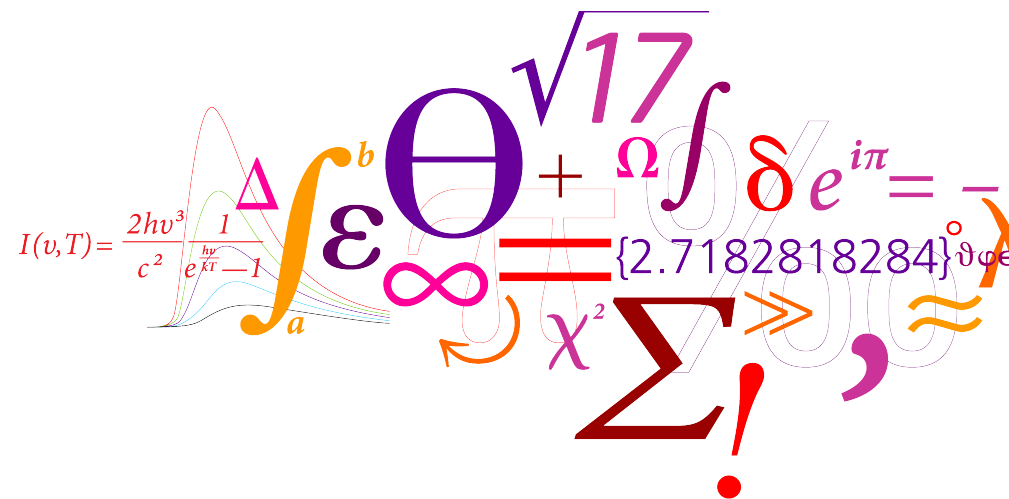


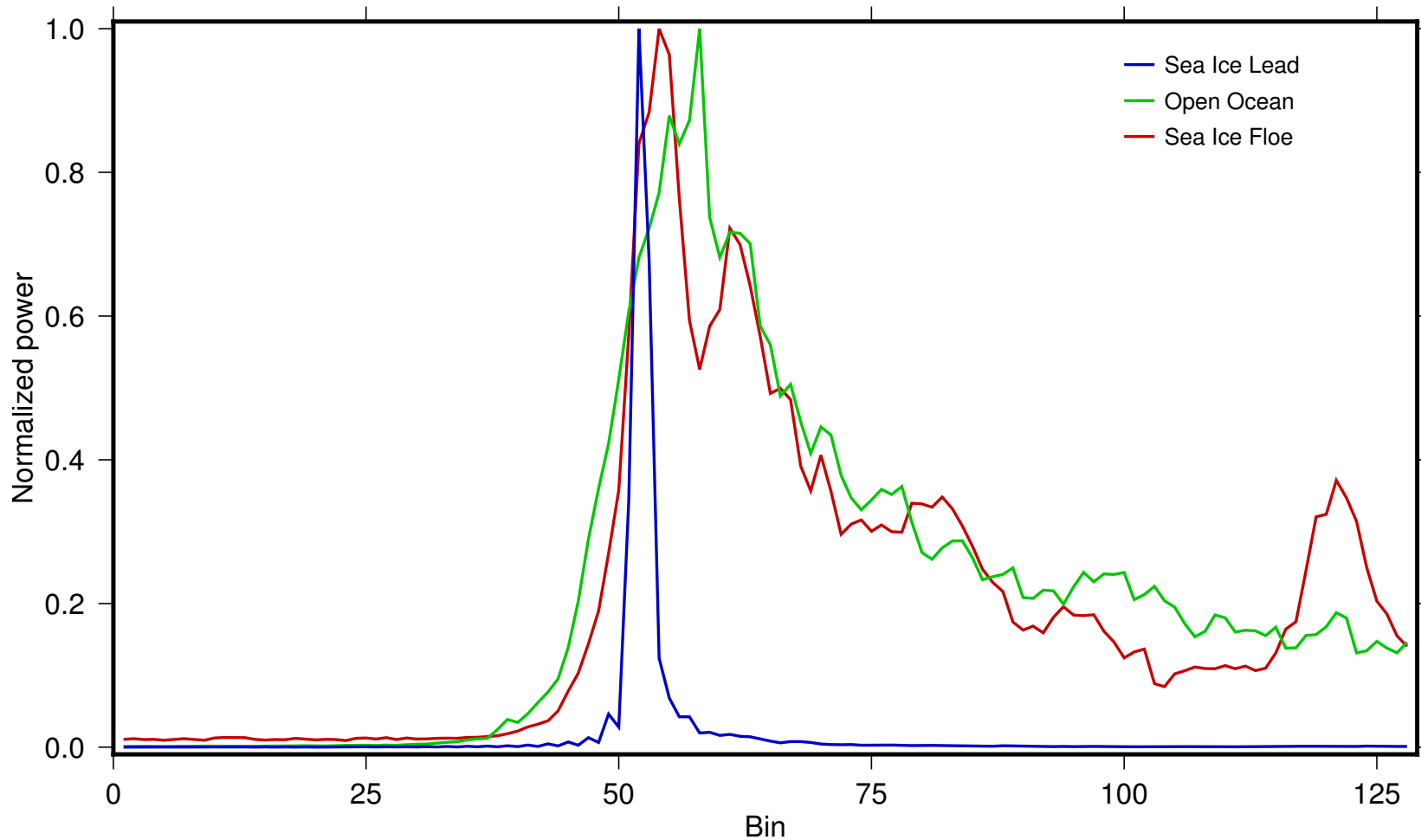
# Polar Ocean

Lars Stenseng

Ole B. Andersen

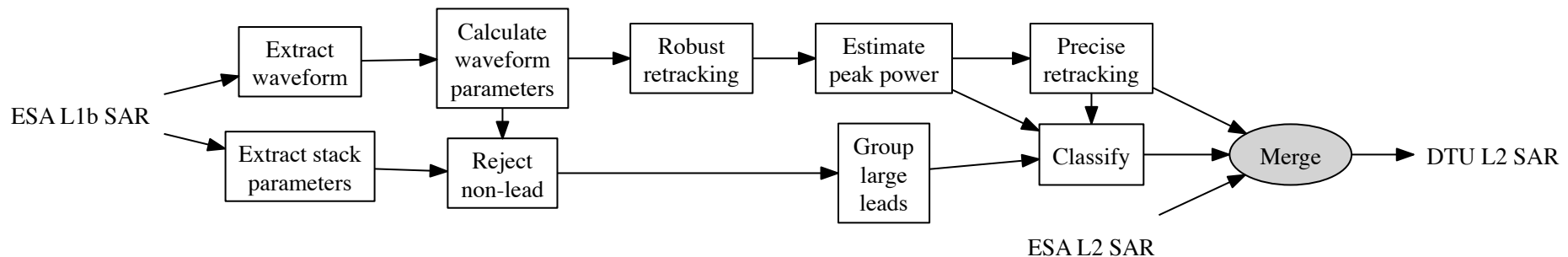


# Typical Arctic waveforms



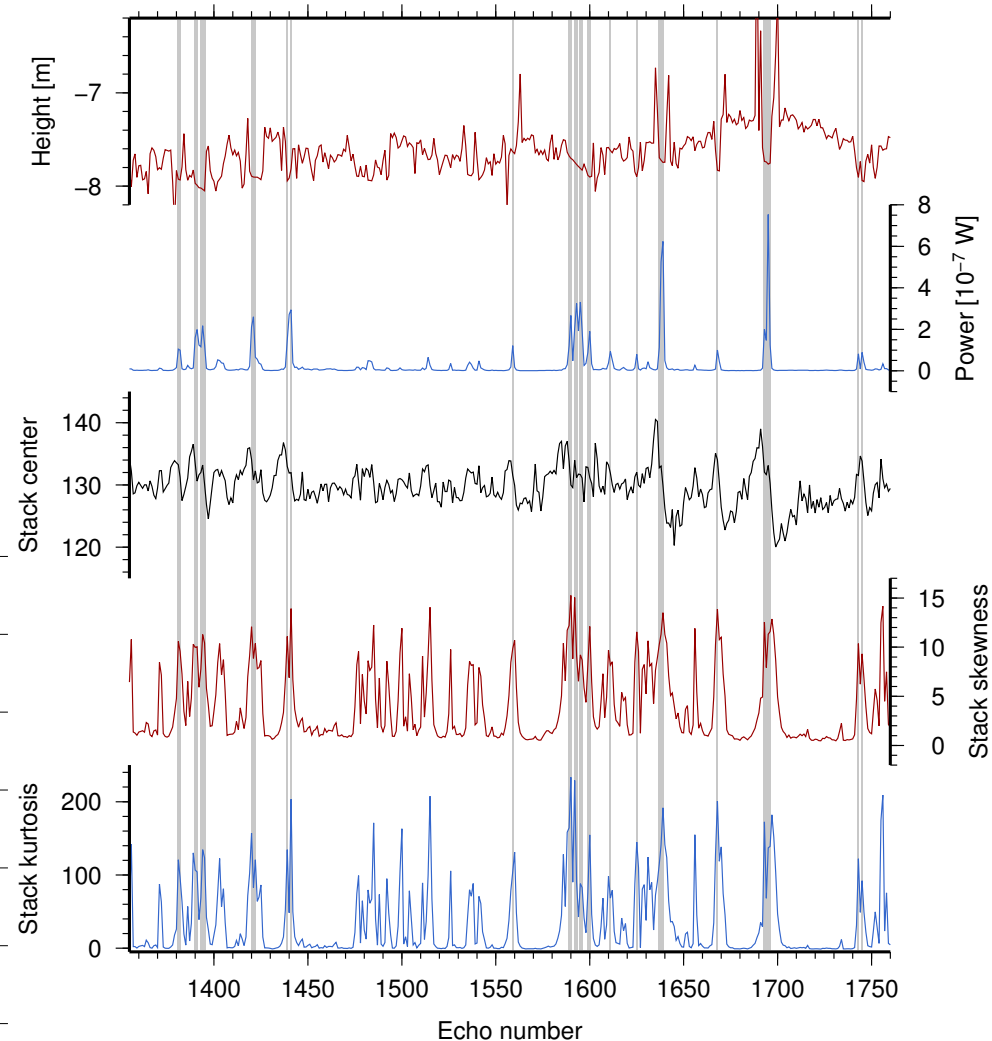
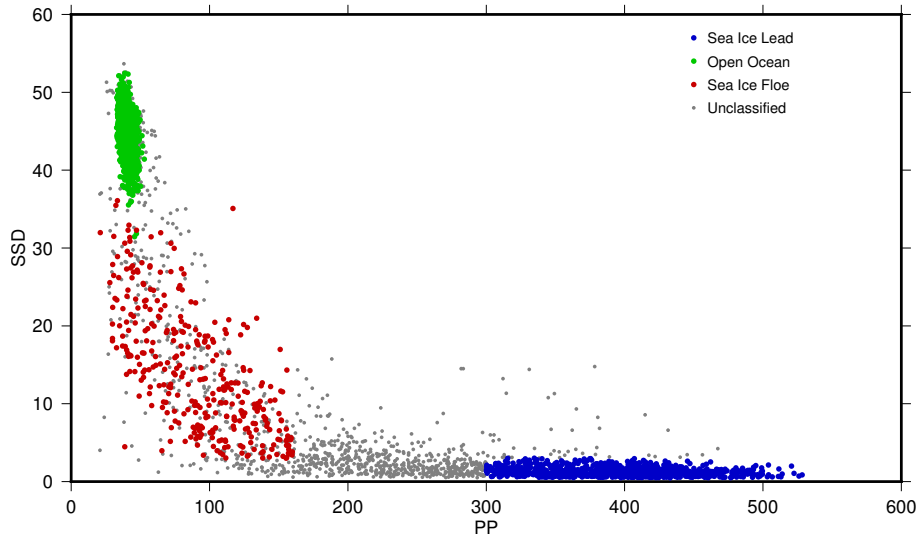
# LARS (LARS the Advanced Retracking System) Polar Ocean Processing Flow

- C++ implementation (under version control)
  - Using: LevMar, Qt, Lapack, Armadillo, FFTW
- Multiple retrackers and classifiers
