

Sarah Schultz Beeck

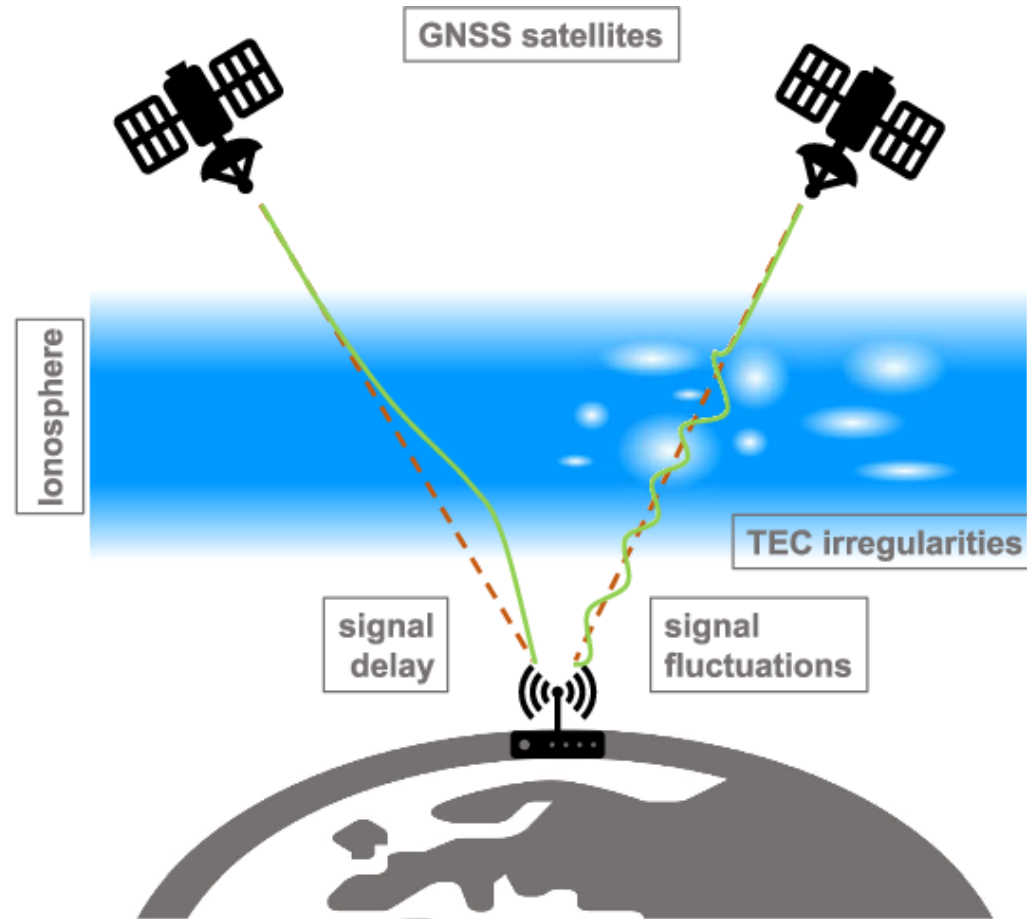
Ionospheric effects on GNSS signals in Greenland

Purpose

- The purpose is to investigate the possibility of near real time monitoring of the ionosphere above Greenland
- The motivation is that ionospheric scintillations can affect navigation in Greenland, where military activity, tourism, and transportation may be affected
- The effects can occur anytime during the solar cycle, but are more prominent during solar maximum

