

Thickness of Sea Ice and Extreme Ice Features in the Beaufort Sea

Beaufort Regional Environmental Assessment (BREA)

-

Results Forum February 24-26, 2015

Christian Haas, Anne Bublitiz & CC Bajish

BREA priority areas

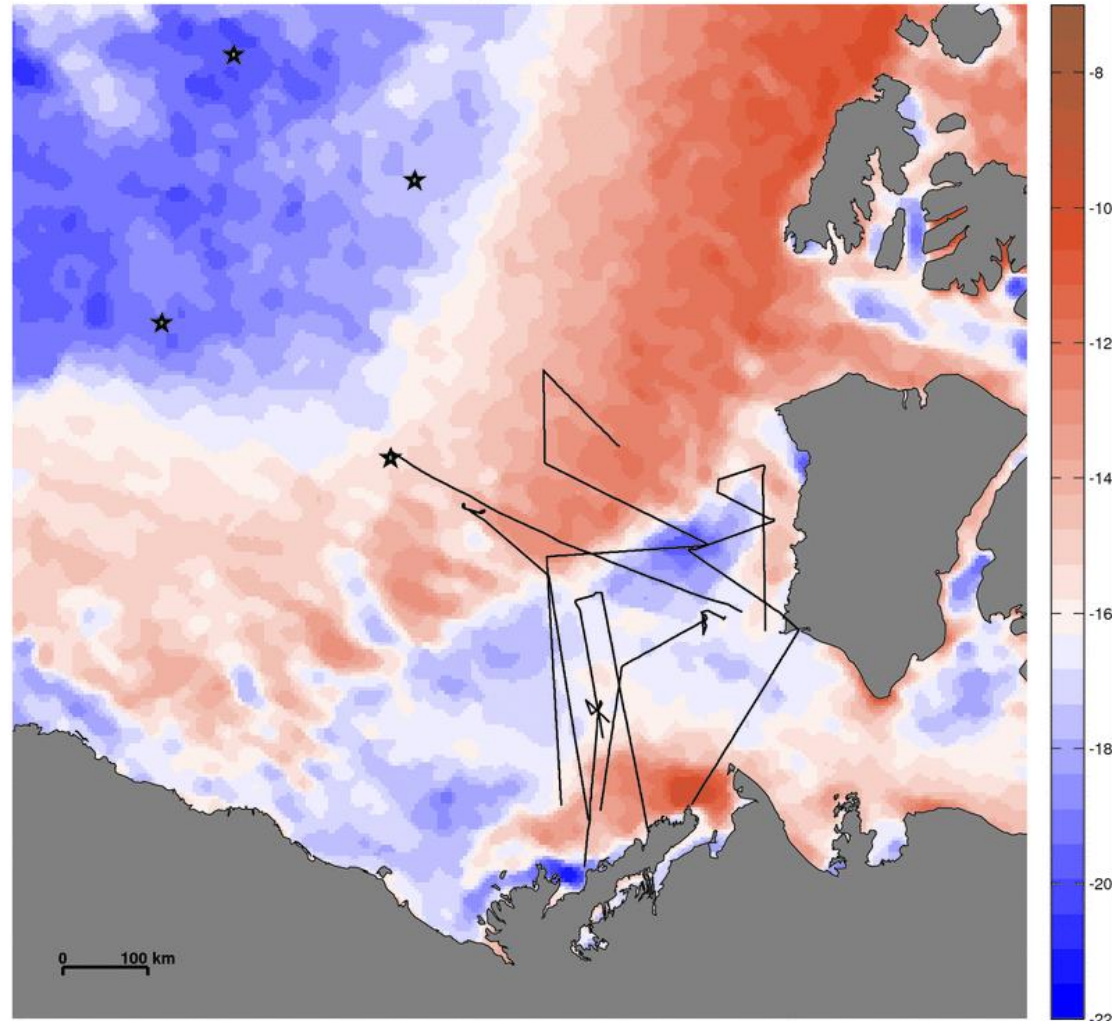
- Coupled ocean-ice-atmosphere modeling and forecasting
- Sea ice types and extreme ice features

Objectives

- BREA: obtain baseline data in preparation of safe and sustainable shipping and offshore operations
- Obtain information on the large-scale spatial and interannual ice thickness distributions in the southern Beaufort Sea
- Focus on multiyear ice and extreme ice features (EIF)
- Establish a Canadian Arctic airborne environmental and sea ice observatory