  - Initial: Empirical retrackers and classification for Polar Ocean
  - Currently: SAMOSA3, Inland water
- Currently running parallel on 64 cores
  - Direct access to Baseline-0 , -A, and -B local mirror (L1b, L2, L2i)
  - All SAR ocean and inland water (3.5 years) -> ~7 hours to process



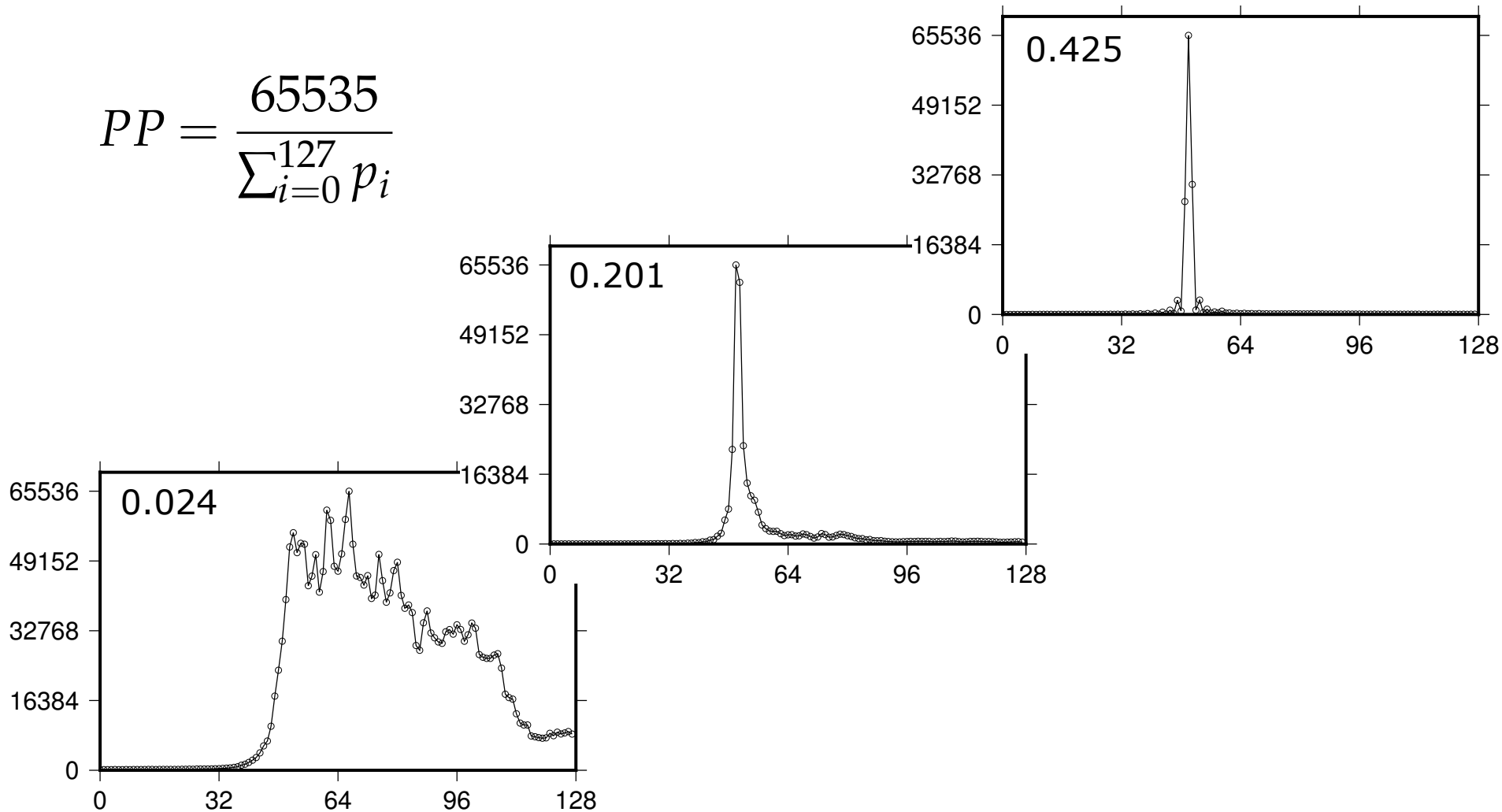
# Classification

- Hybrid classification
  - Standard Pulse Peakiness
  - Stack Standard Deviation
  - Stack Center History
  - Single Peak Width