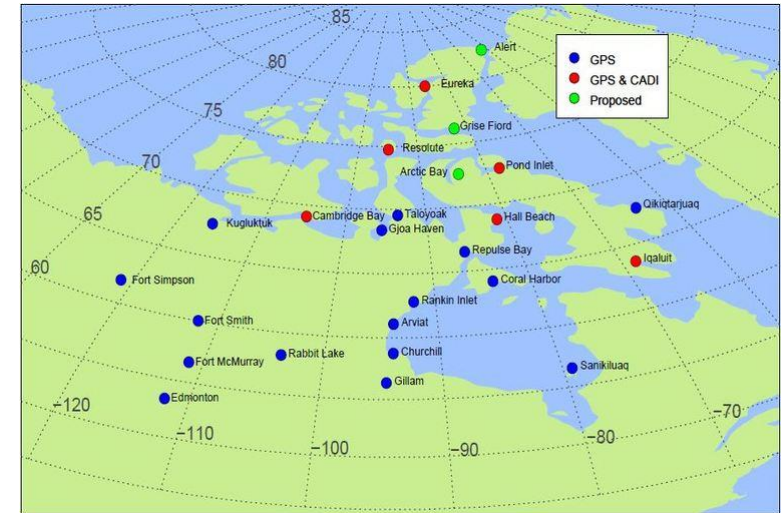


Ionospheric scintillation

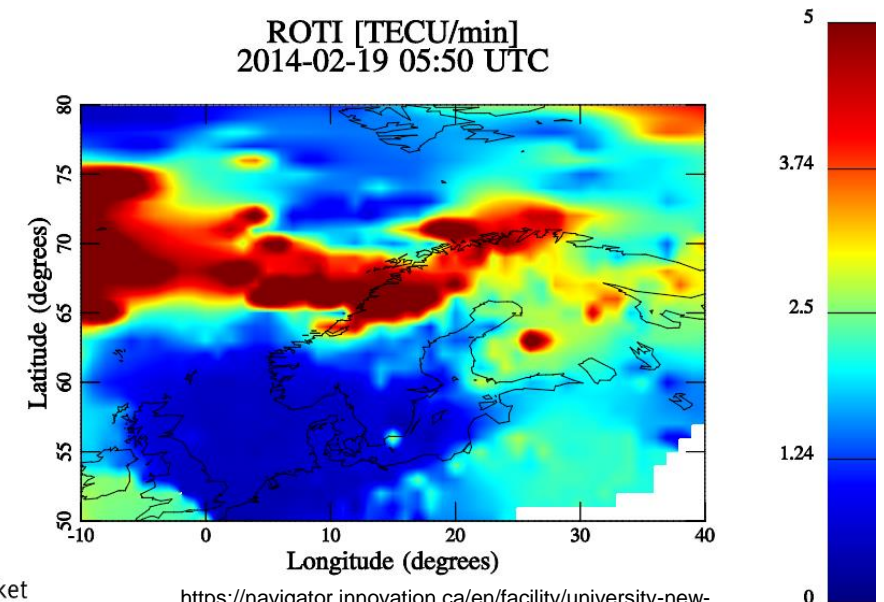


Other monitoring systems

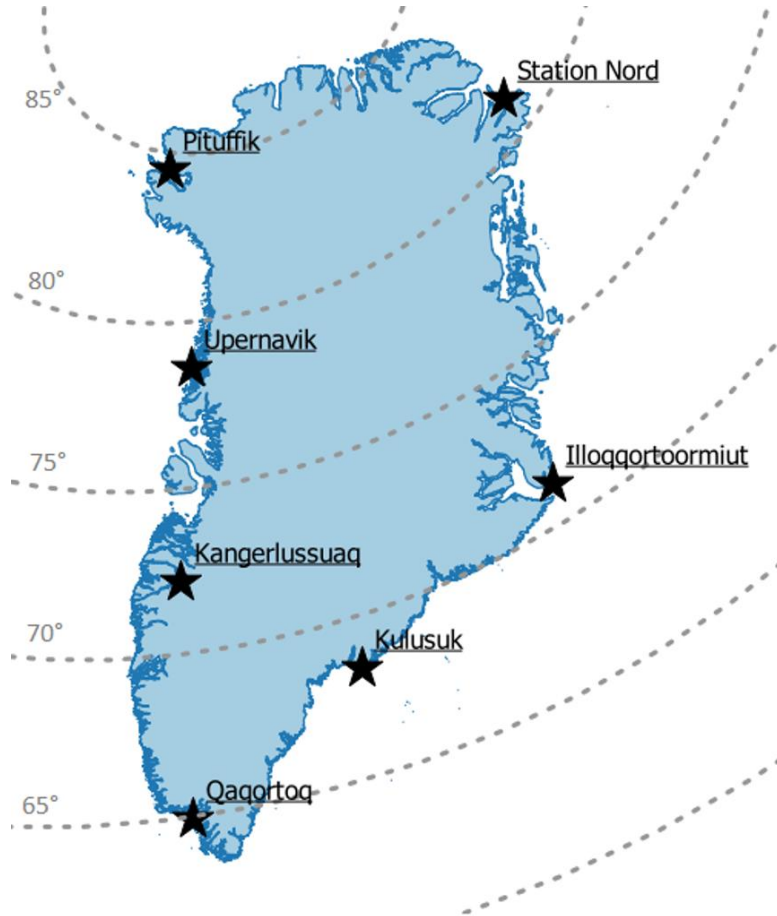
- CHAIN – Canadian network of scintillation monitor
- Norwegian Mapping Authority – TEC and ROTI maps above Scandinavia
- GNET – There are currently two PolaRx5S receivers in Greenland