2009 - 2014

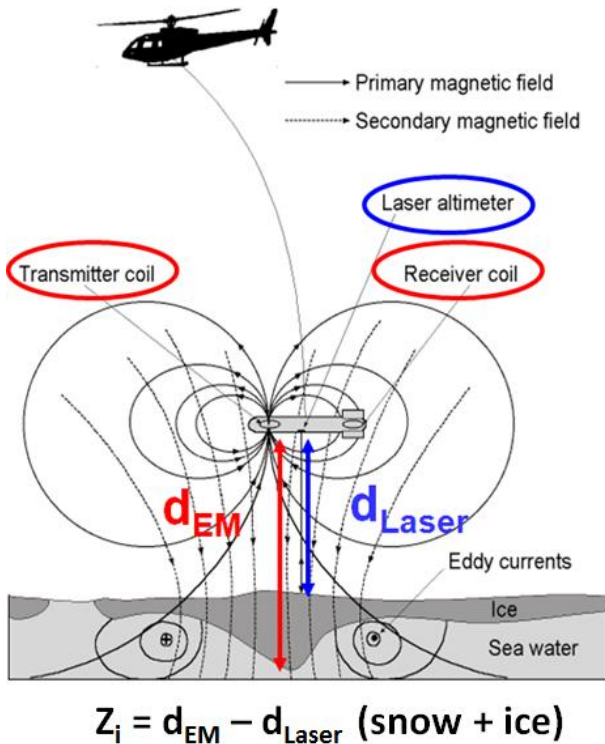
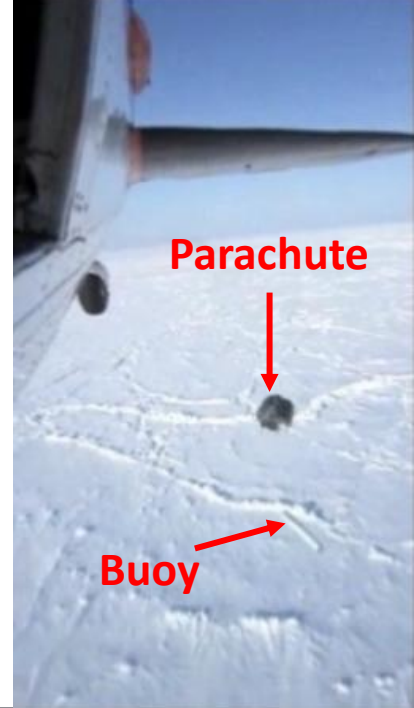
2009-12-18