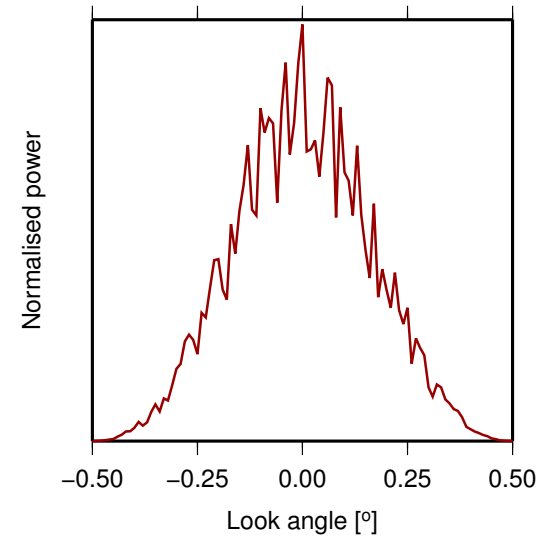
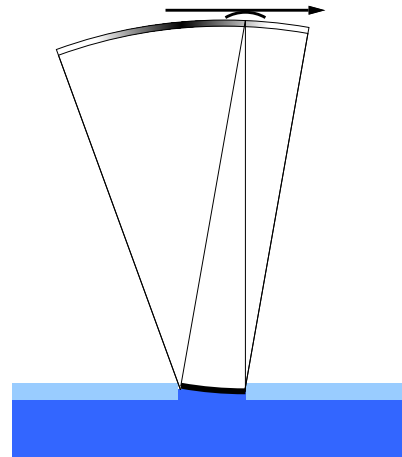
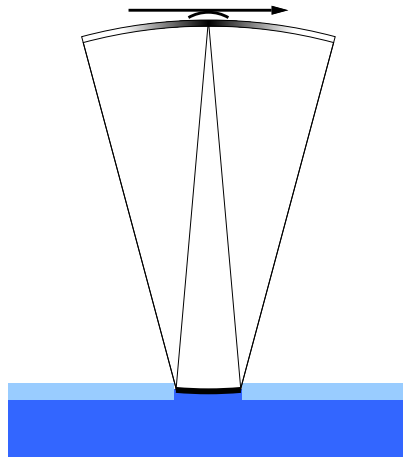
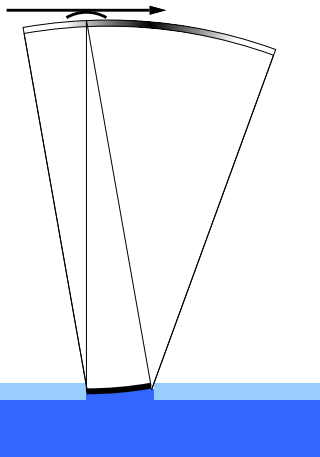
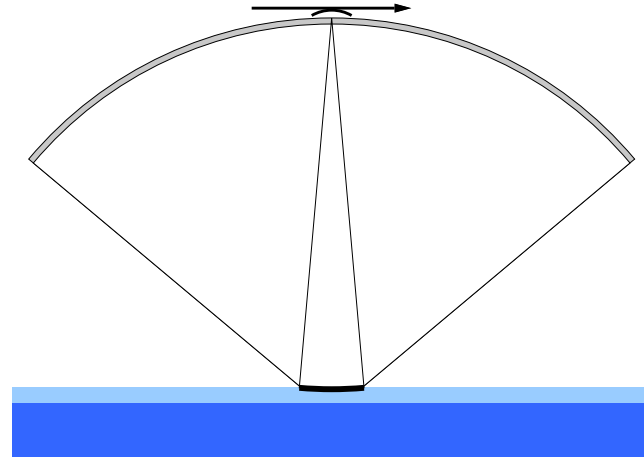
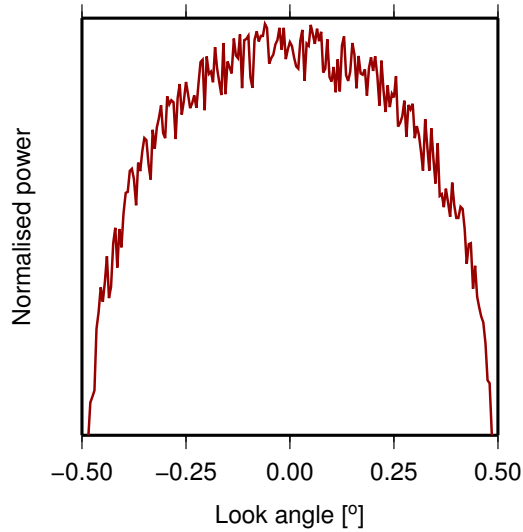
# Pulse Peakiness

