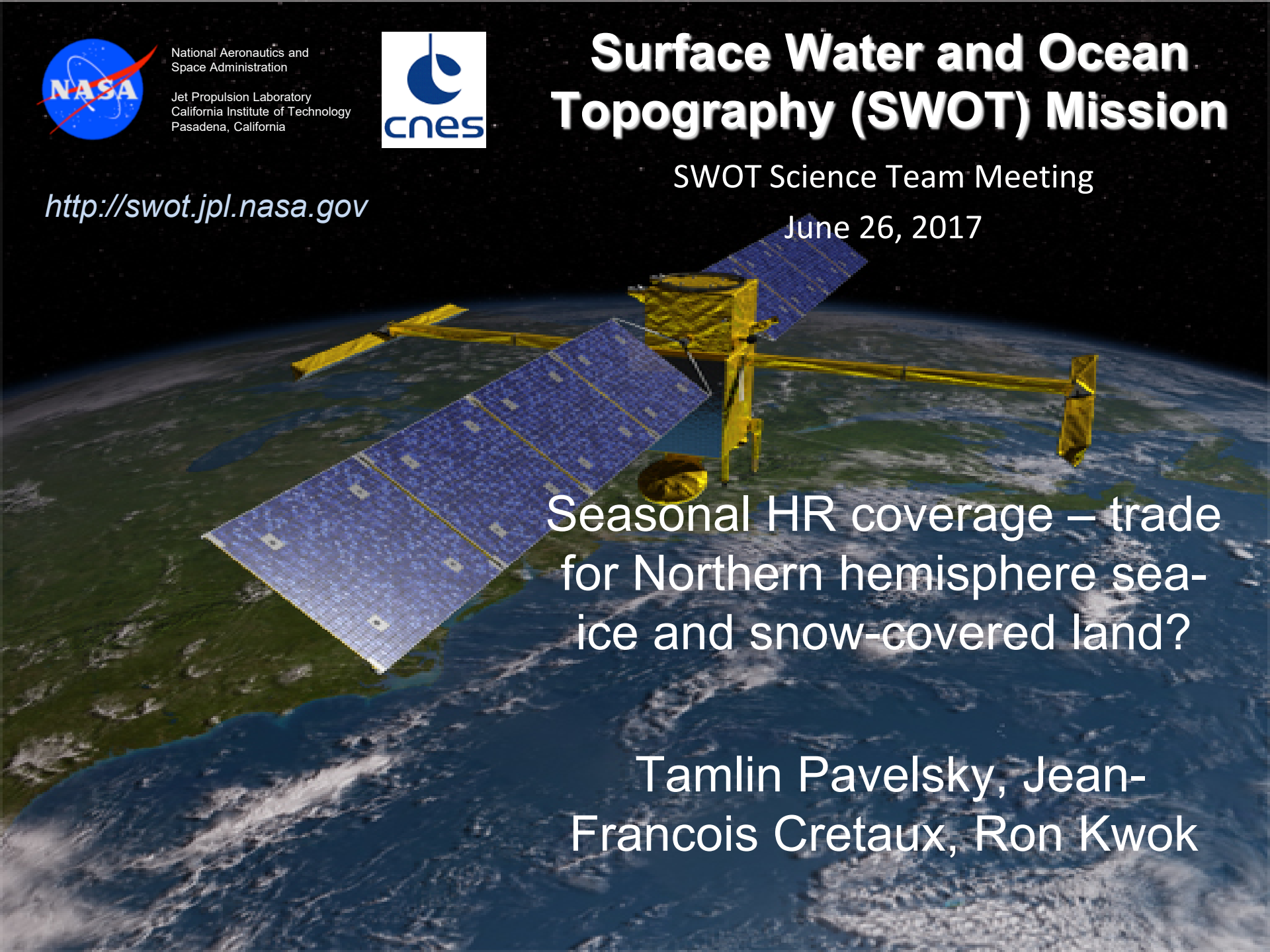
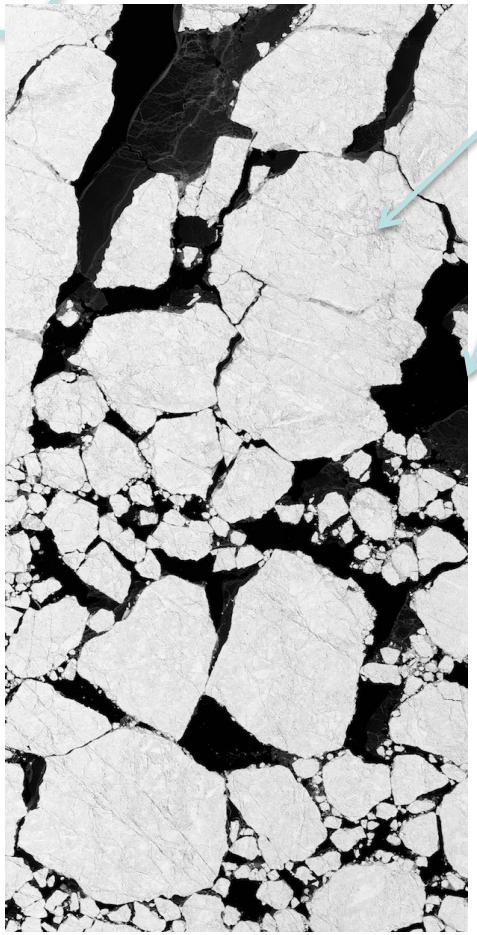
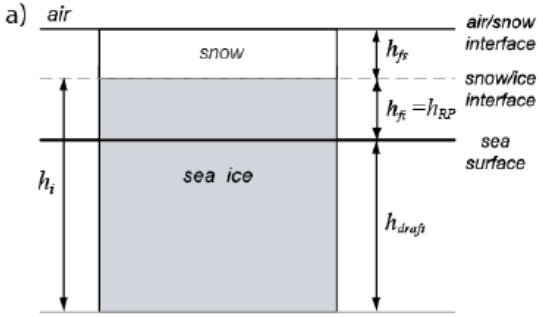