ROTI [TECU/min]
2014-02-19 05:50 UTC



The SWADO network



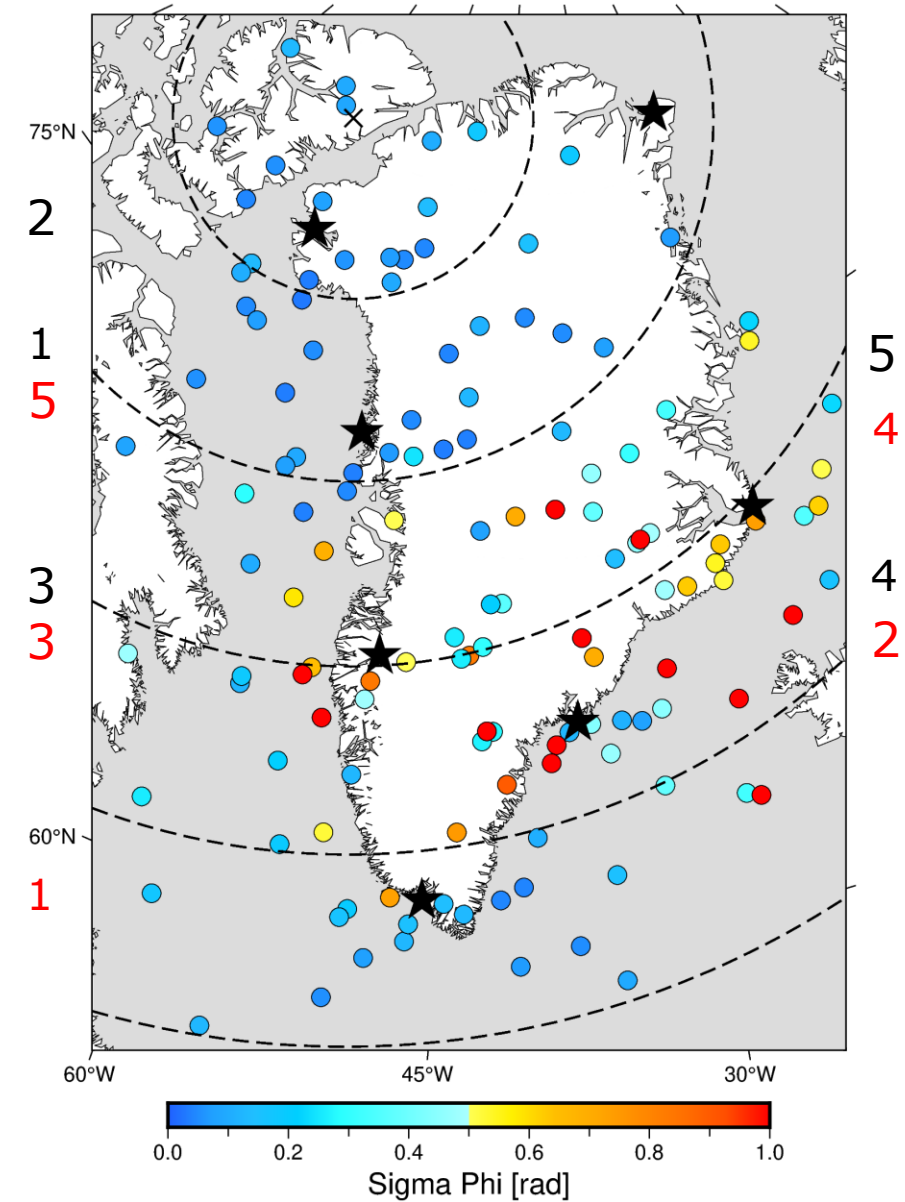
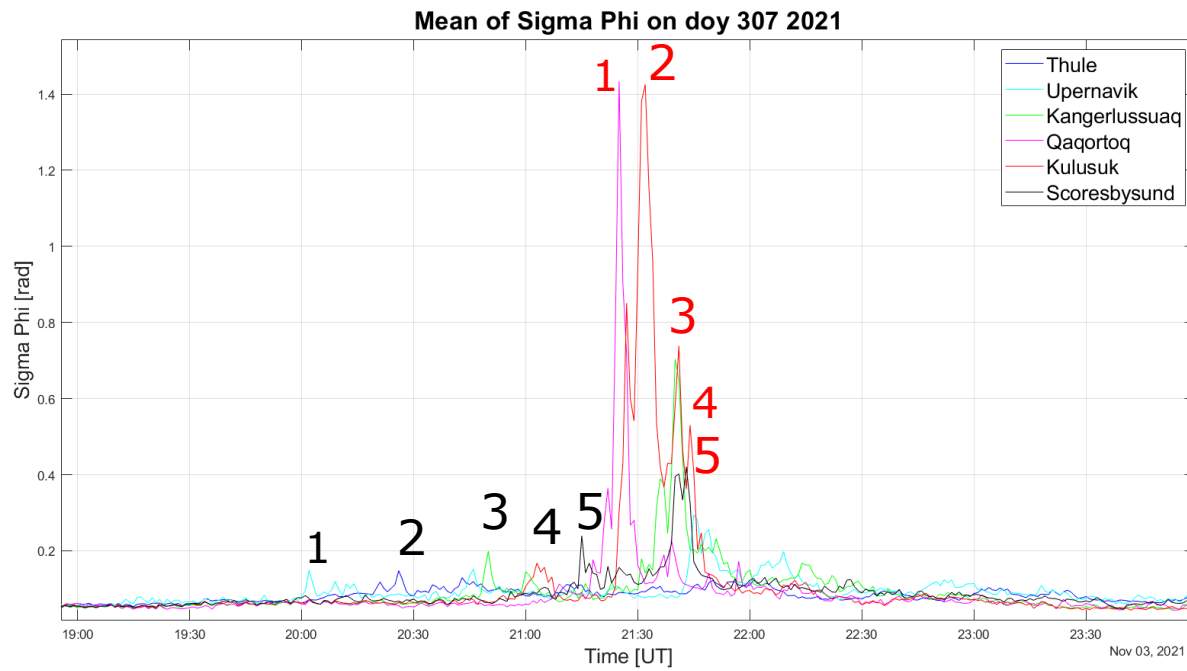
Multi frequency multi constellation receiver