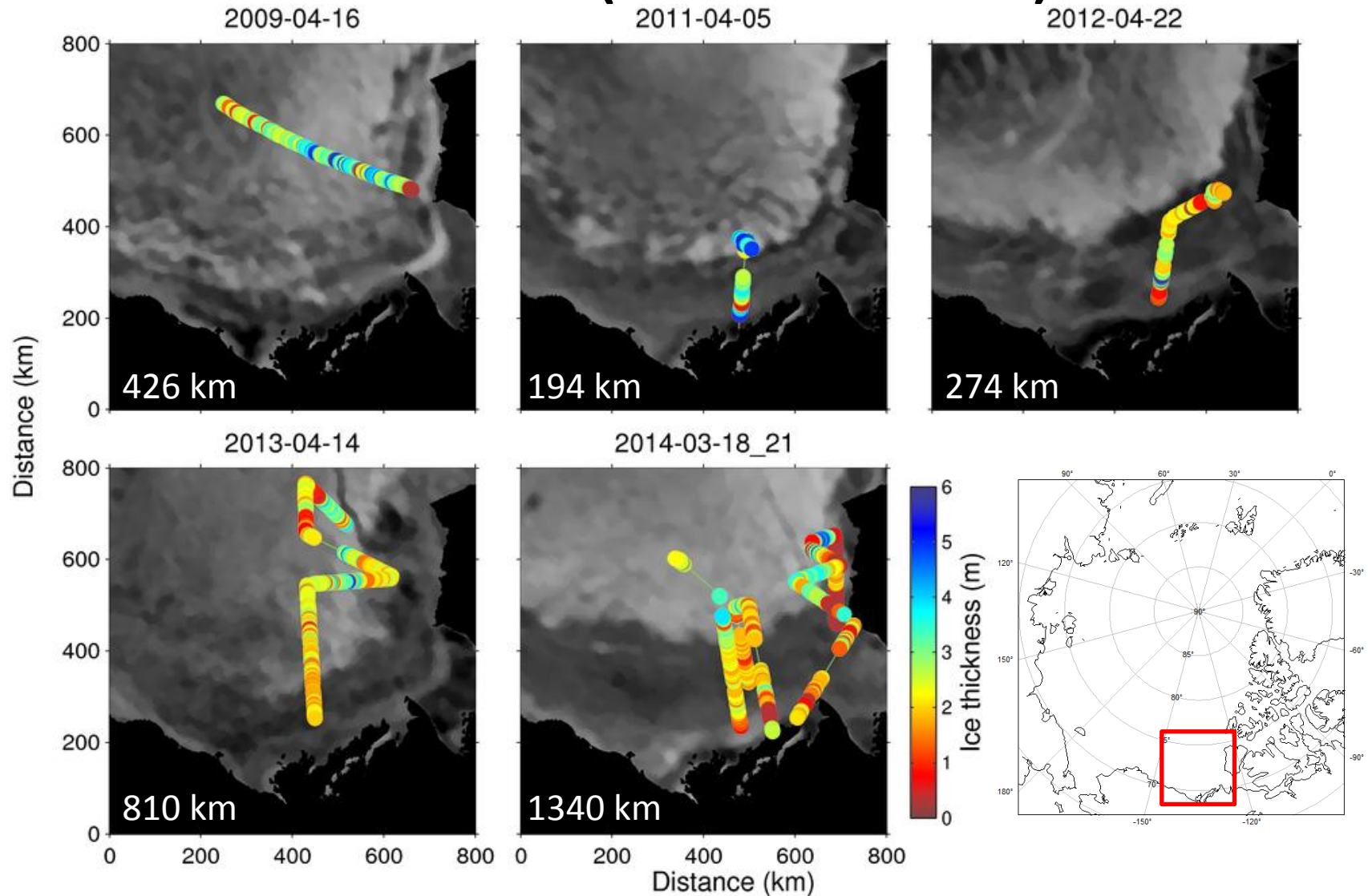
ASCAT, courtesy BYU

Airborne EM thickness sounding

- Using Kenn Borek Air Basler BT67 aircraft
- Also used for buoy air deployments



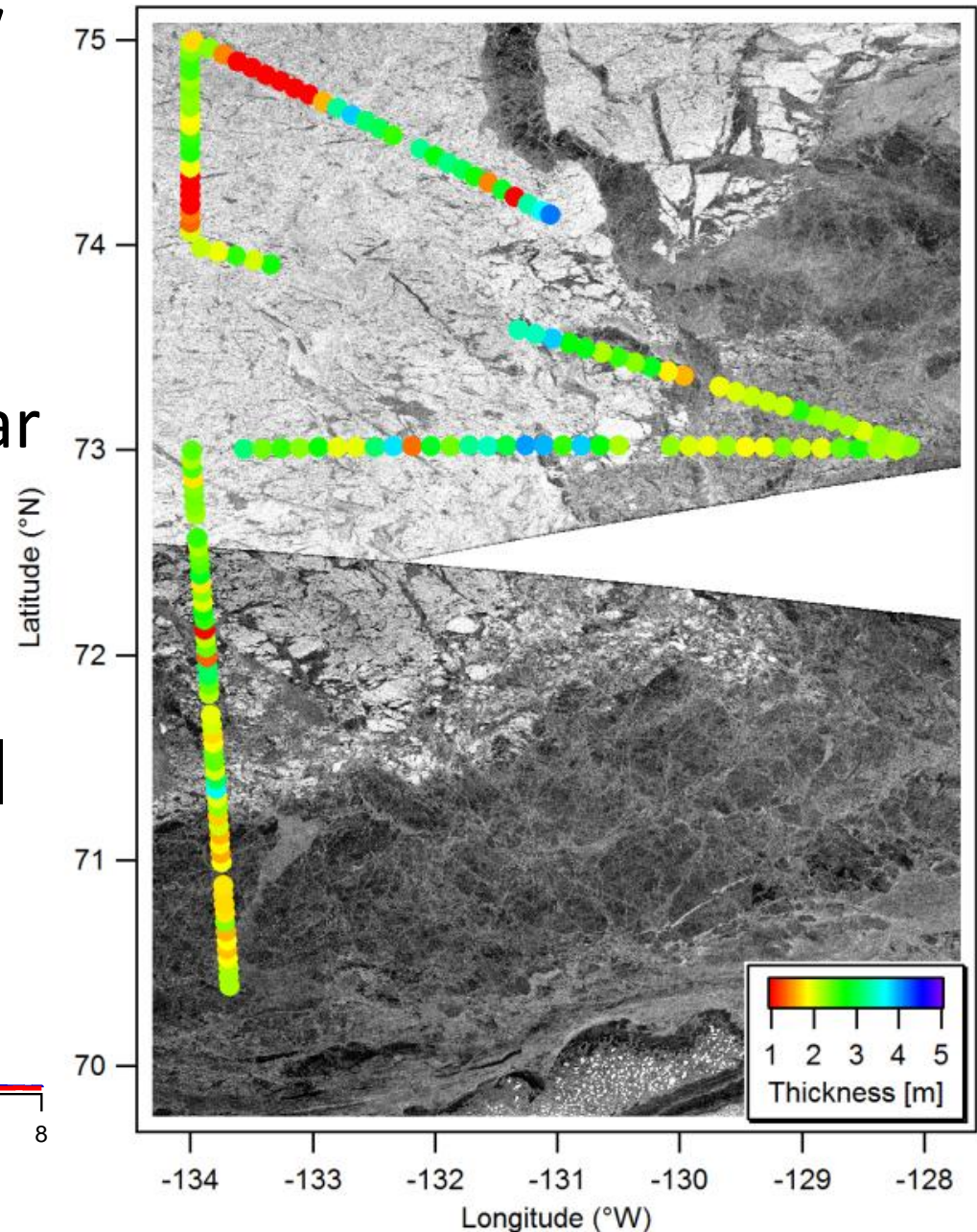
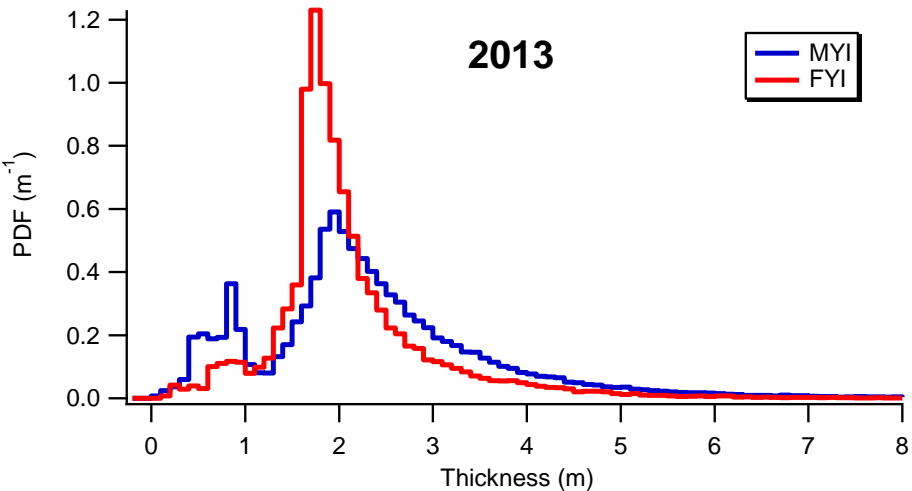
Results (2009-2014)