$$PP = \frac{65535}{\sum_{i=0}^{127} p_i}$$

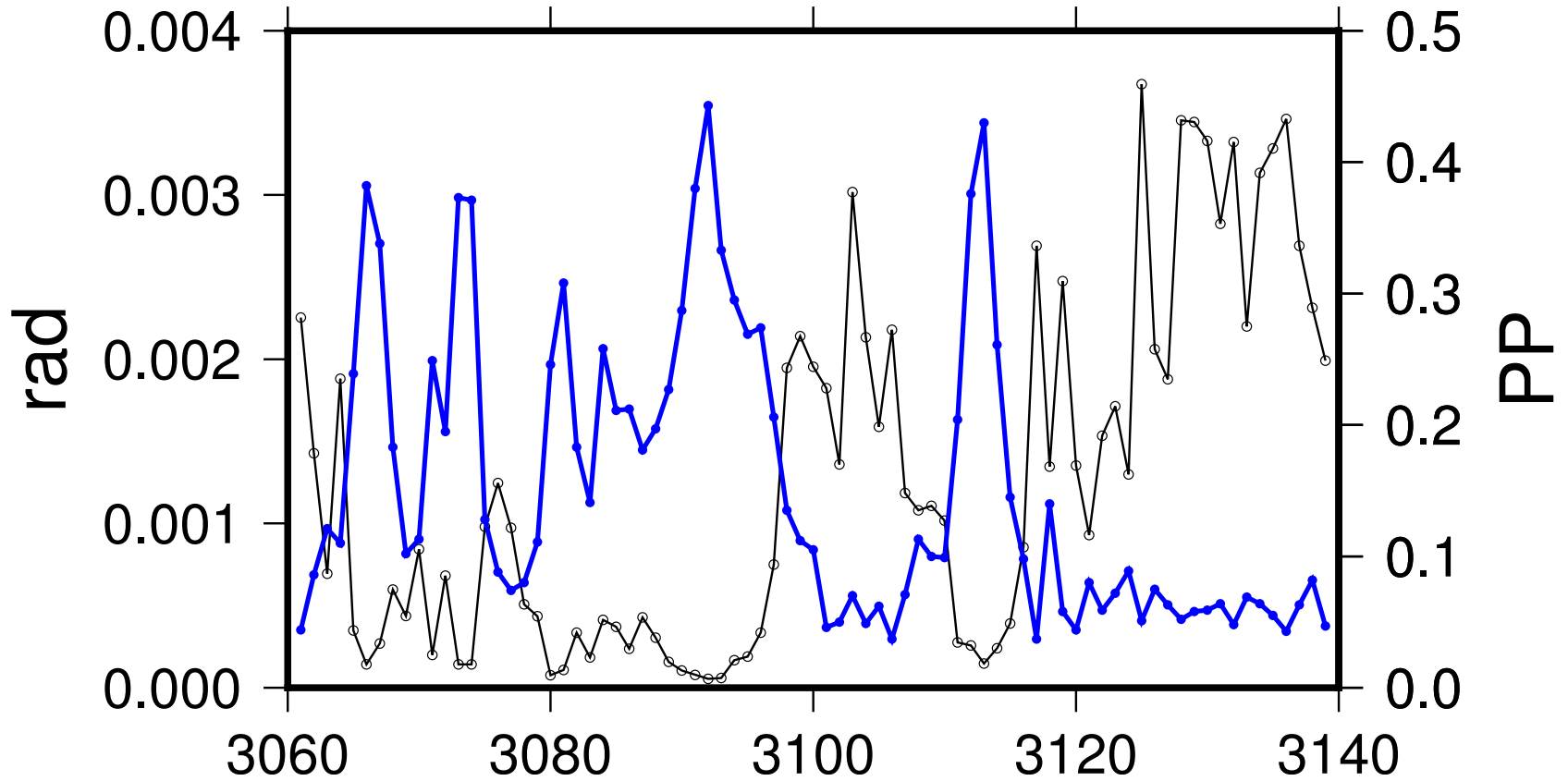


# Reflective properties

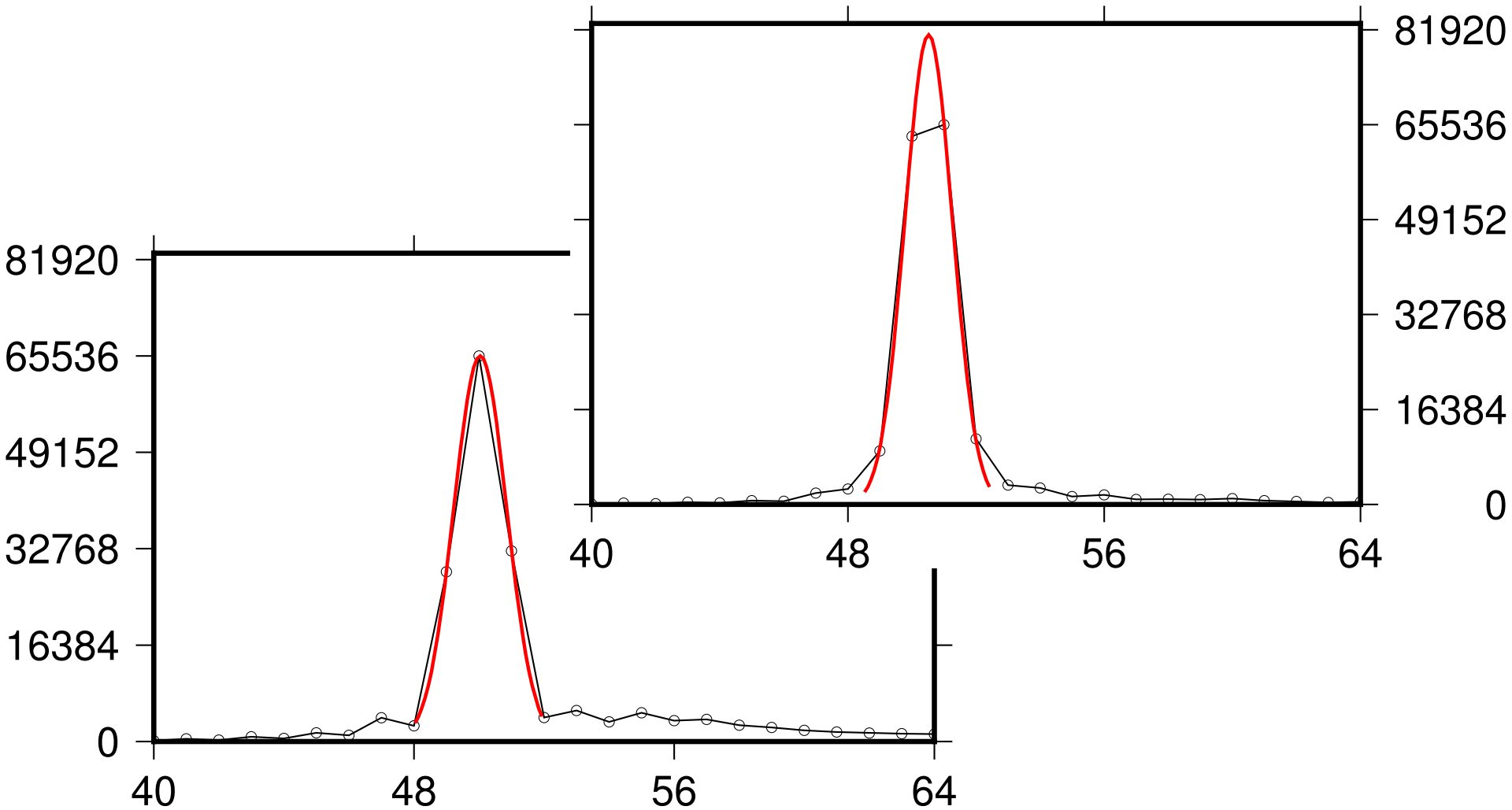
## Stack Standard Deviation



# Stack Center



# Sampling and peak power estimation

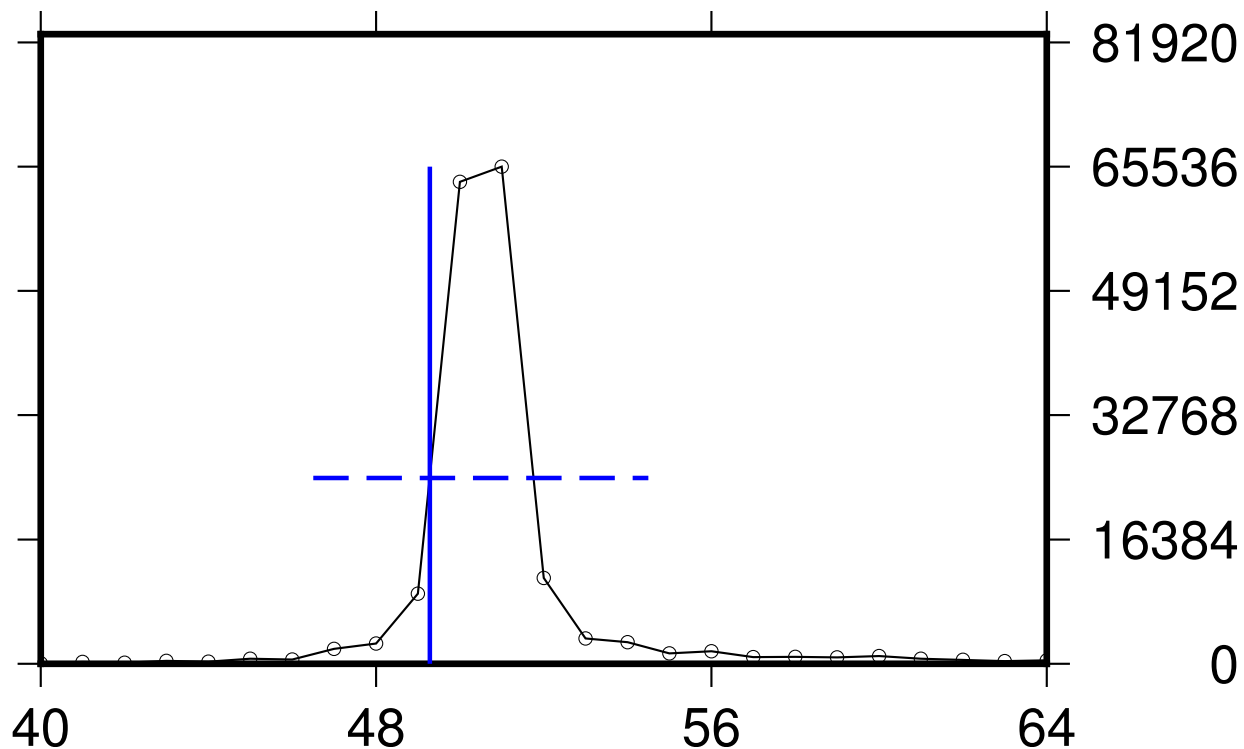