GISTM – GNSS ionospheric scintillation and TEC monitor

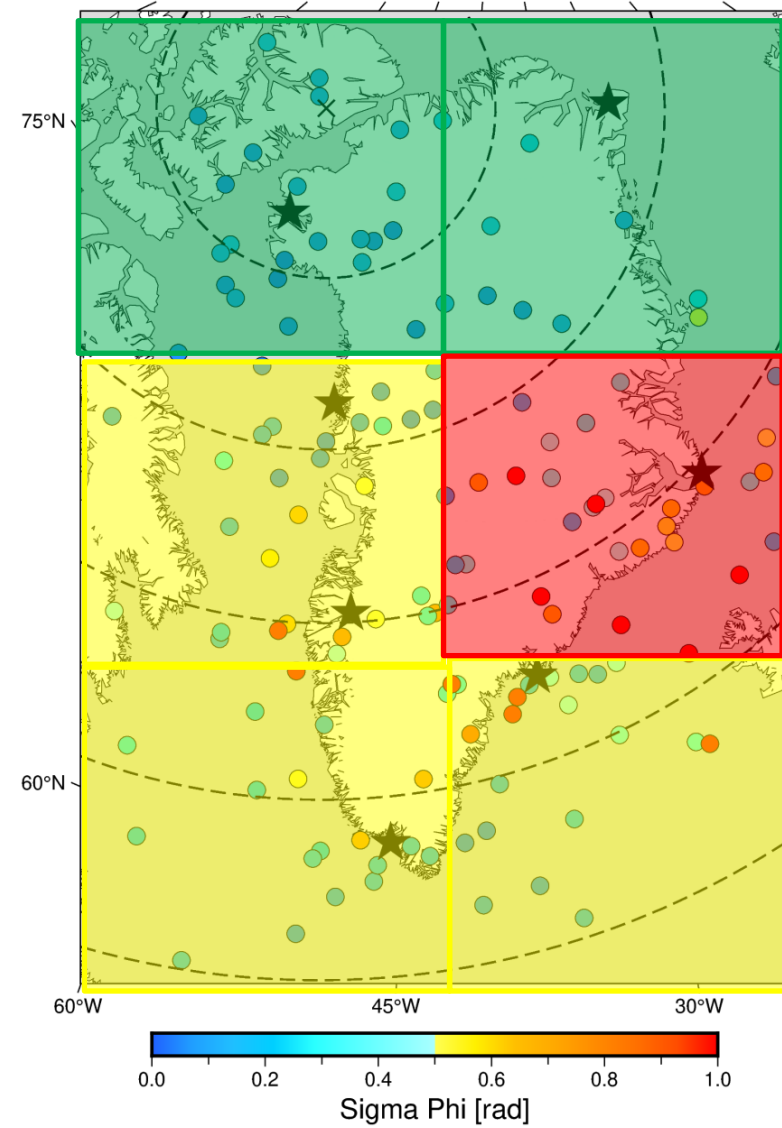
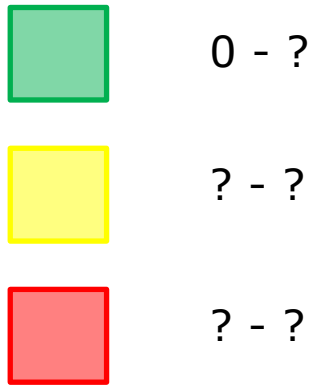
Samples at 100 Hz

