

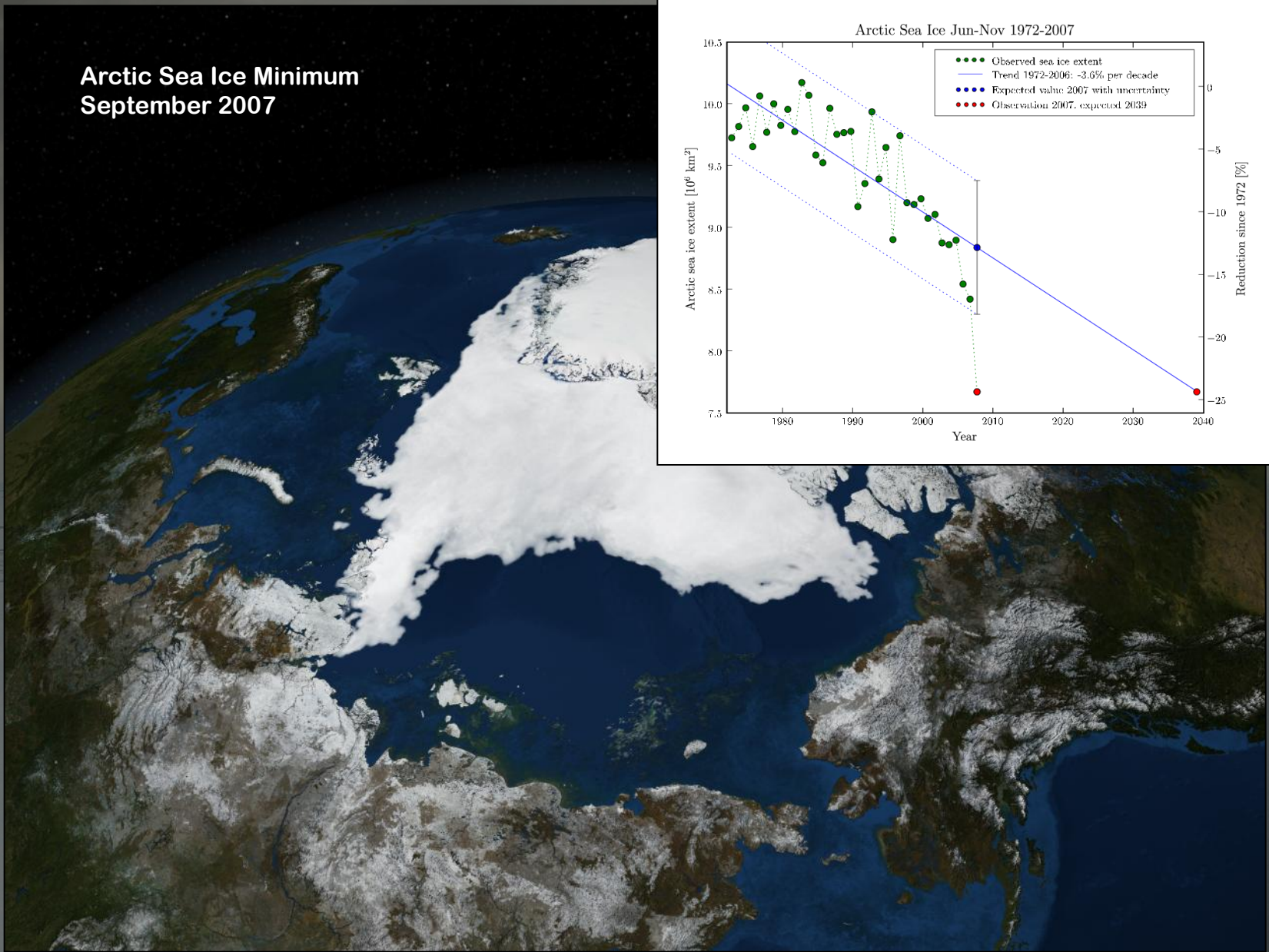
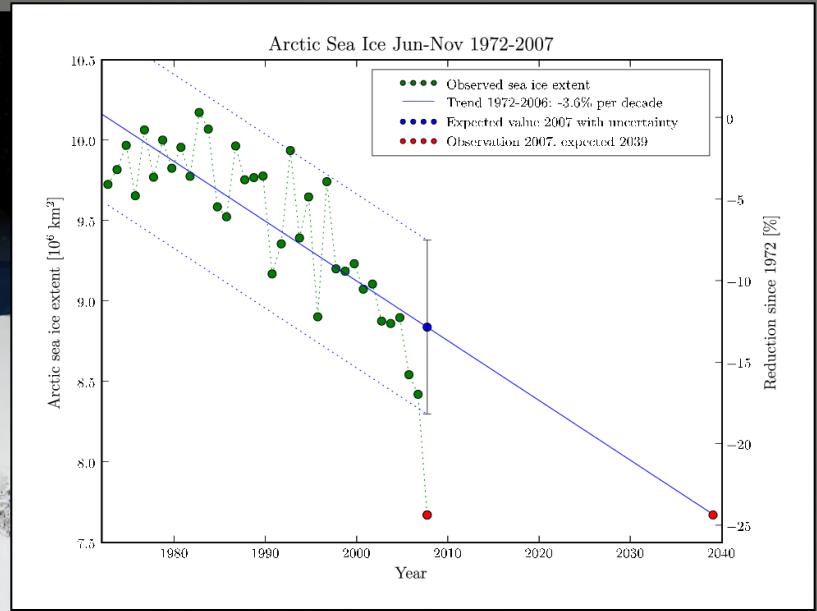
Sea Ice Thickness in the Transpolar Drift in Summer 2007

Results from Ark XXII/2

Stefan Hendricks¹, Lasse Rabenstein¹, Volker
Leinweber¹, Christian Haas²

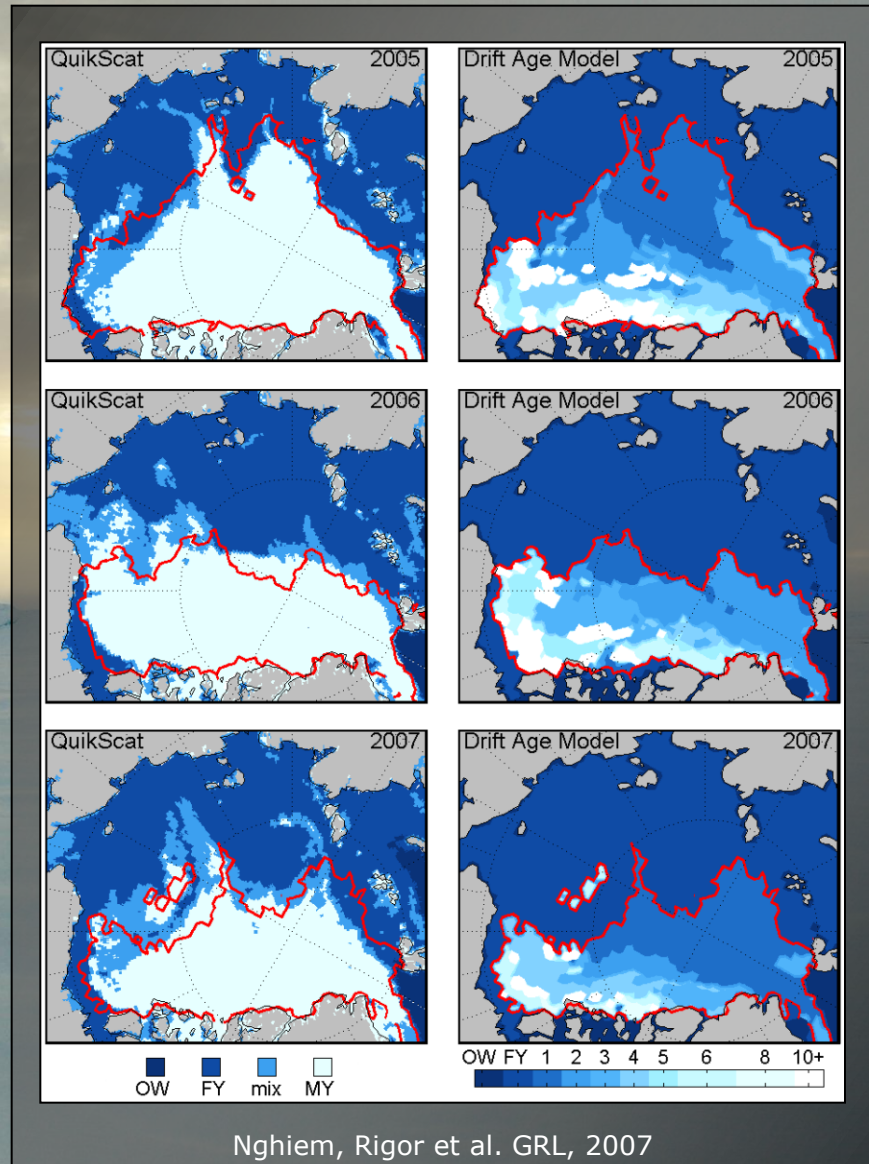
1. Alfred Wegener Institute for Polar and Marine Research,
Germany
2. University of Alberta, Canada