# Retracking

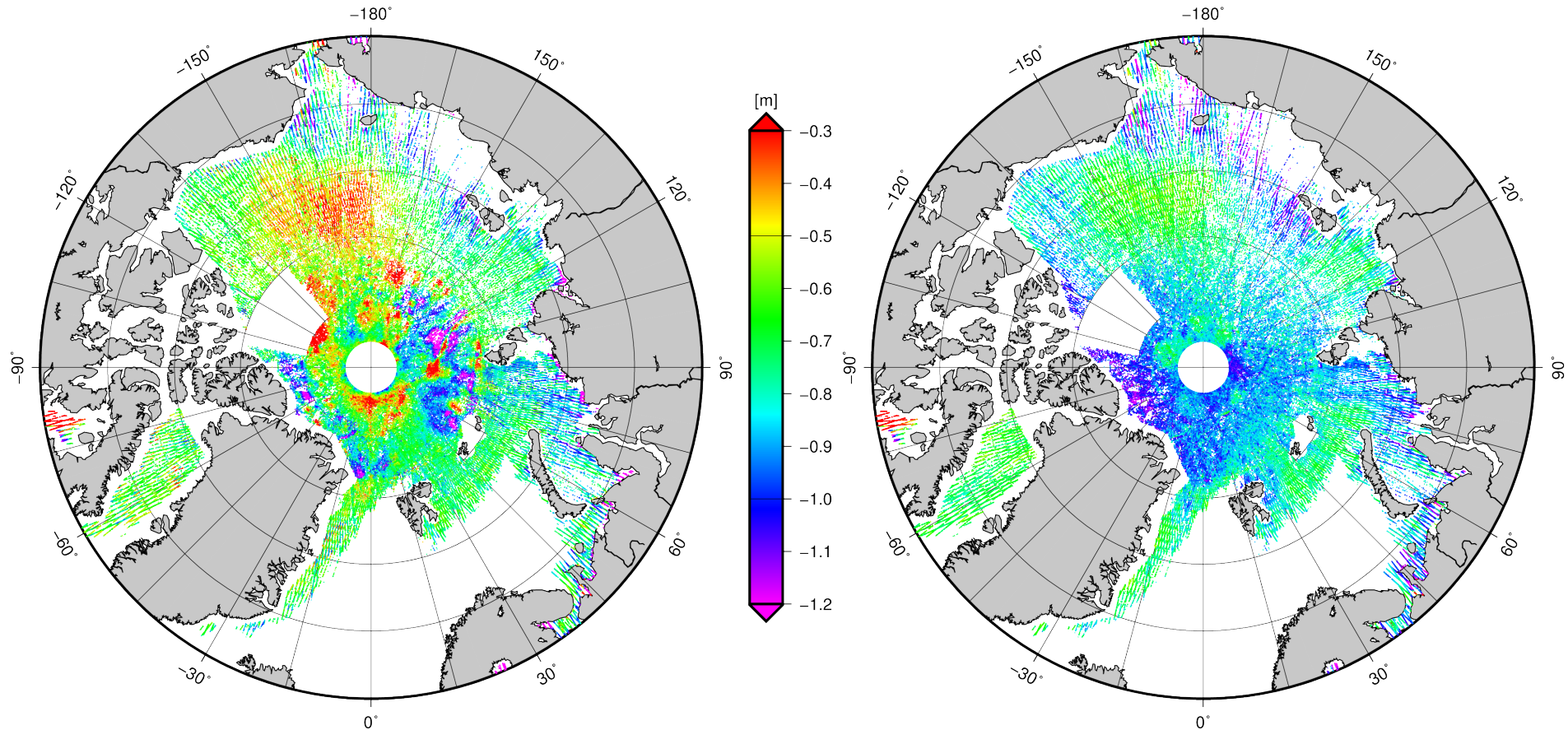
$$P_b = \frac{1}{5} \sum_{i=m-2}^{m+2} p_i$$

$$E = \frac{F_T \cdot P_b - p_{j-1}}{p_j - p_{j-1}} + j - 1$$



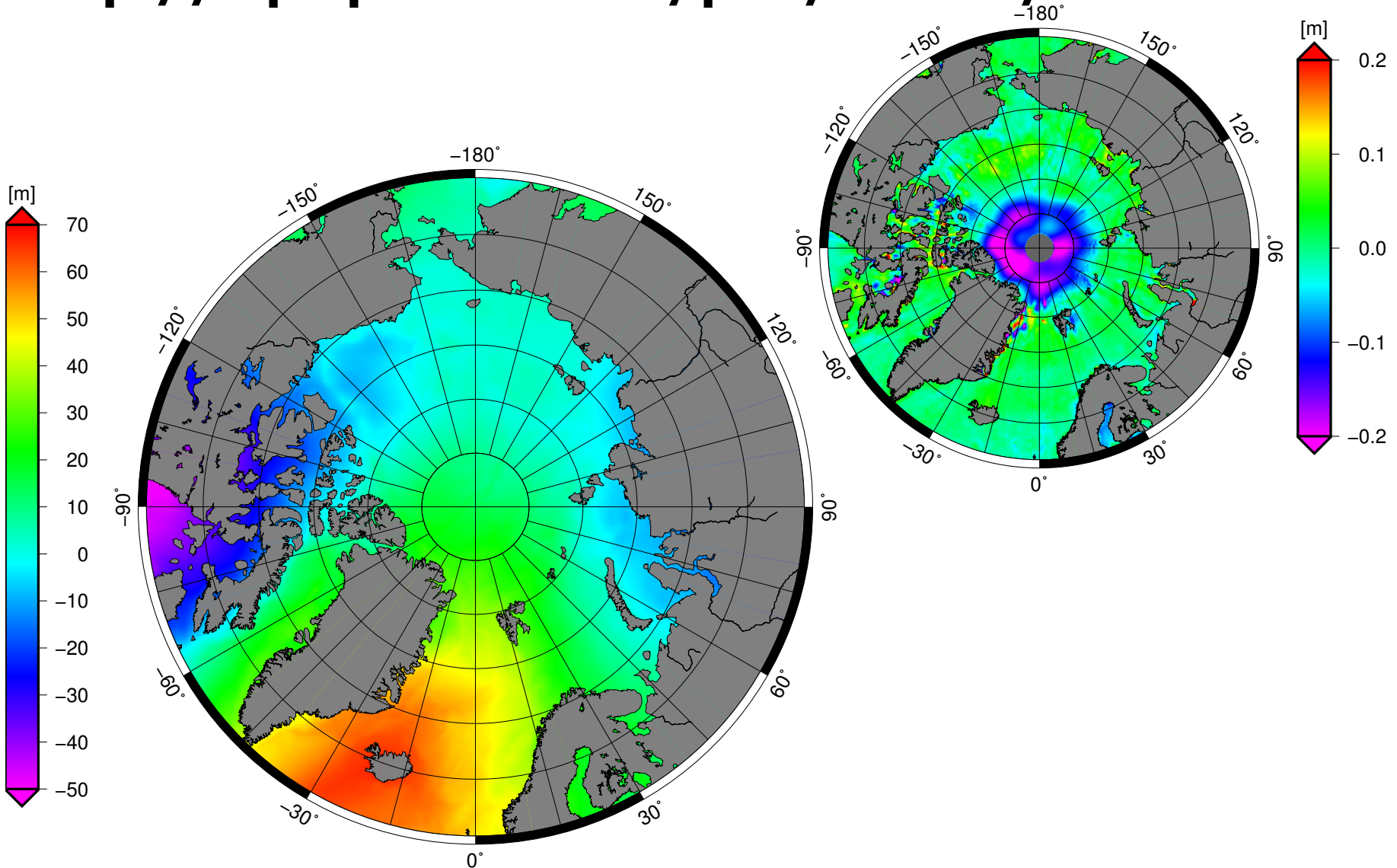
# Retracked SAR (March 2013) VS MSS models