Computes ISMR files with 1-min resolution at the station

Visualisation of event

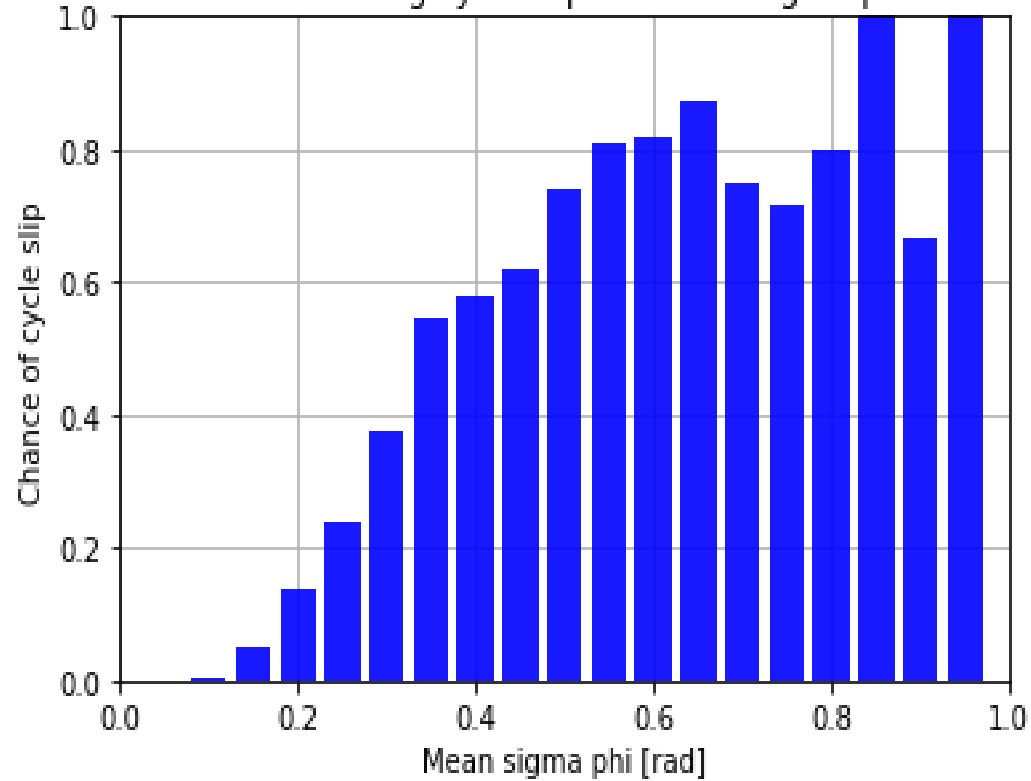


Impact map



How do we find a threshold?

KLQ2: Percent of intervals containing cycle slip vs. mean sigma phi over 15 min on Galileo.



Depends on:

- Type of receiver
- Position of receiver
- GNSS constellations
- Time of data collection

Work at the University of Bath

Compare sigma phi data with simulated sigma phi, to test the scintillation module for Greenland.

Run scintillation scenarios and investigate how Galileo and GPS are affected.