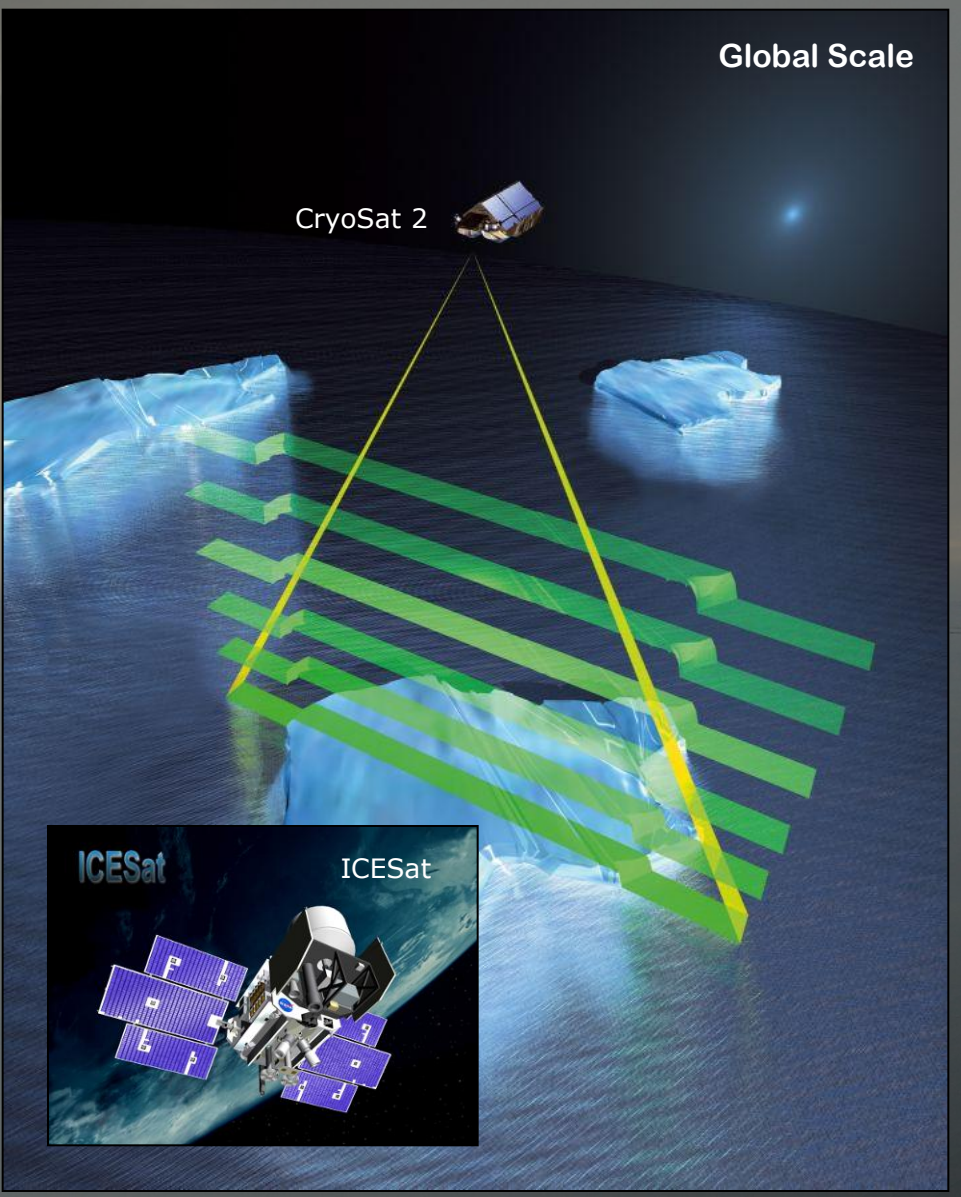
Arctic Sea Ice Minimum September 2007

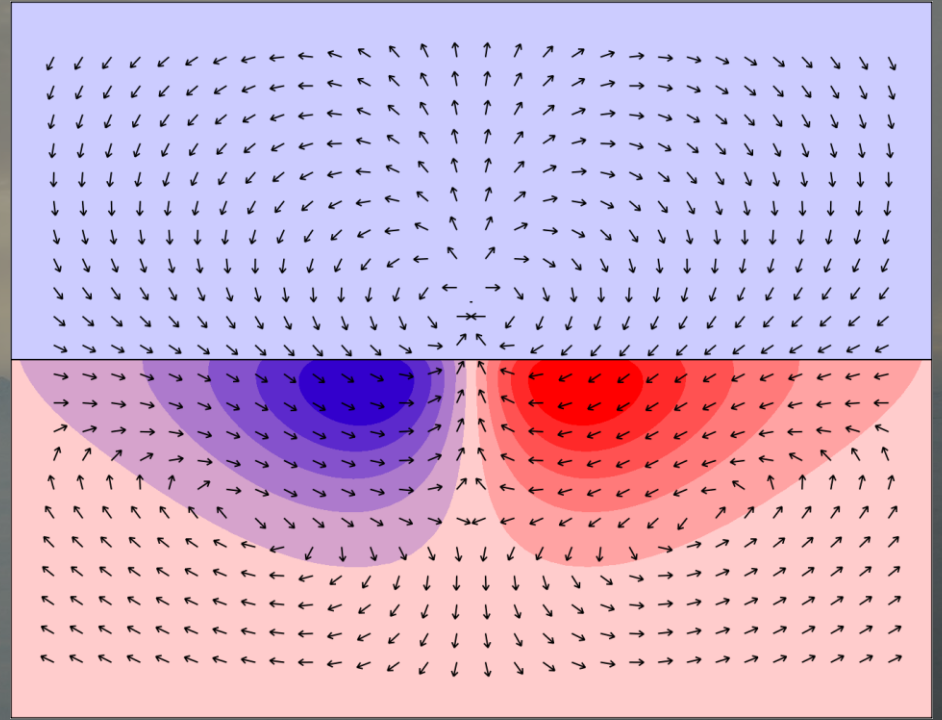
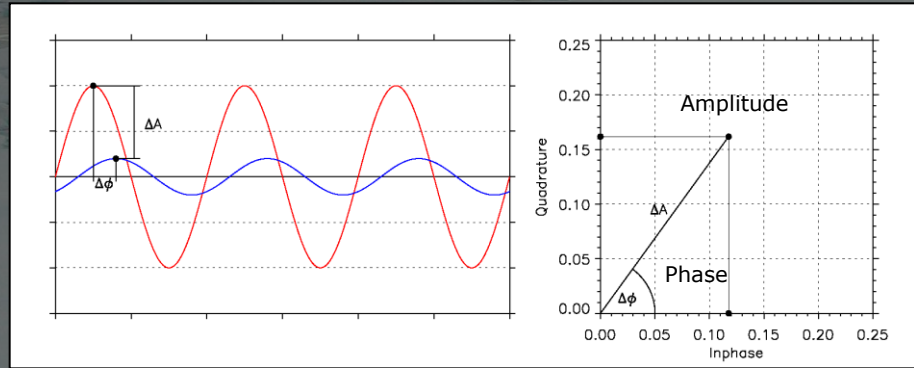
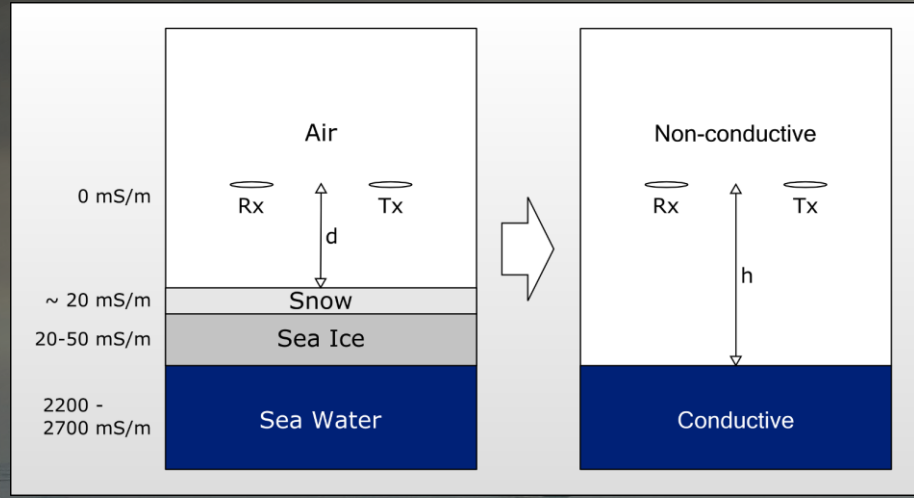