- Thickest MYI occurs in narrow band at south eastern edge of MYI zone
- FYI mostly 2 m thick

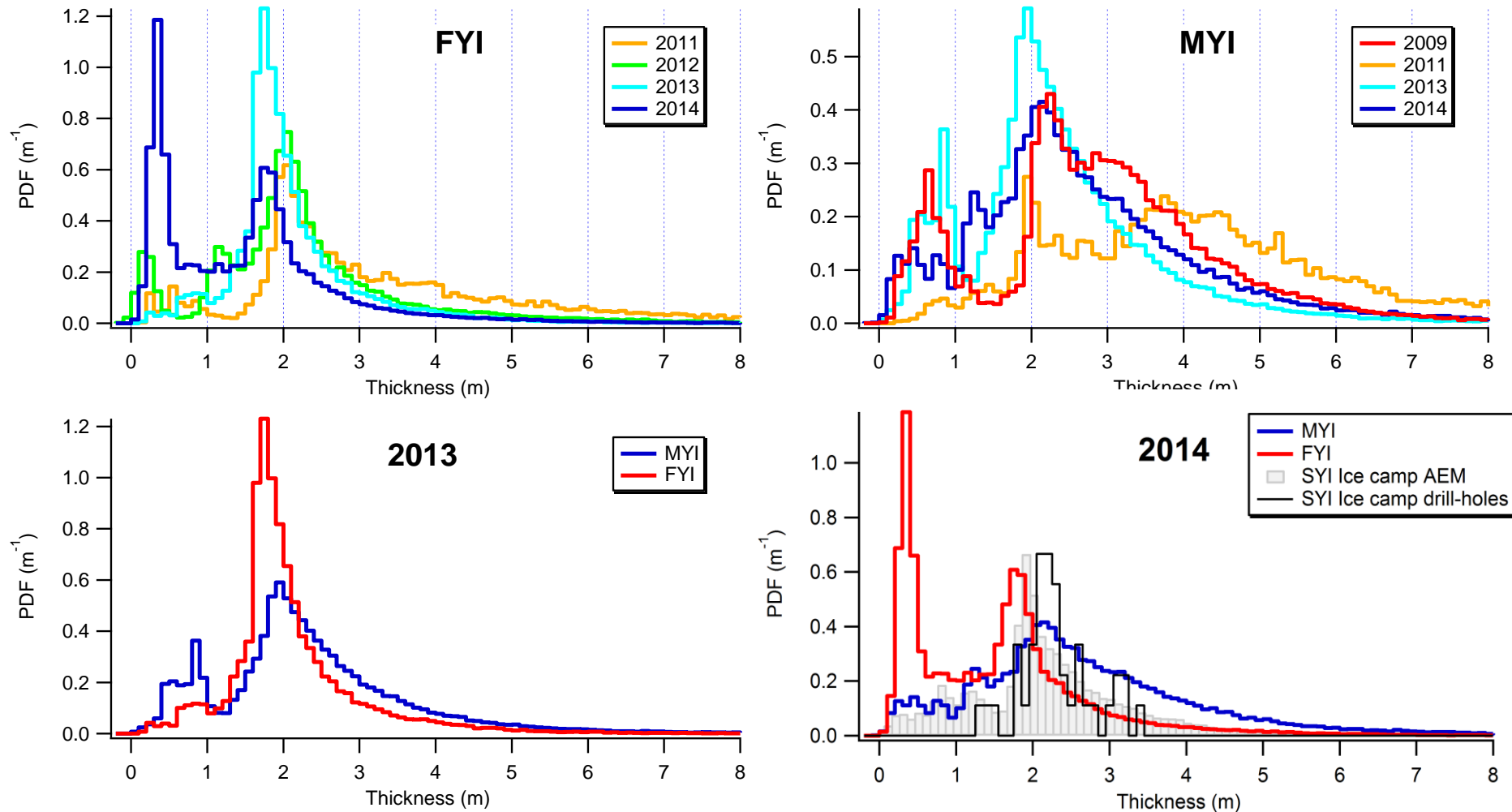
2013 BREA survey

- Good coverage of FYI and MYI
- Note narrow band of thick ice with high radar backscatter