## UCL04 and DTU10 (L2)



# DTU13 Mean Sea Surface

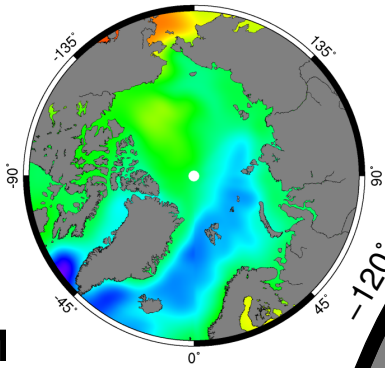
<ftp://ftp.space.dtu.dk/pub/DTU13/>



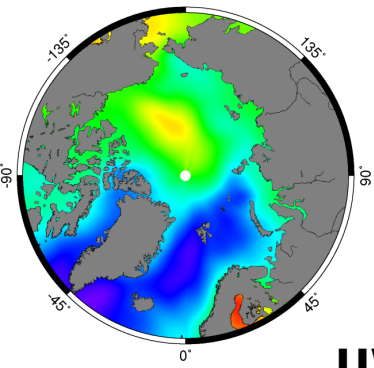
# DTU13 Mean Dynamic Topography



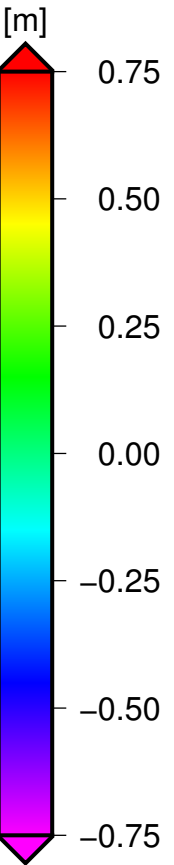
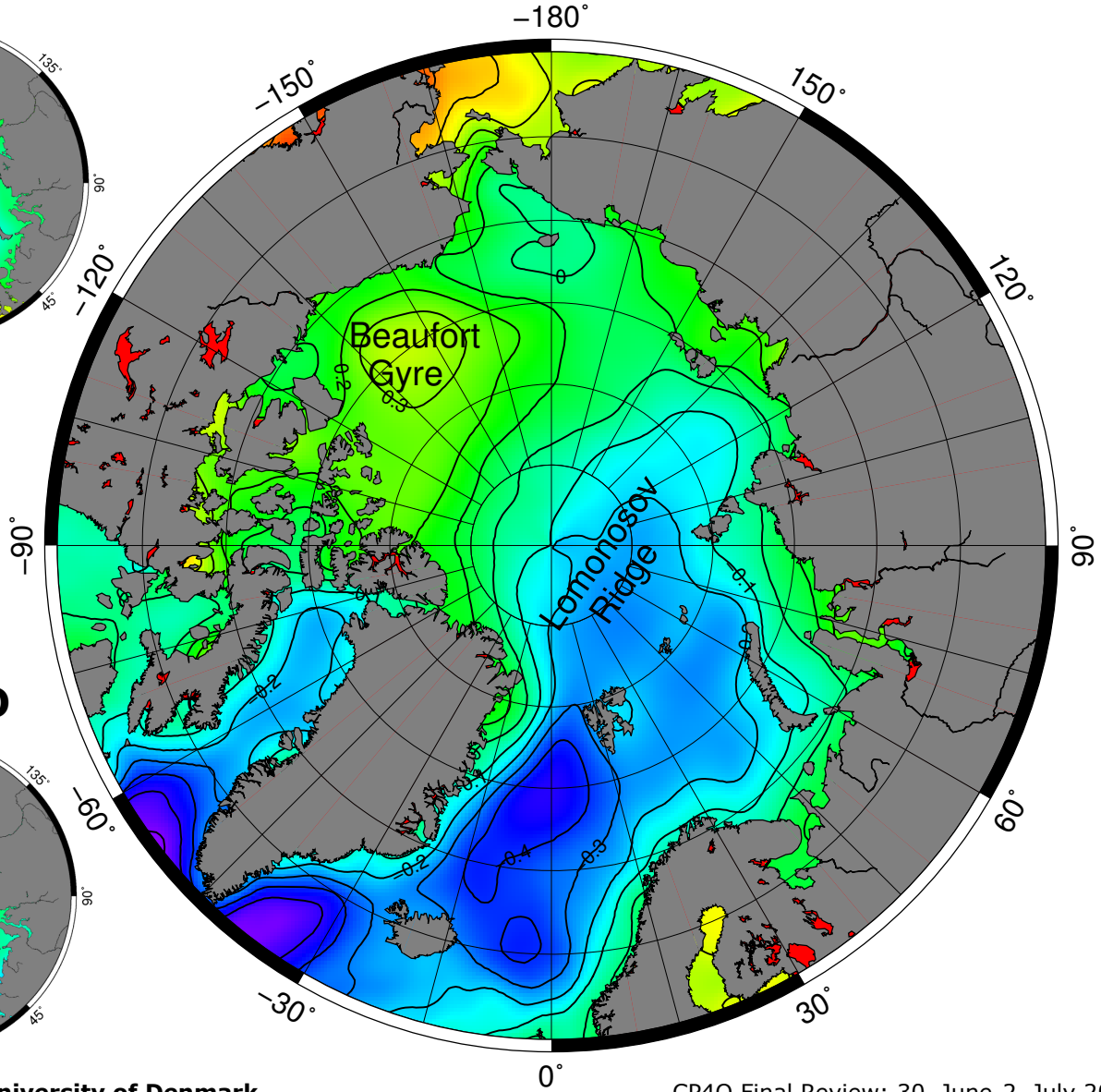
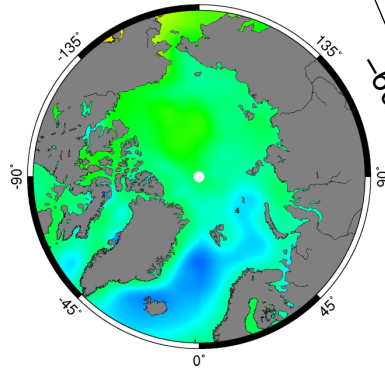
GECCO