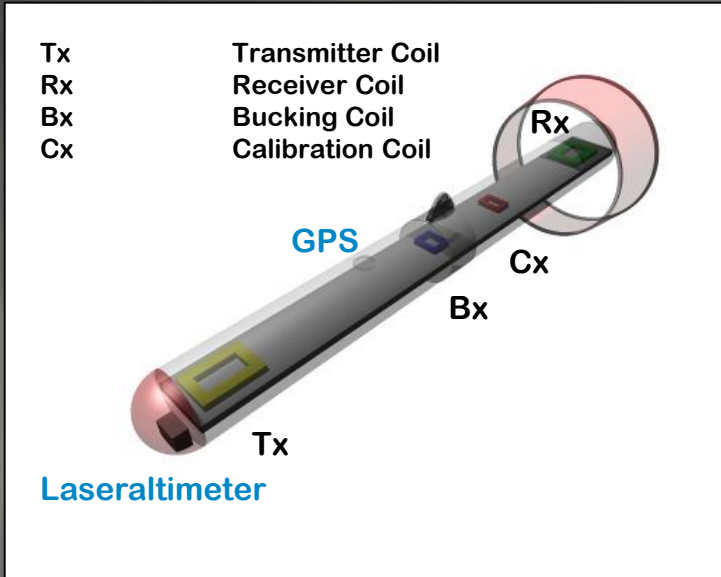
Retreat of Perennial Sea Ice

- **Ice Age from**
 - Quikscat Backscatter
 - Drift Model
- **Retreat of perennial sea ice from $4.69 \times 10^6 \text{ km}^2$ (March 2005) to $3.61 \times 10^6 \text{ km}^2$ (March 2007) : **-23%** (Nghiem, 2007)**
- **Most prominent retreat in the East Arctic**

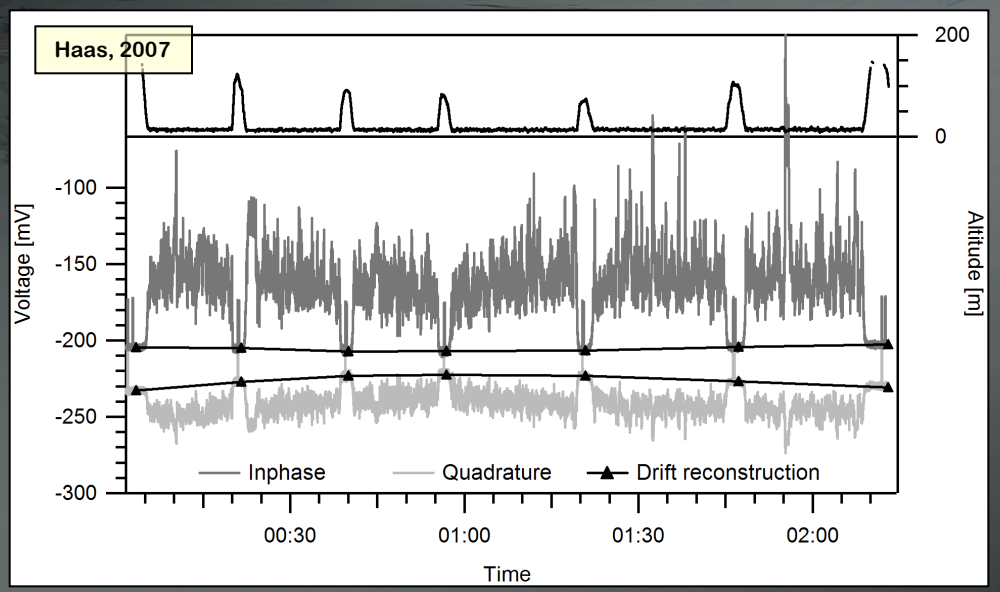
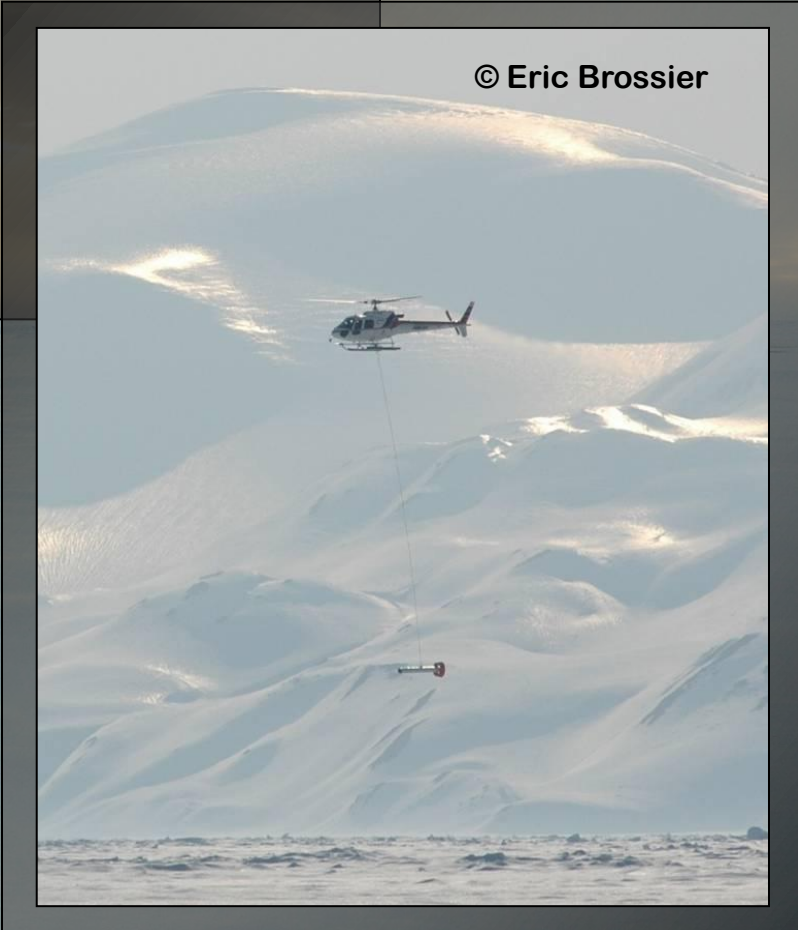








- Length : 3.4m
- Weight : 100 kg
- Coil Separation : 2.7 m
- Frequency : 3.68 (4.06) kHz
- Recording Frequency : 10 Hz \equiv 3 – 4m
- Operation Height : 10 – 15 m
- Footprint : 40 – 50 m