Ice thickness variability

FYI vs. MYI



- Disappearance of extensive thick MYI

Xtreme ice features (EIFs)



Photo of an ice island in 2012 (© C. Haas)

Extreme ice features (EIFs) (or: Multiyear Humock Fields MYHF)

- Definition: $Z_i > 6$ m for at least 100 m

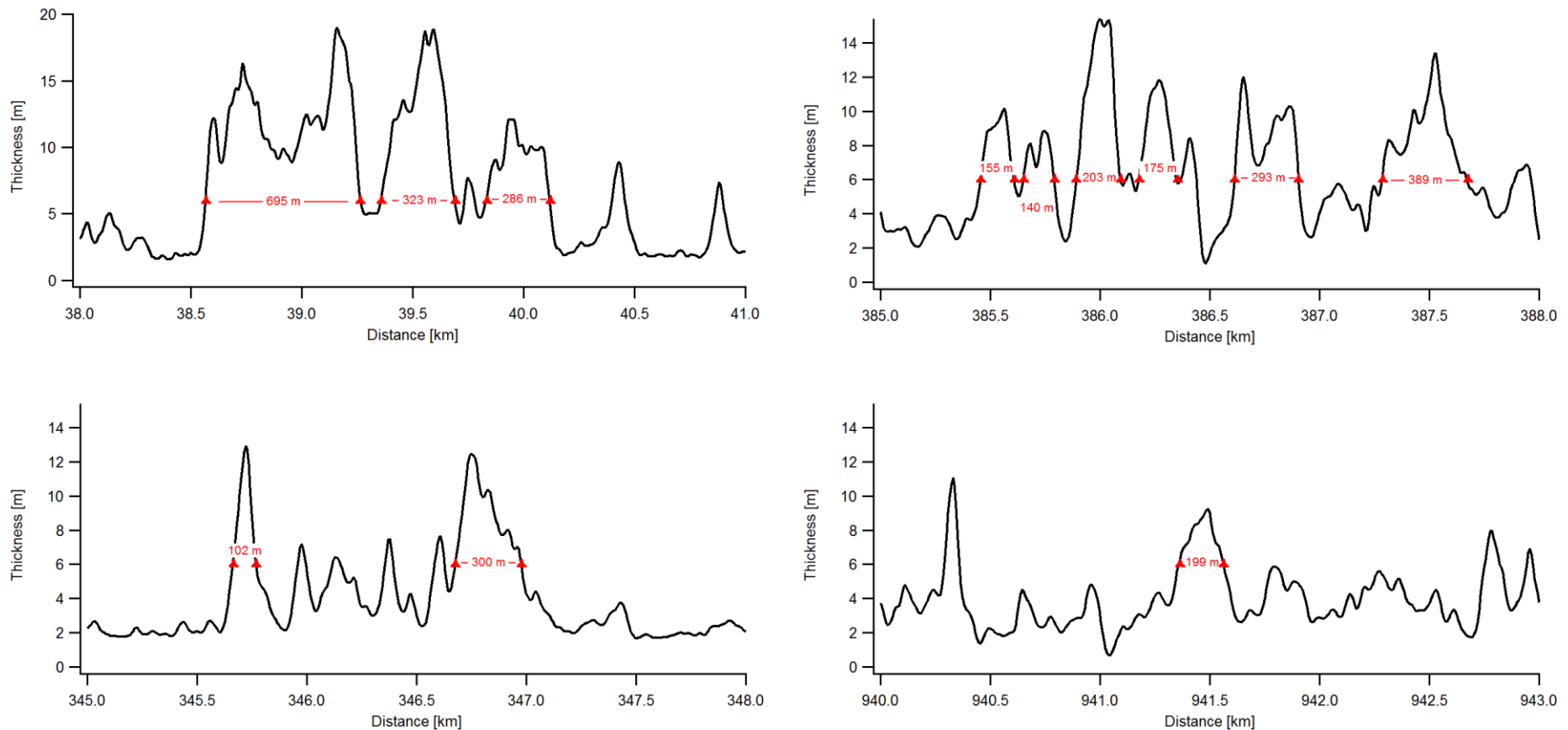
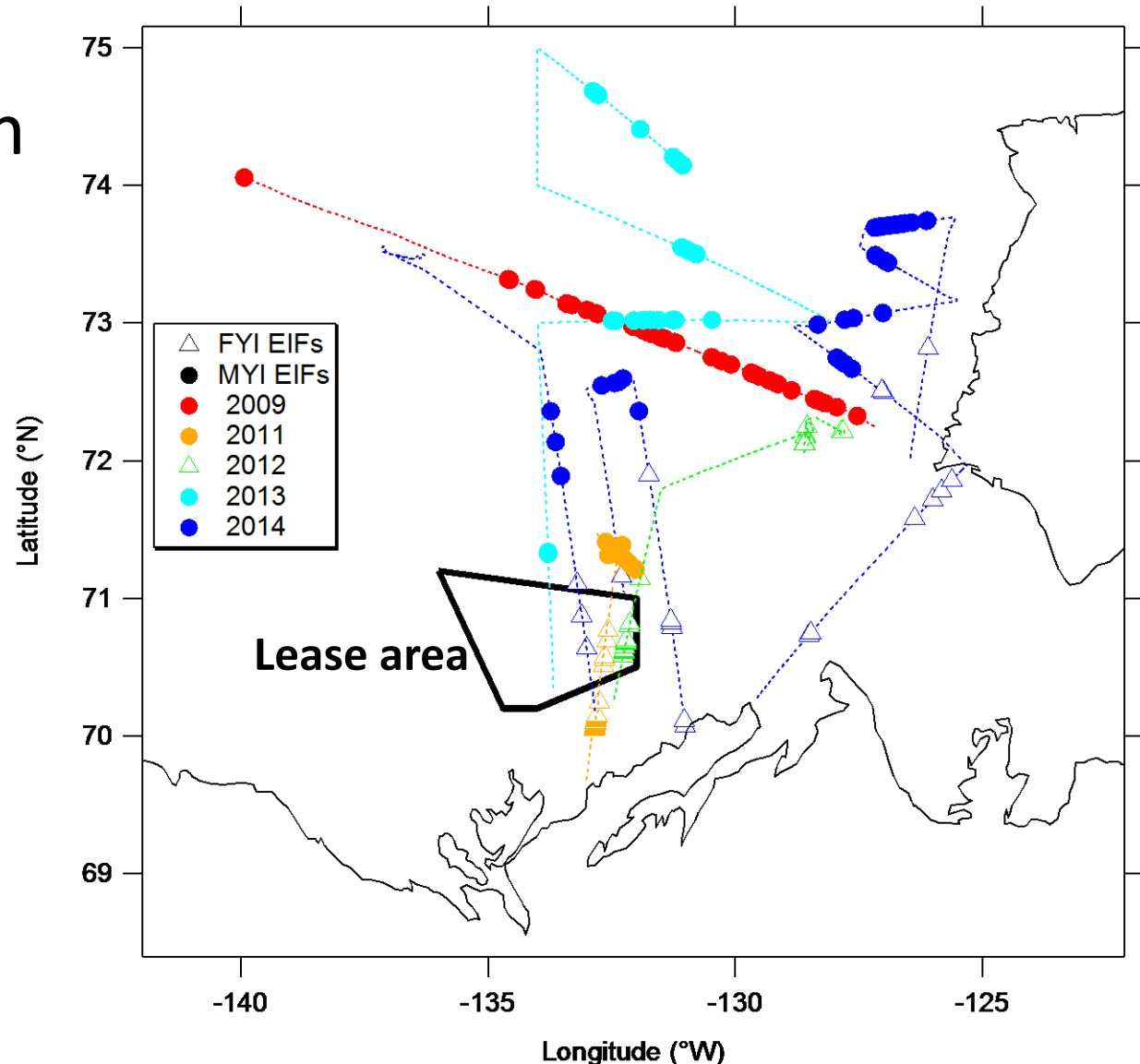