MICOM

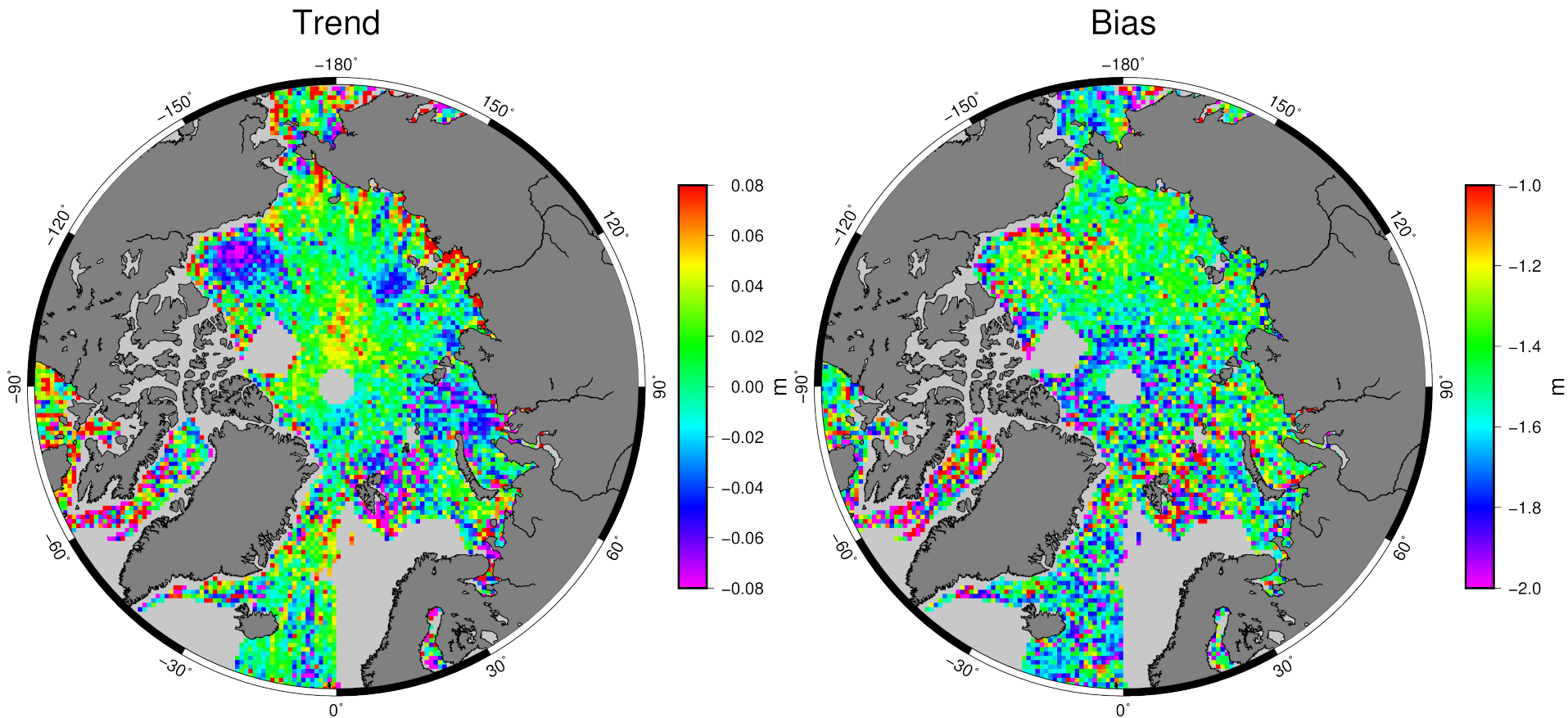


UW/PIO

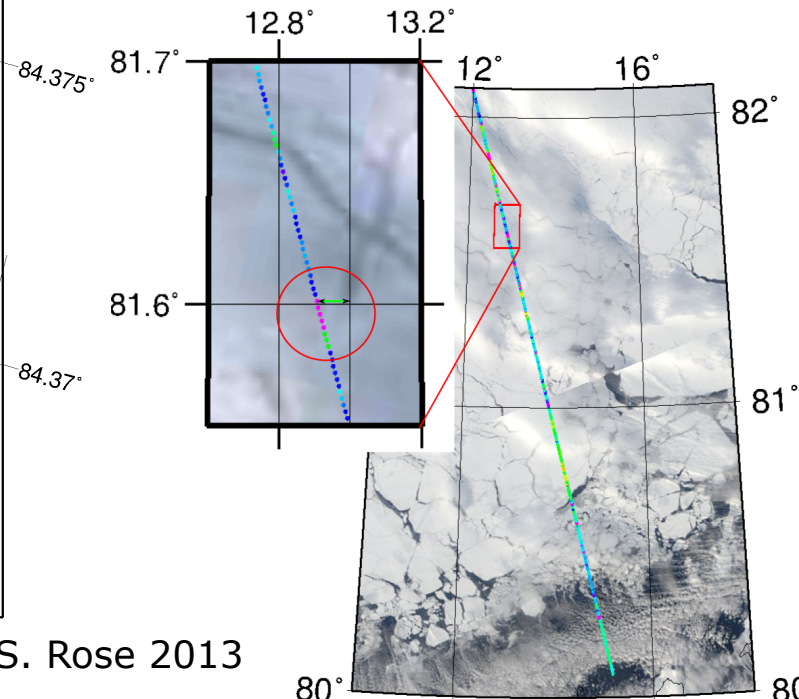
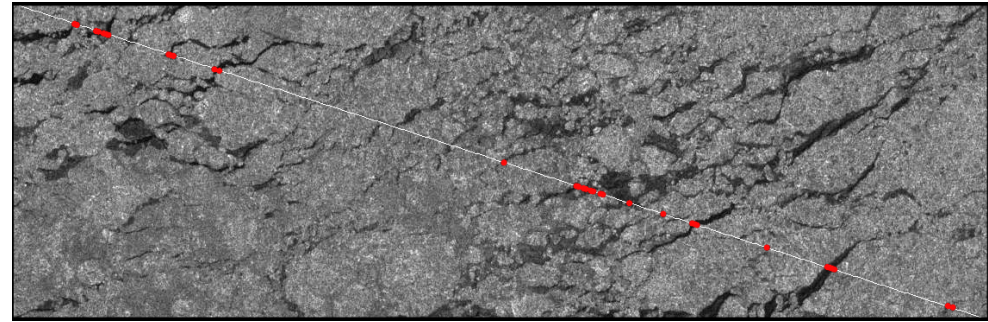
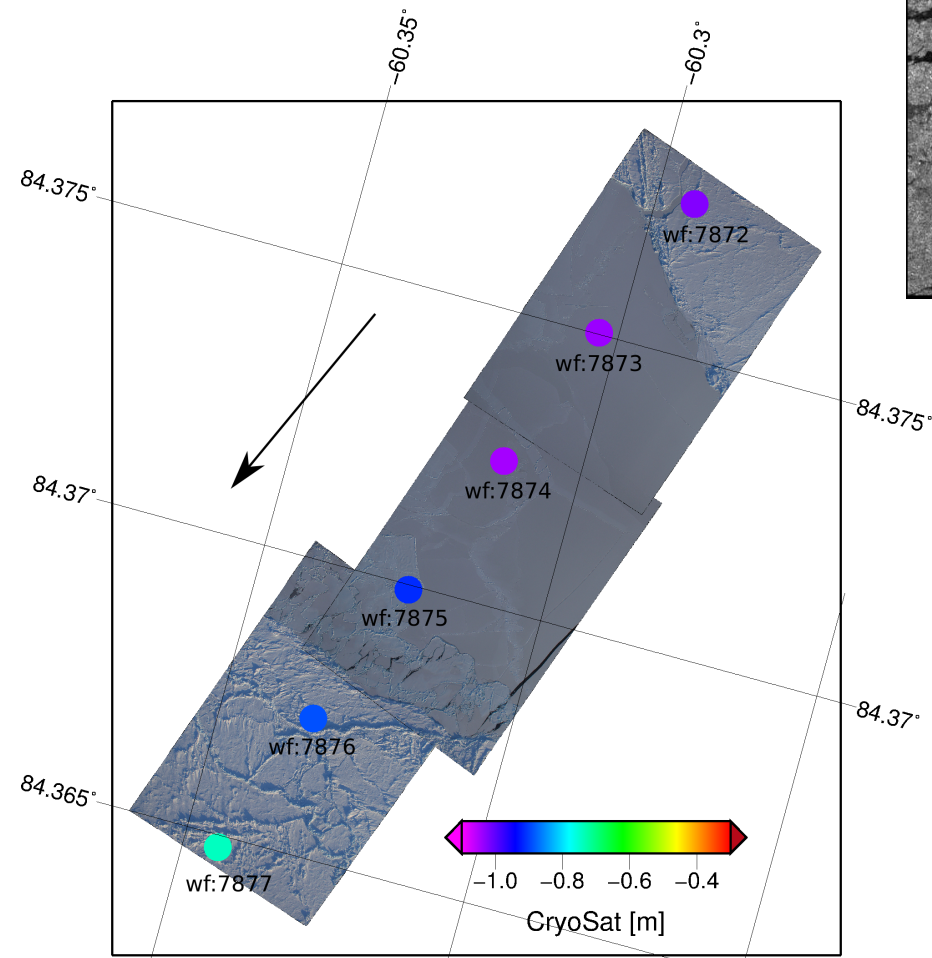


