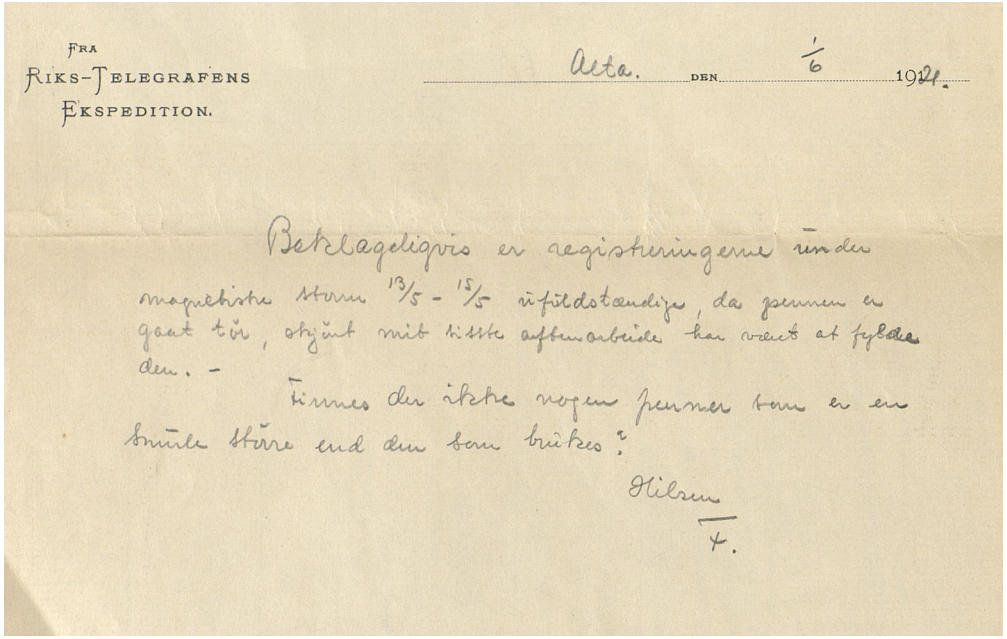






Vagabond currents





FRA
RIKS-TELEGRAFENS
EKSPEDITION.

Alta. DEN 1/6 1921.

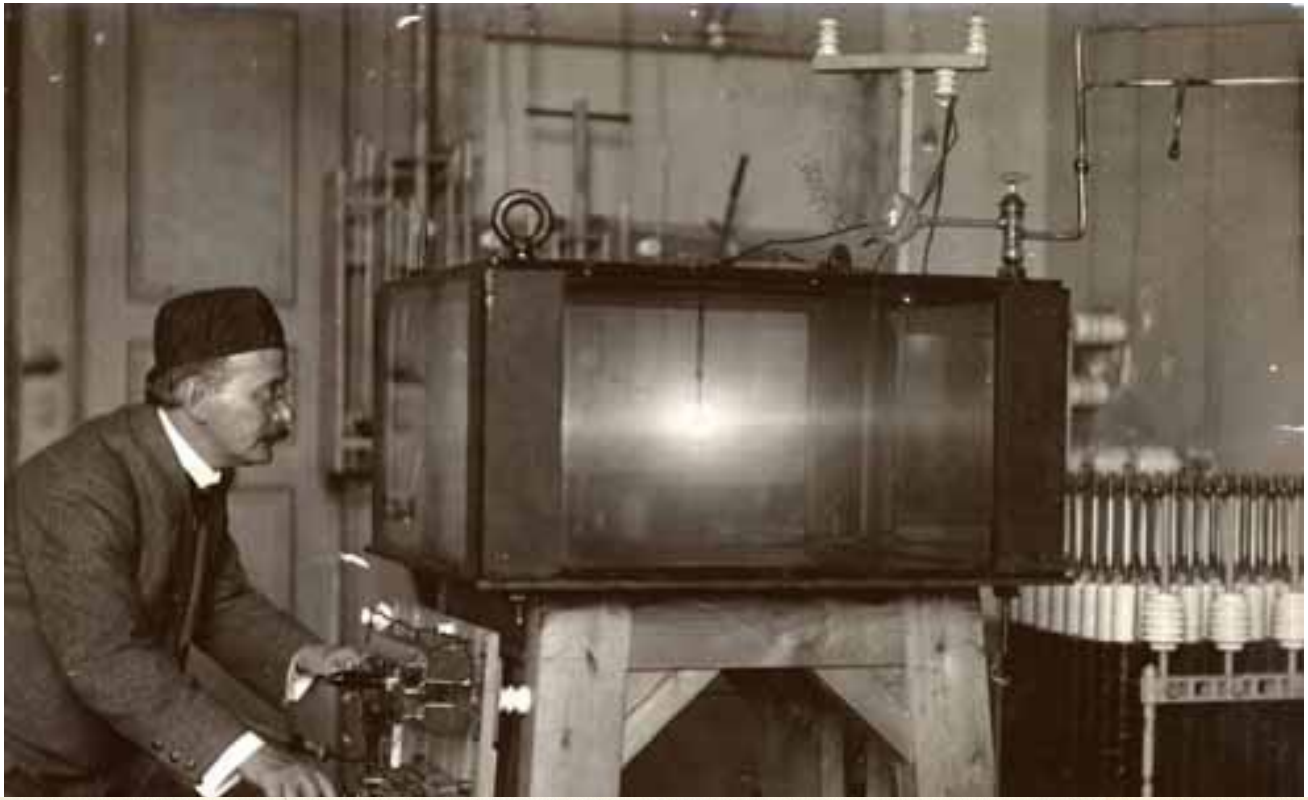
Beklageligvis er registreringerne under magnetiske storm 13/5 - 15/5 ufuldstændige, da pennen er gaat tør, skjønt mit sisste aftenarbeide har vært at fylde den. -