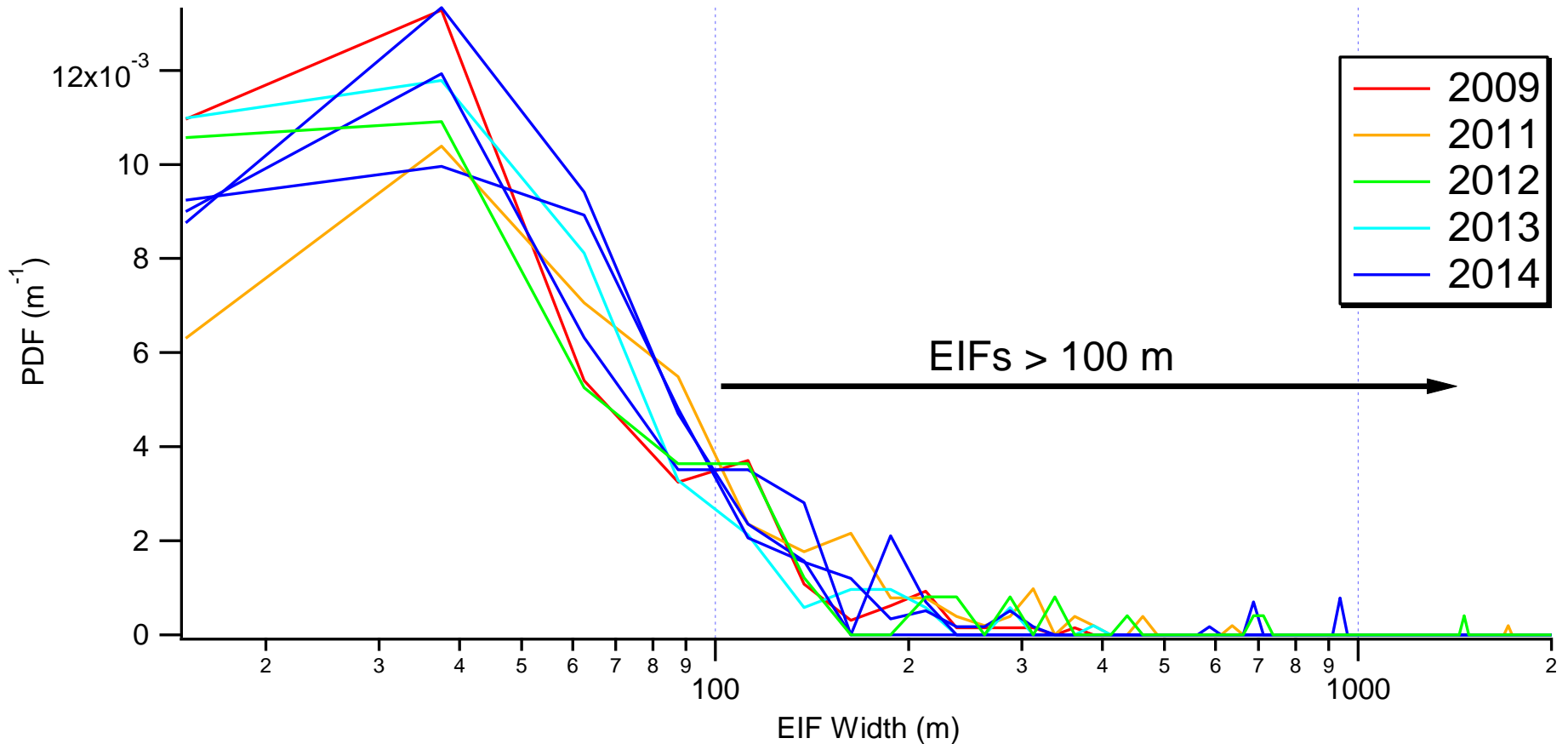
Figure 8: Examples of extreme ice features as defined in the text. Note different vertical scale in upper left panel.