Standard instrument: Geonics EM31

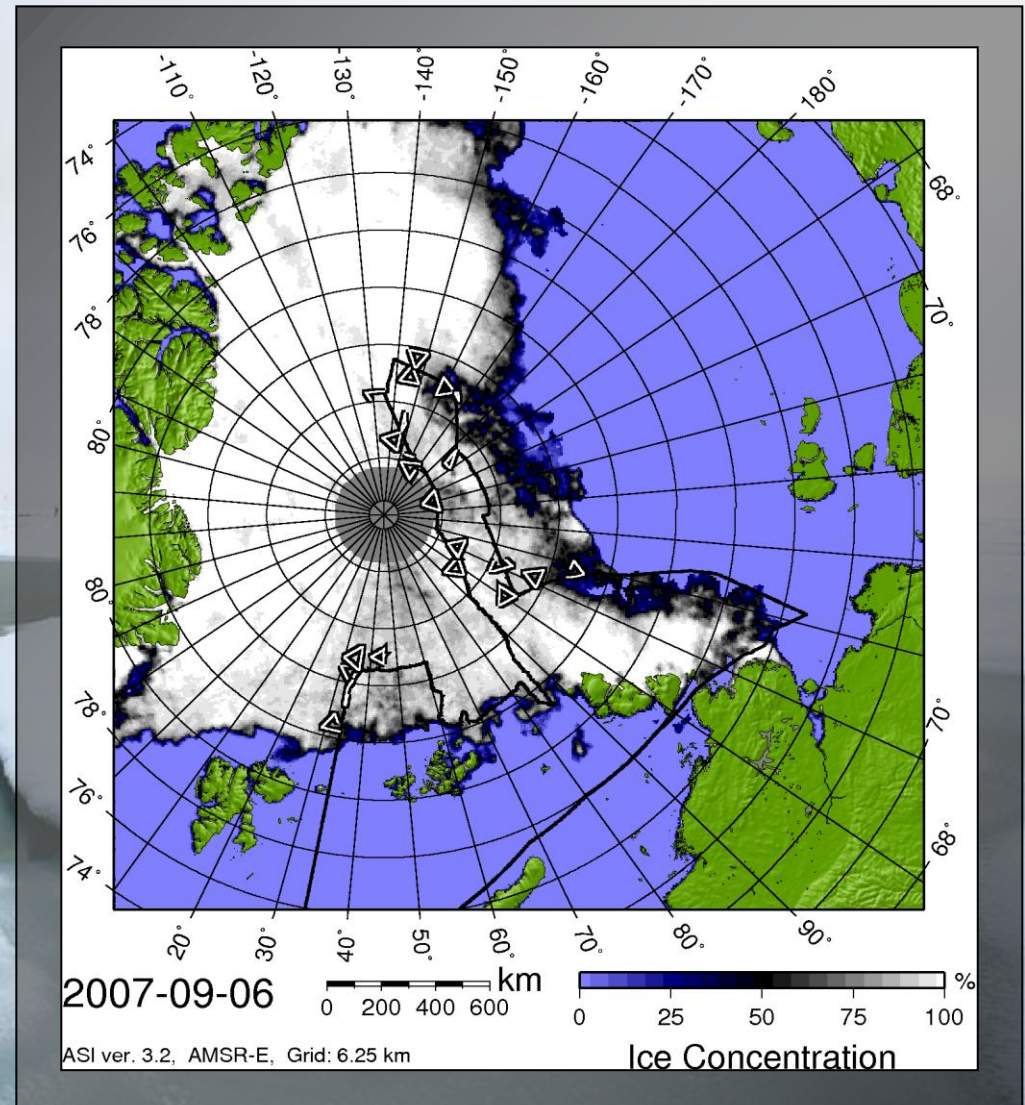


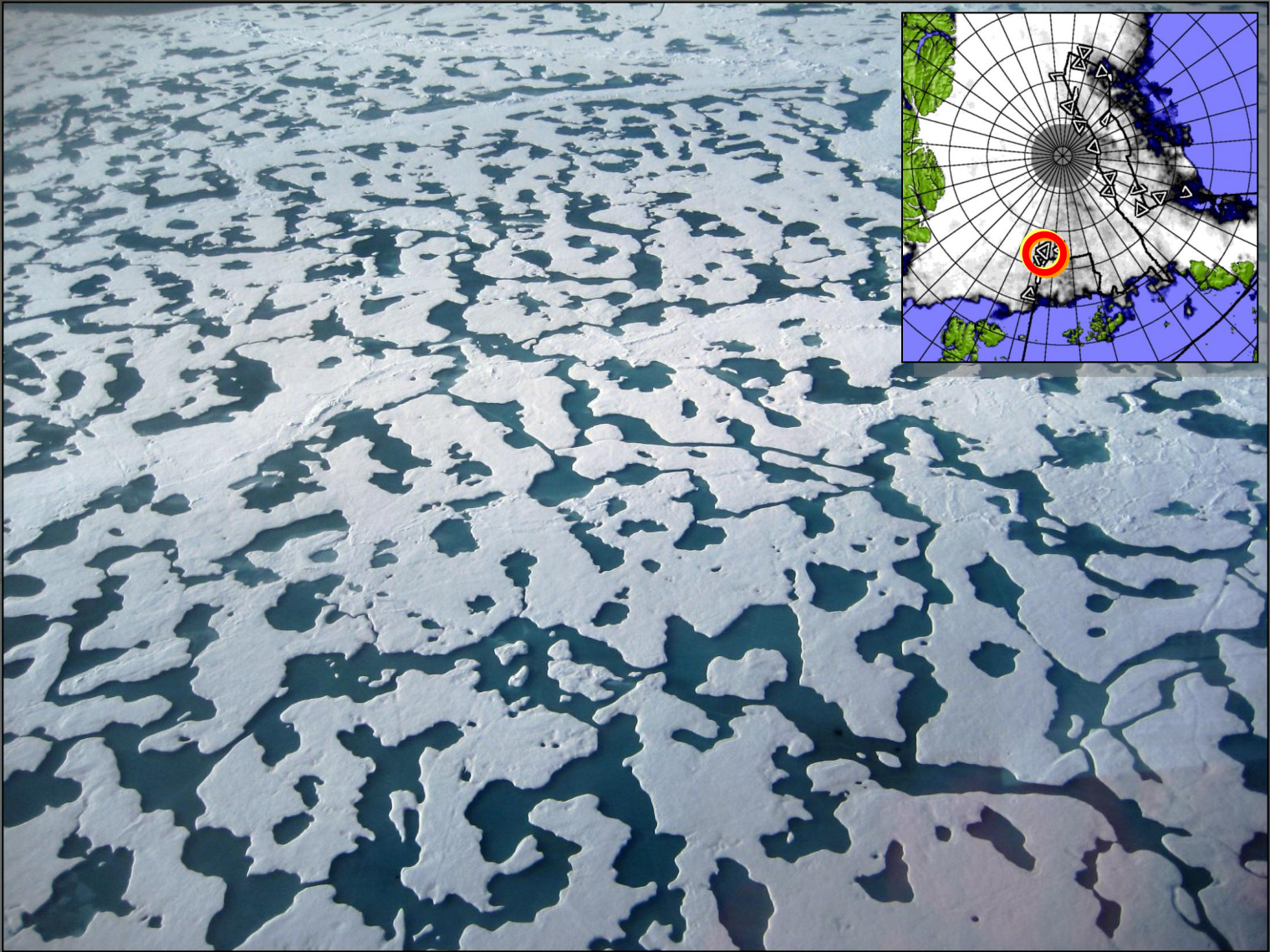
SPACE (Synoptic Pan-Arctic Climate and Environment Study)



Sea Ice Work

- 22 flights ~ 4000 km
- Ground EM on 12 ice stations
- Drill hole measurements in Russian EEZ