# Trend and Bias

## Baseline-B (17 months non-continuous)

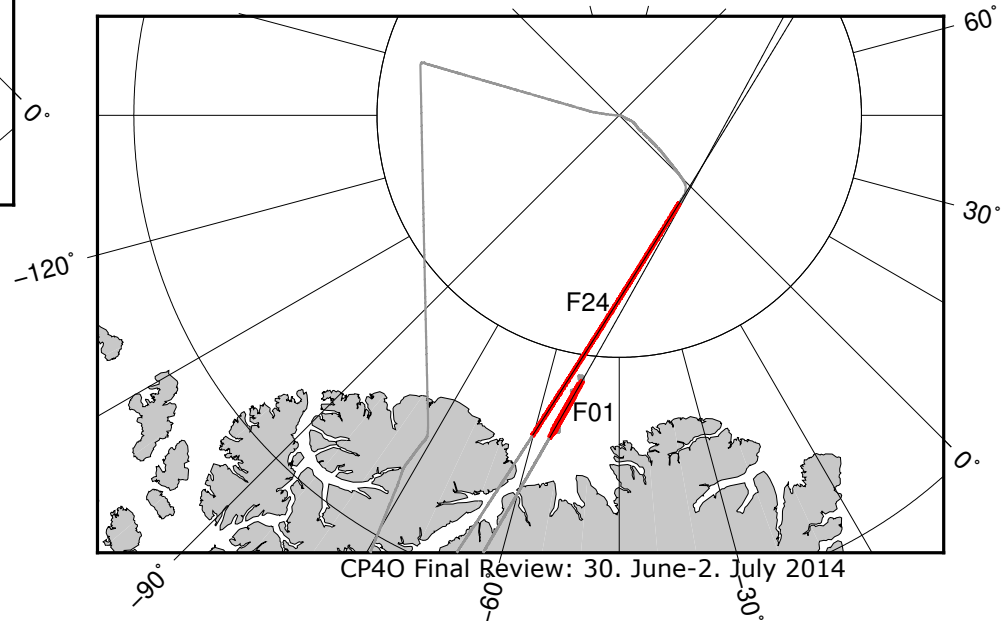
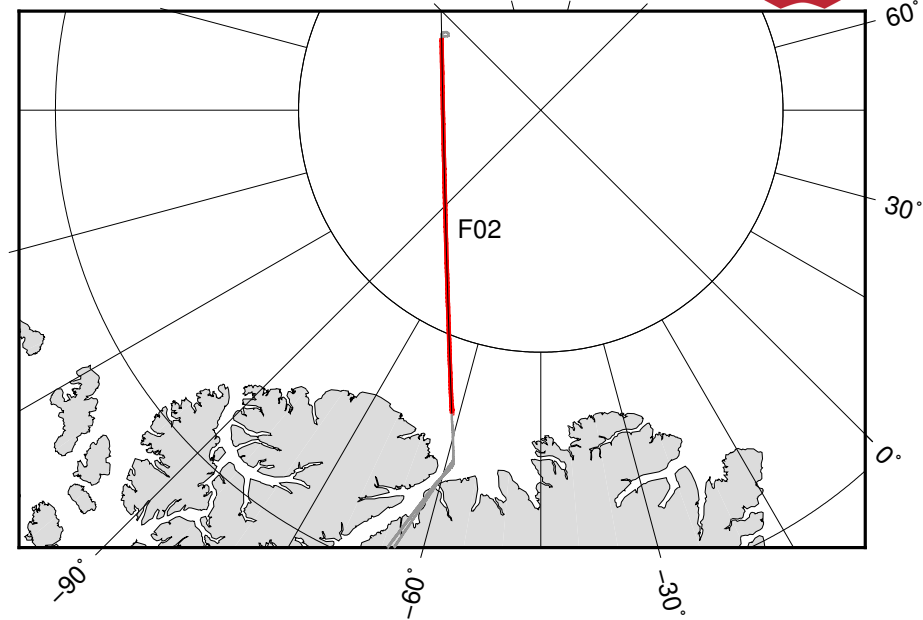
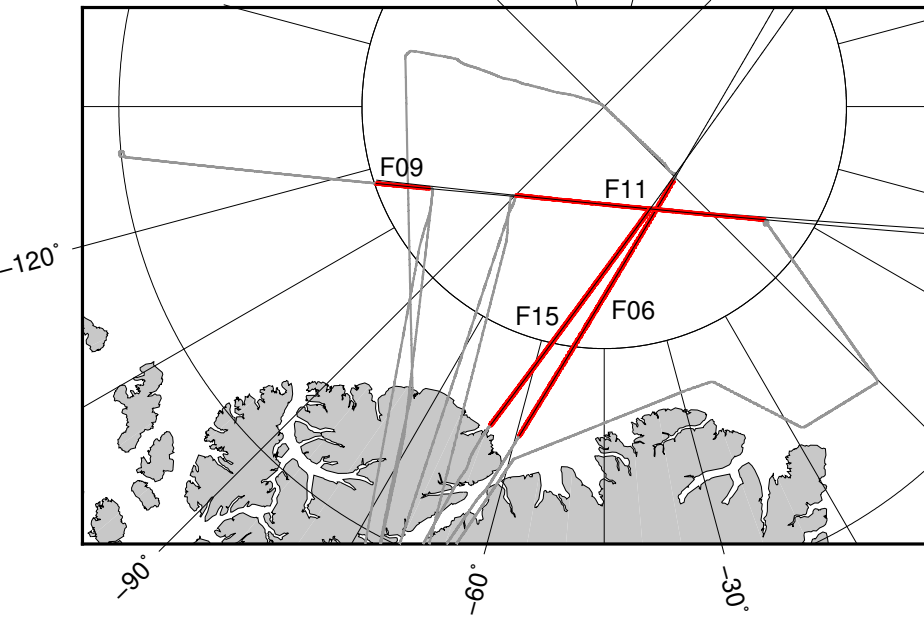


# Validation of classification IceBridge, ENVISAT ASAR and MODIS



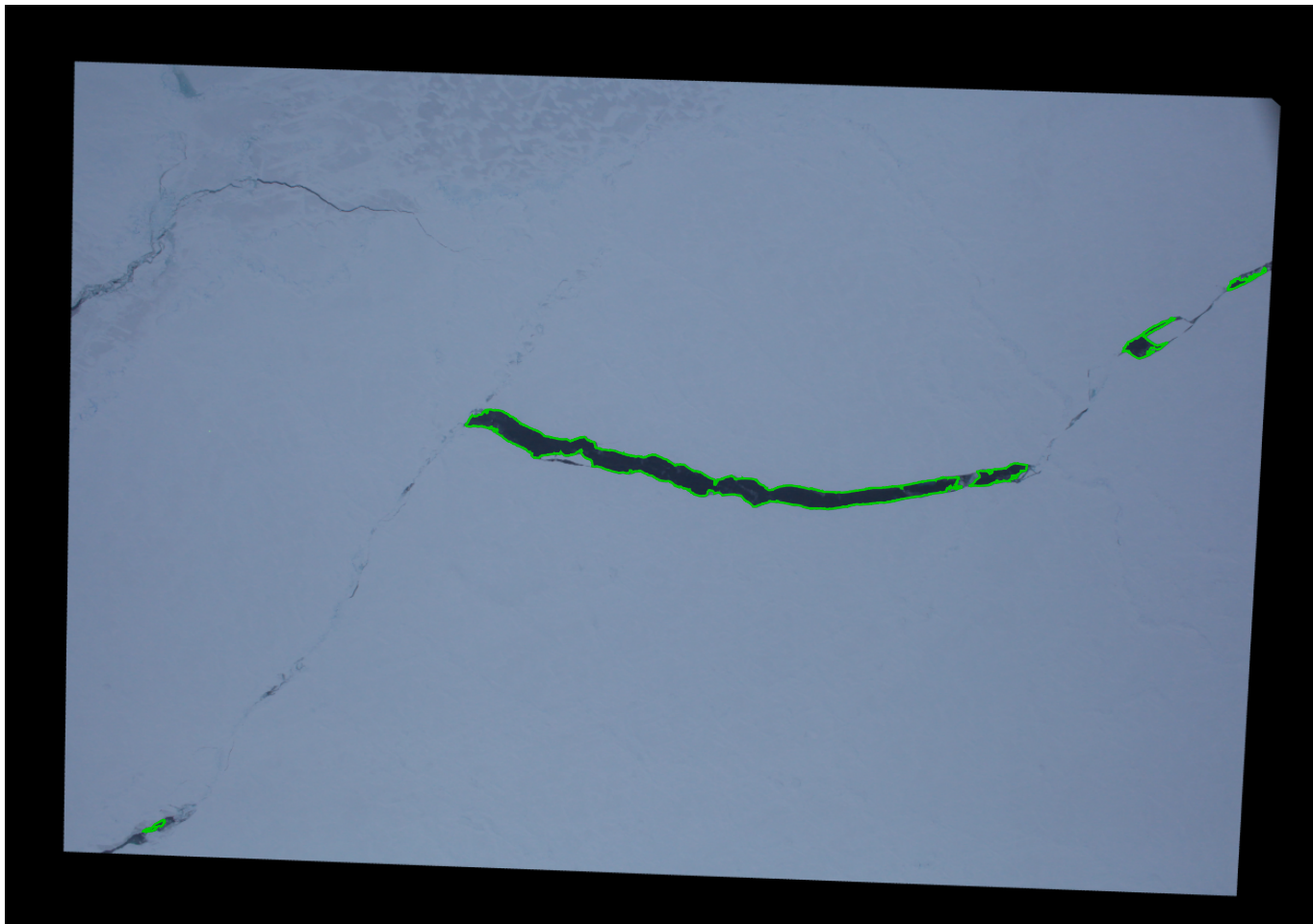
From: S. Rose 2013

# IceBridge underflights 2011-2013



CP40 Final Review: 30. June-2. July 2014

# IceBridge (DMS Lead detection)





# DTU13MSS and DTU13MDT

<ftp://ftp.space.dtu.dk/pub/DTU13/>