Locations of EIFs, 2009-2014

- EIFs occur both in MYI and FYI regimes
- Often related to near-shore shear zones



EIF widths



- Most thick ice (>6 m) less than 100 m wide (pressure ridges)
- Most EIFs < 200 m wide

Summary & Conclusions

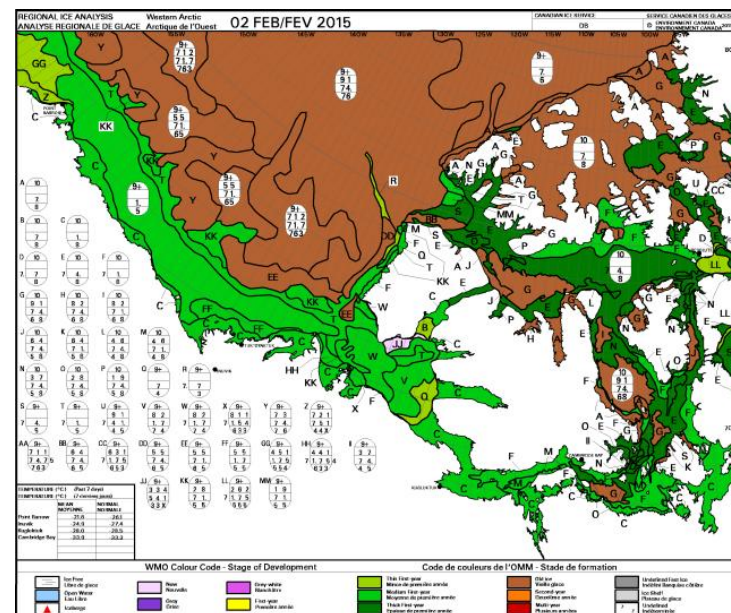
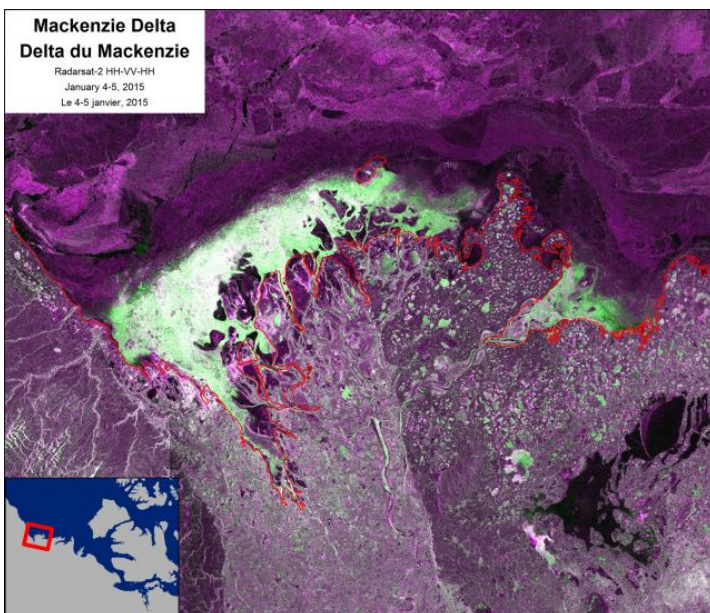
- Ice thickness surveys since 2009
- Results easily biased by locations, length, and number of flights
- Thickest MYI near south-eastern edge of MYI regime
- Recently, MYI/SYI modal thickness similar to FYI
- EIFs present both in FYI and MYI regime
- EIF sample numbers too low for trend analysis