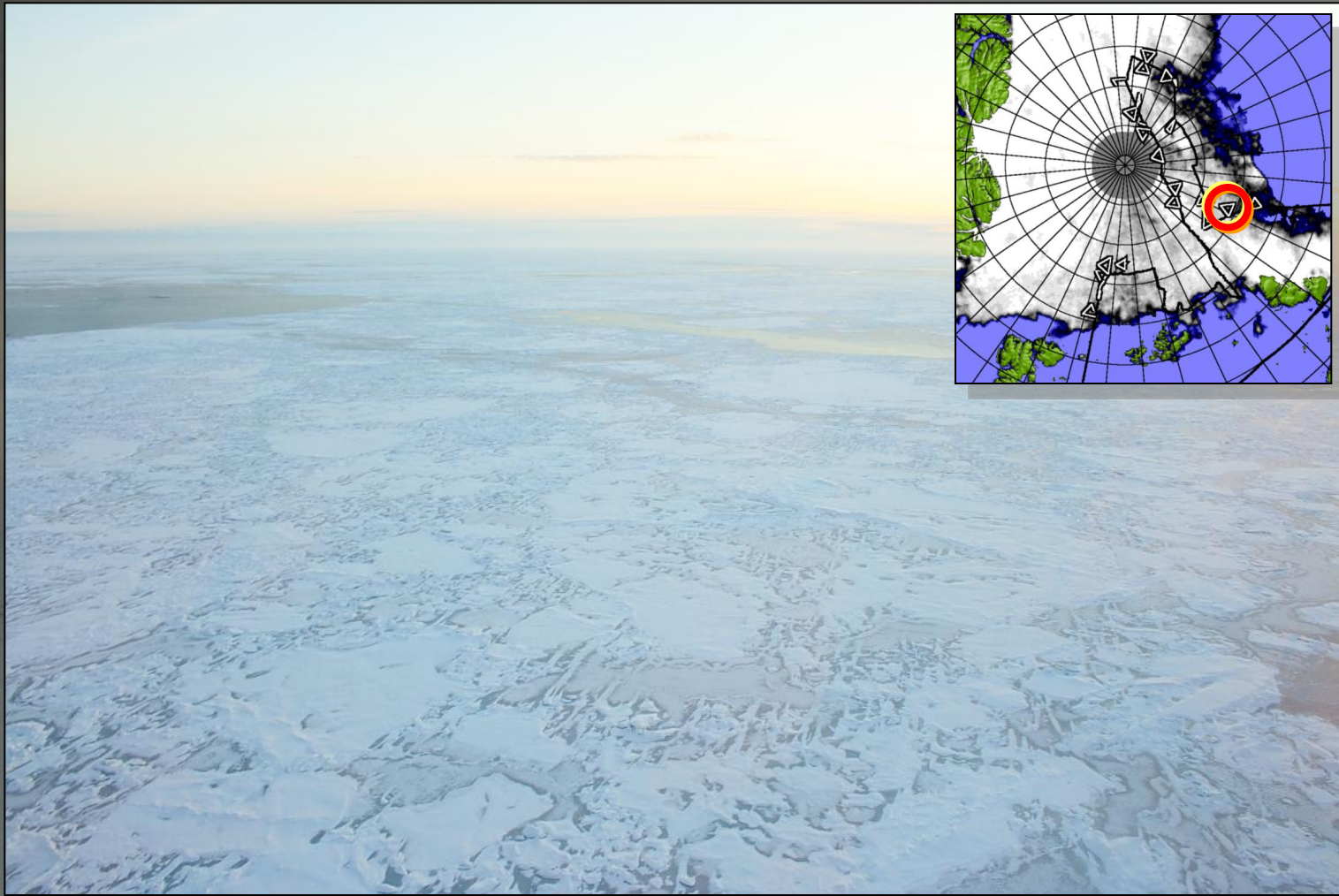




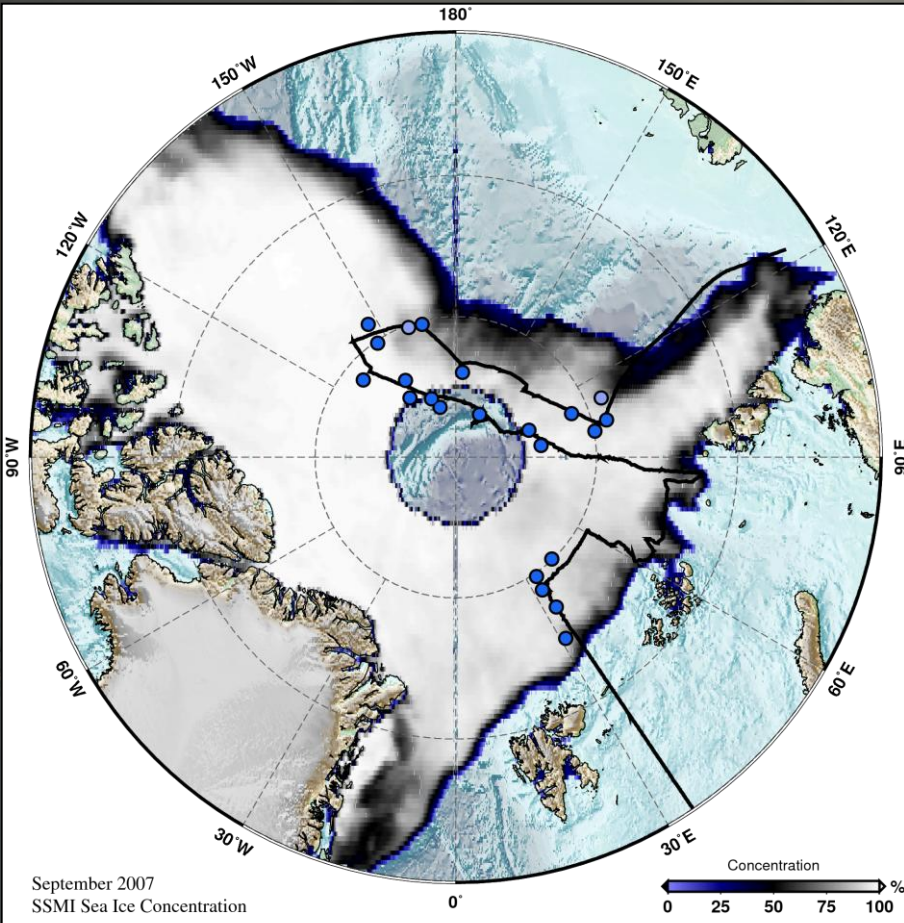
7. August



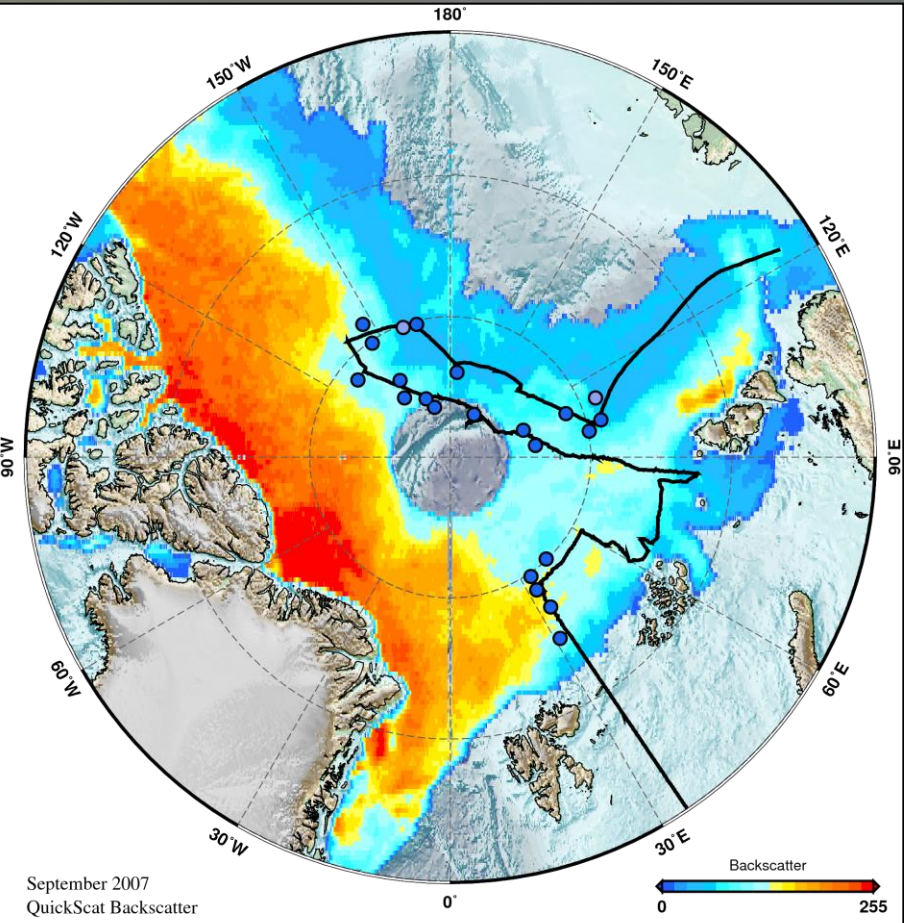
7. September



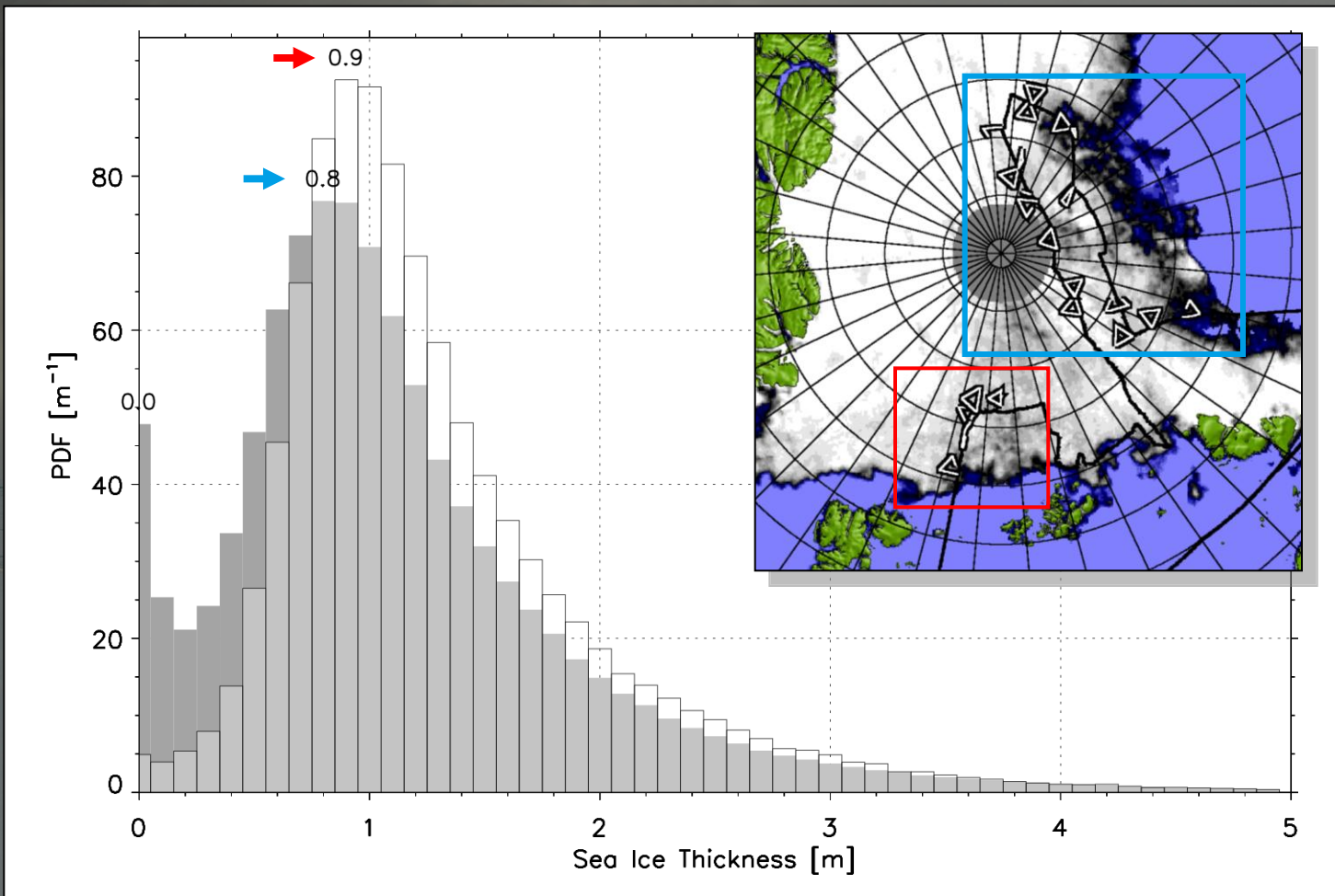
17. September



Cersat, Ifremer

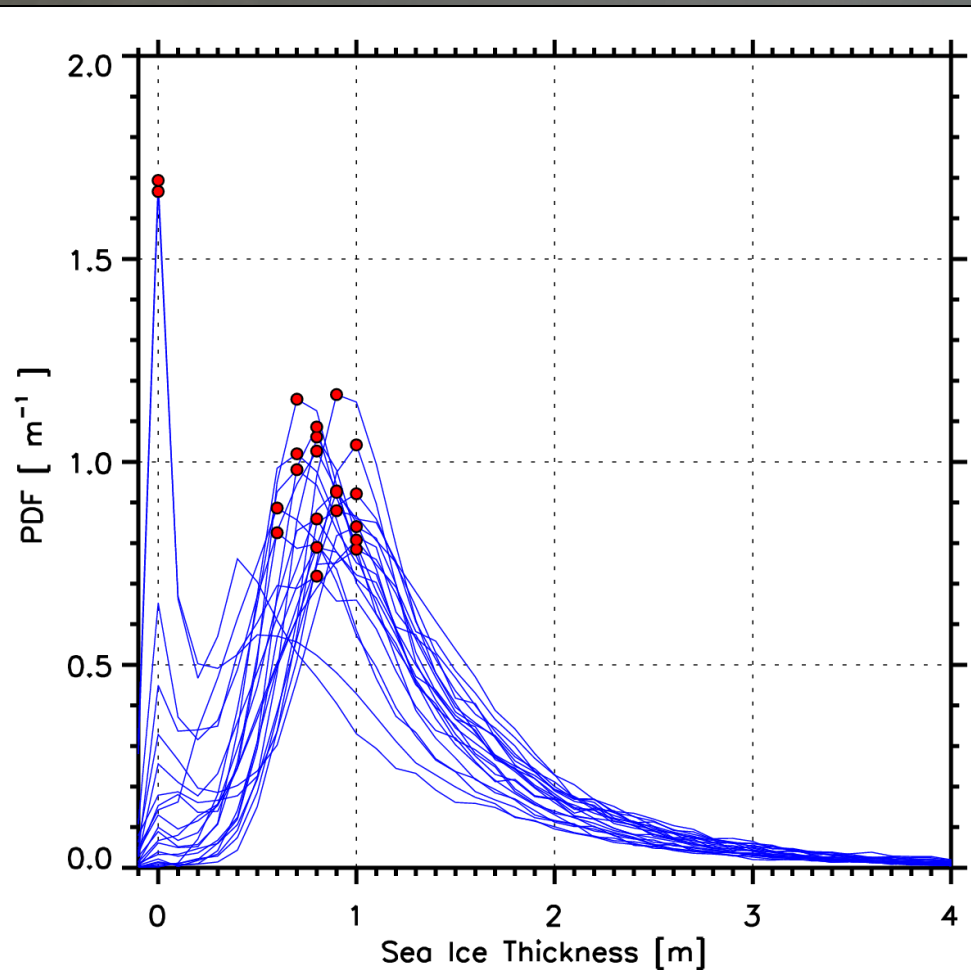


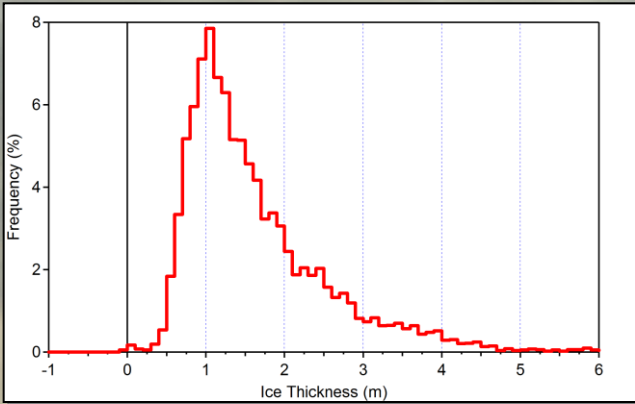
Cersat, Ifremer