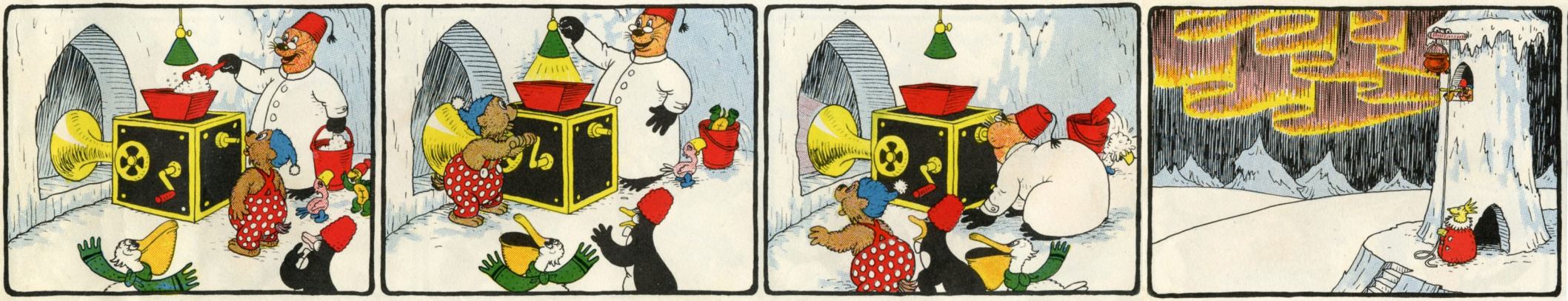
Finnes der ikke nogen penner som er en smule større end den som brukes?

Hilsen

F.

Spørsmål? (magnar.g.johnsen@uit.no)





- Nu må I både se og høre godt efter! Maskinen her, med håndsving og grammofontragt, har jeg selv opfundet. Man tager 3 strøgne skovlfulde fin, frossen sne -!

- Og medens du, Klump, drejer kraftigt på håndsvinget, tænder jeg lyset. På den måde bliver sneen og lyset blandet sammen. Jo bedre blanding, des smukkere resultat!

- Og nu skal der pustes og p-u-s-t-e-s, og I skynder jer hen til vinduet og ser, hvad der sker, når man blander sne og lys sammen og puster!

- Næh! Maskinen laver nordlys, hvor er det smukt!
- Kan I huske, første gang vi så det, da blev vi lidt bange?
- Sådan en maskine ville jeg gerne have!