MEOPAR

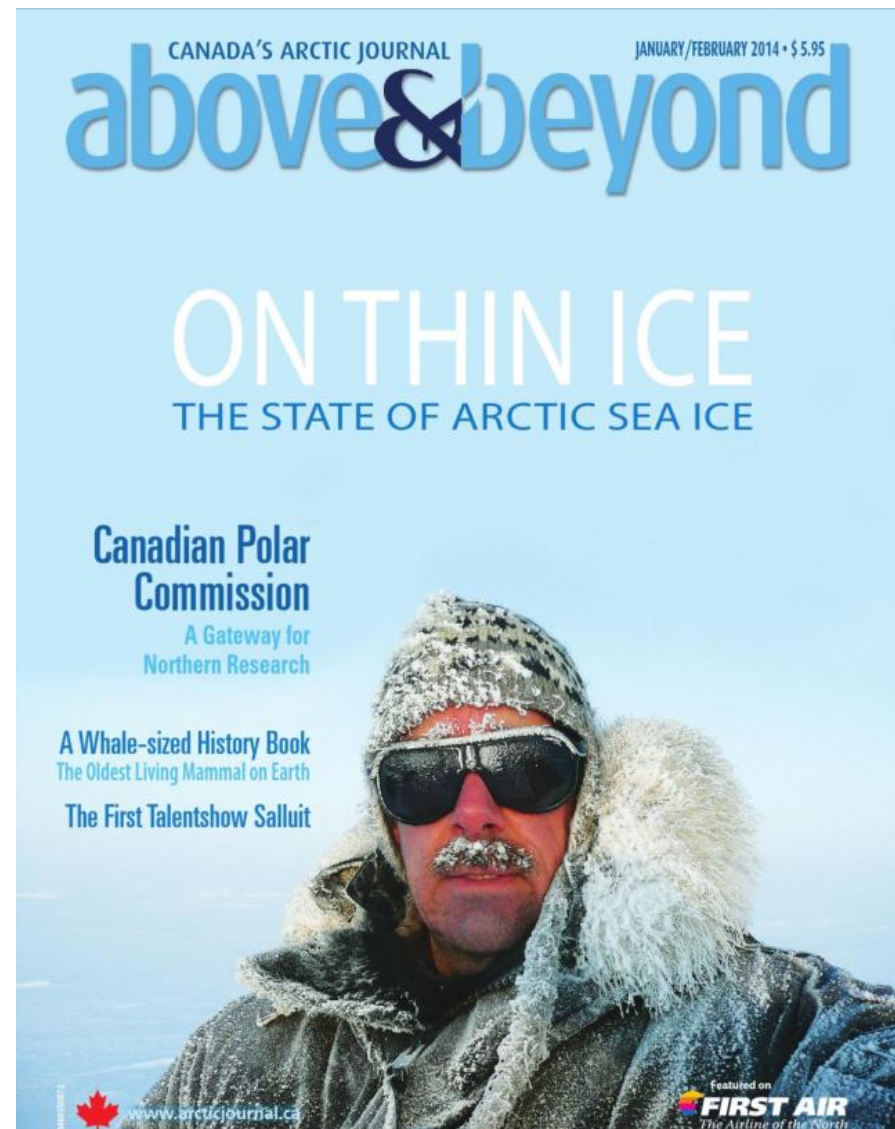
Outlook I

- More surveys in 2015 and 2016 within MEOPAR (*Marine Environmental Observation Prediction and Response Network*)
- Join us from April 20-23 in Inuvik for wildlife and ice observations!!



GAPS

- Need better stakeholder engagement
- Include fast ice surveys to link to hunting, transportation, and other on-ice activities



Outlook II

- Snowmobile ice thickness surveys for MARES (MARine Ecosystem Study, USA) between Tuktoyaktuk and Barrow AK in April 2016 or 2017?