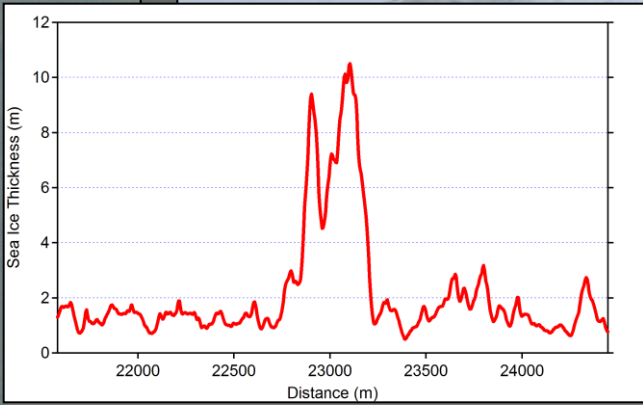
Variability of Thickness Pdf's

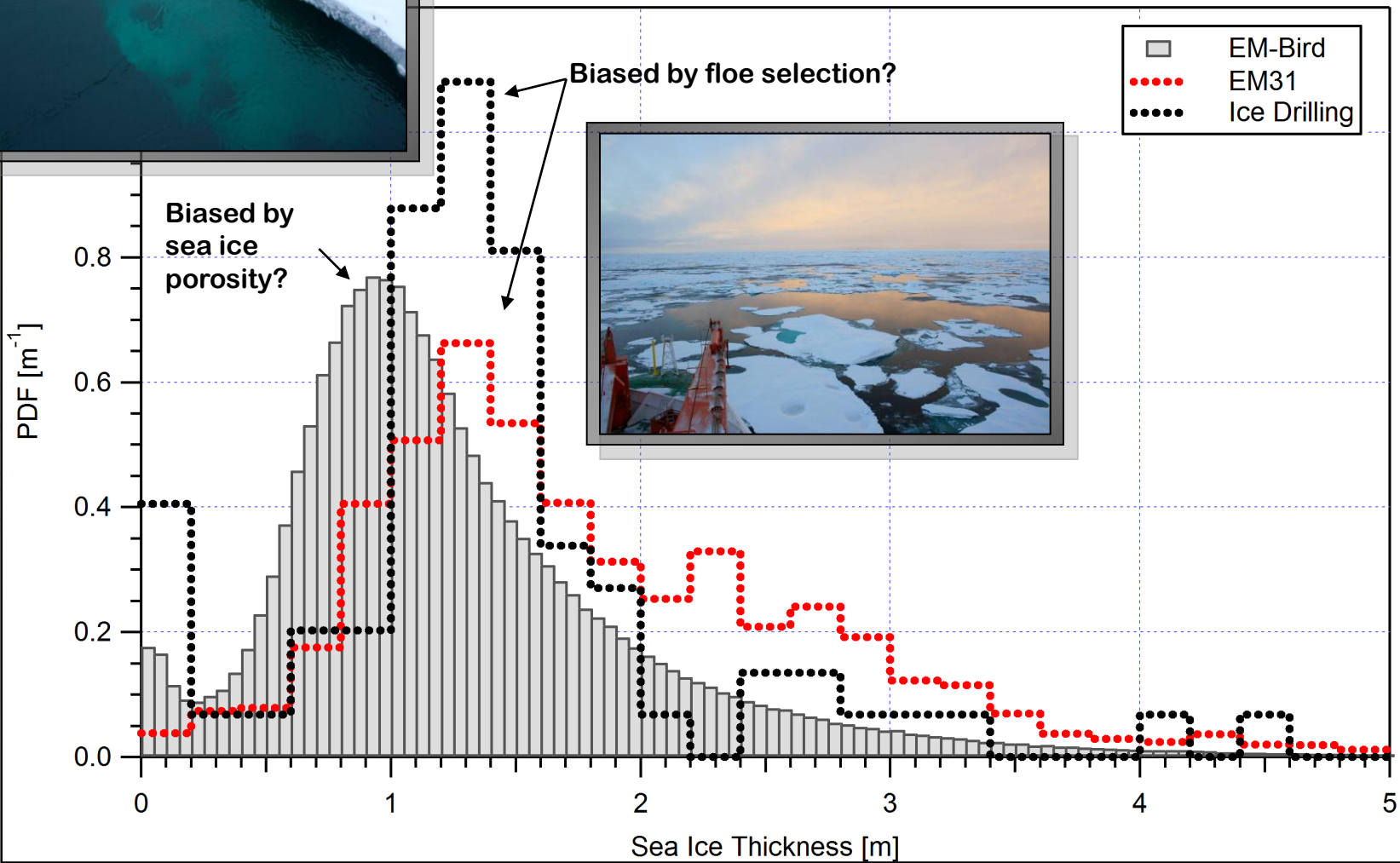
- **Modal Thickness :**
representation of level ice
(thermodynamic growth)
- **Modal Thickness < Mean
Thickness** because of
ridges
- **Except open water all
distributions strictly
monomodal**
- **All Modal Thickness
values equal or below 1
meter**

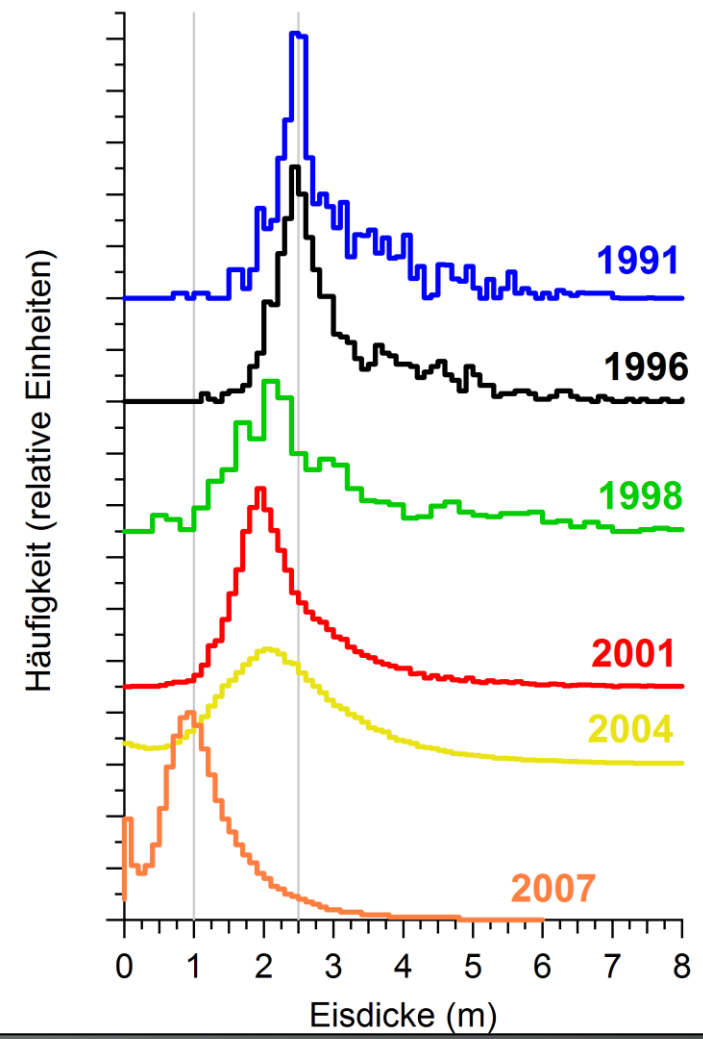
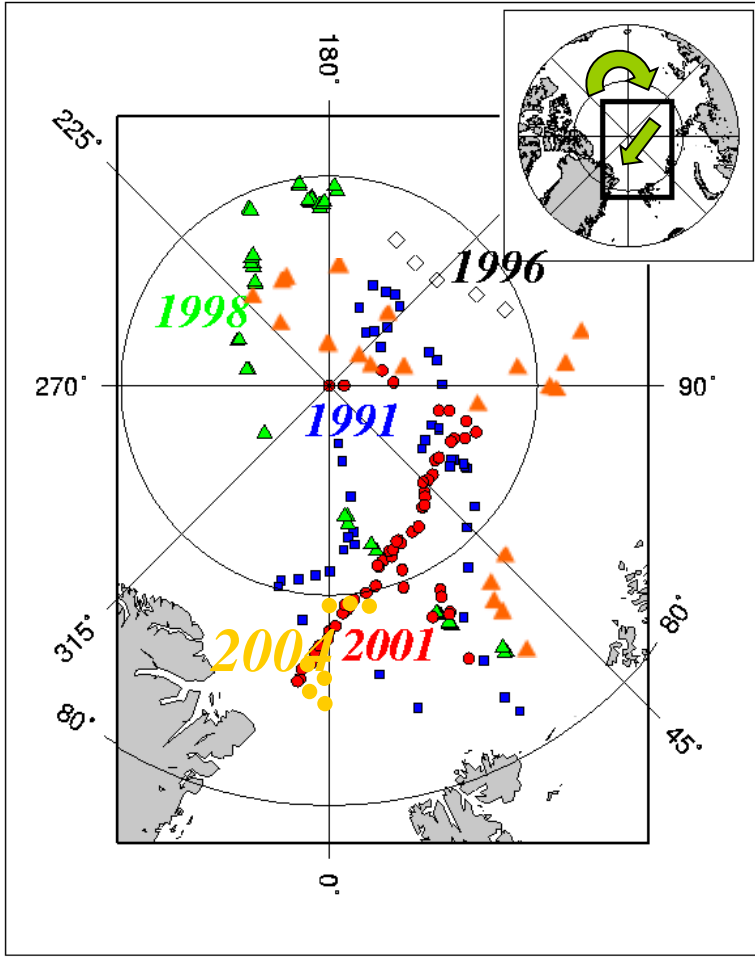


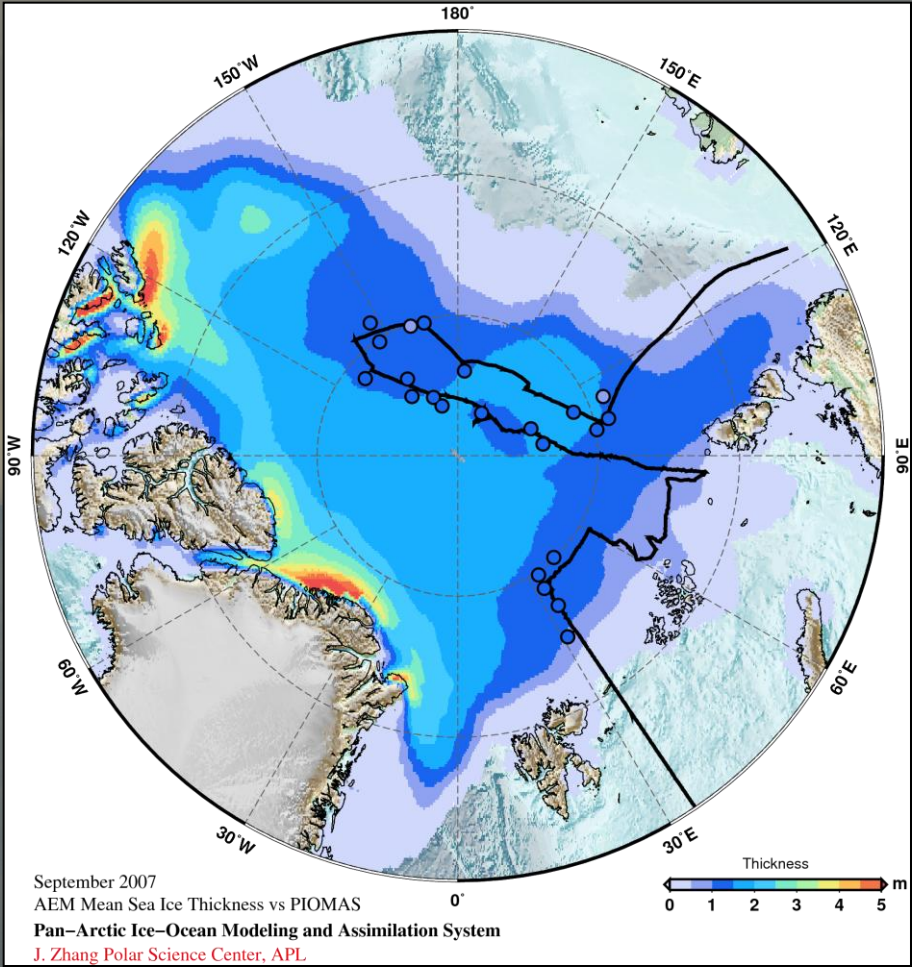
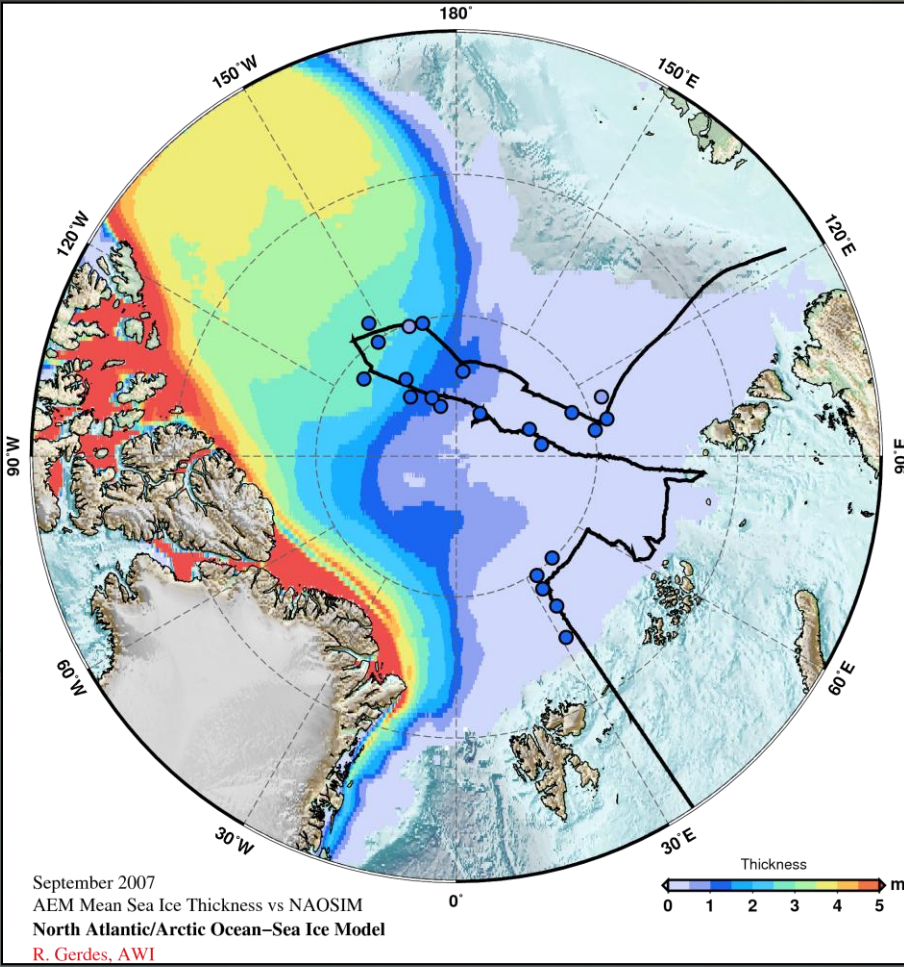


8. September

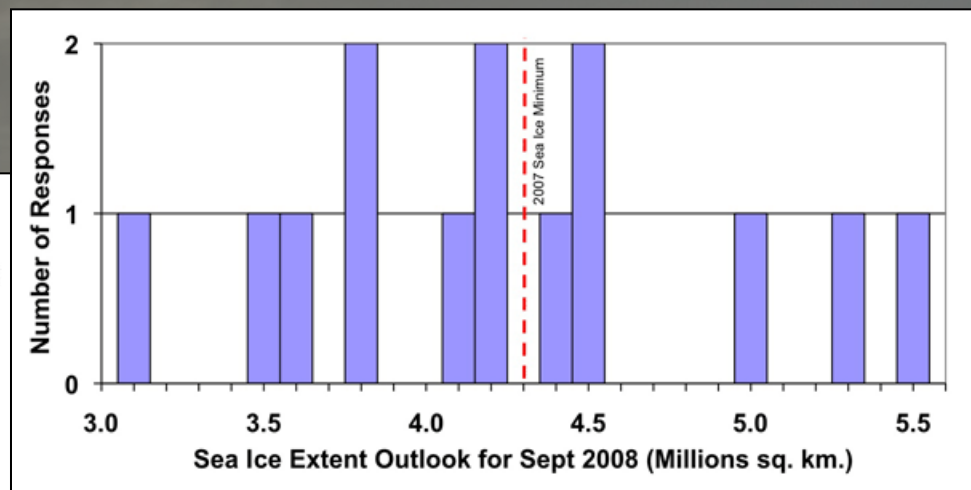
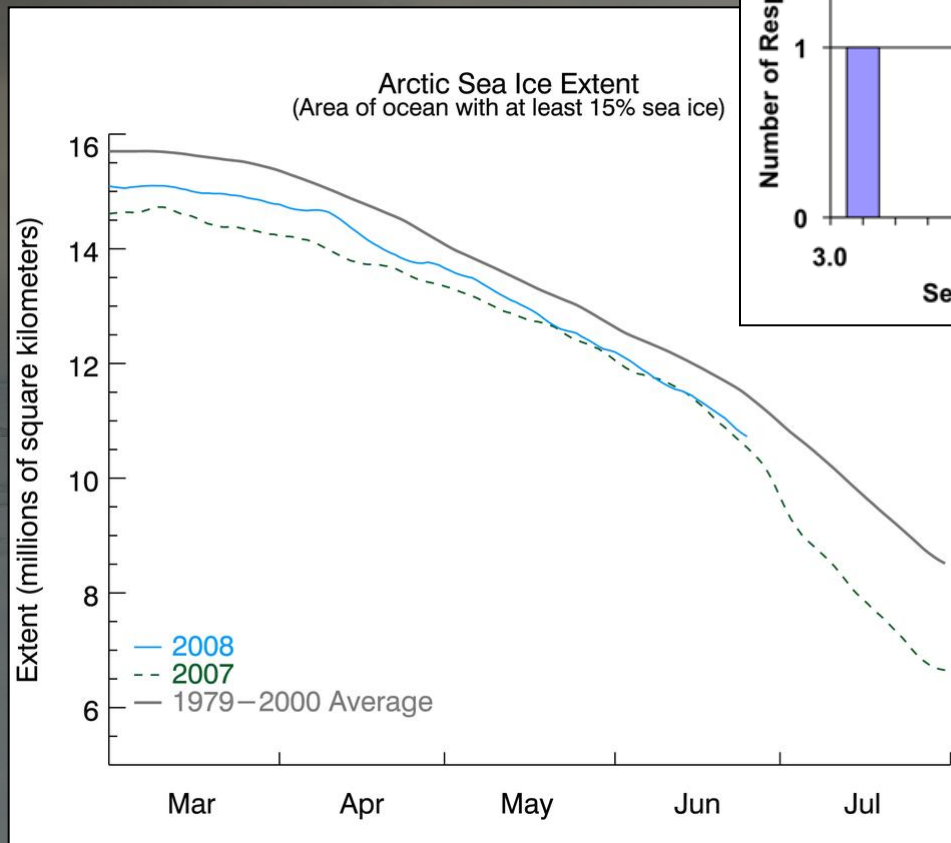








- **Uniform sea ice thickness distribution in the Transpolar Drift in autumn 2007**
- **Modal thickness (< 1 m) suggests only first/second year ice**
- **No identifiable MYI sea ice thickness class**
 - Surface roughness?
- **Modal thickness decreased from 2.5 m (1991) to 0.9 m (2007) in the Transpolar Drift**
 - Retreat of perennial sea ice
- **Thin ice favors further ice retreat**



National Snow and Ice Data Center, Boulder CO

Arctic Sea Ice Extent : NSIDC
Reports: Study of Enviromental Arctic Change



Thank you ...