National Aeronautics and Space Administration
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California
cnes
Surface Water and Ocean Topography (SWOT) Mission
SWOT Science Team Meeting
June 26, 2017
http://swot.jpl.nasa.gov
Seasonal HR coverage – trade for Northern hemisphere sea-ice and snow-covered land?
Tamlin Pavelsky, Jean-Francois Cretaux, Ron Kwok

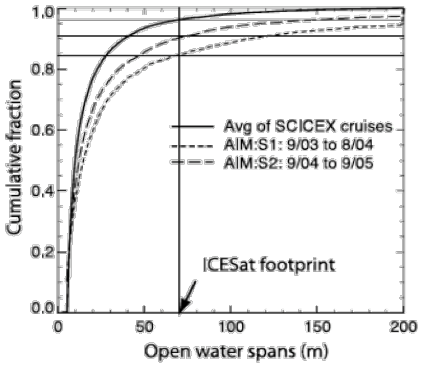
SWOT over the ice-covered oceans



Geometry



Lead width



Objective: Calculation of sea ice freeboard/thickness and sea surface height – freeboard is the height of the ice surface above the local sea surface.

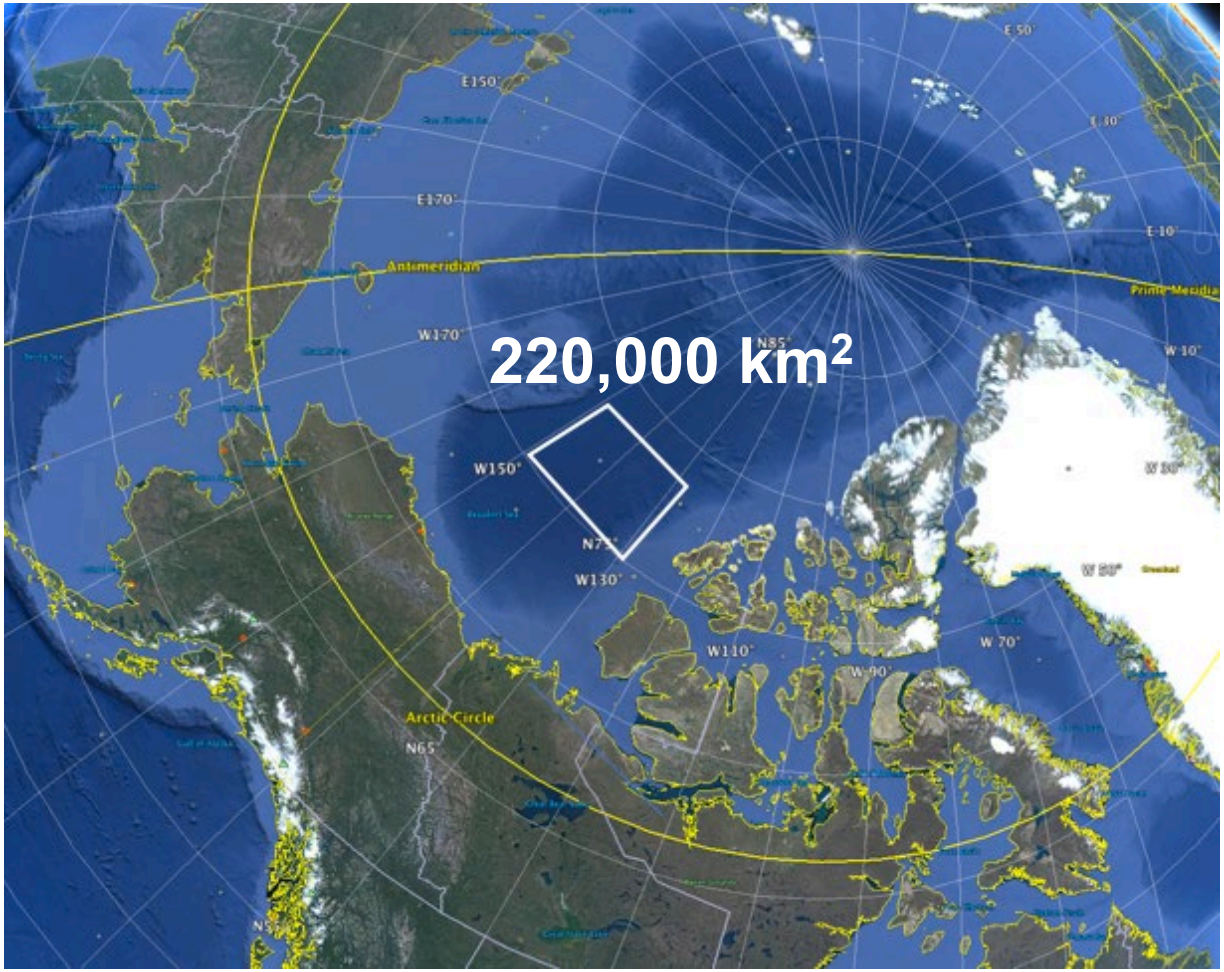
Why we need HR data?

- narrow leads (most <10^2 m wide).
- leads are long-narrow features associated with brittle failure.
- need several centimeter precision for accurate determination of local freeboard.

R. Kwok - JPL

HR Requirements for Sea Ice

Seasonal HR coverage over a substantial area of sea ice (~220,000 km^2) will allow studies of sea ice freeboard using SWOT.



Projected area of sea ice freeboard studies.

Terrestrial HR Mask Tradeoff

In order to facilitate download of HR data over sea ice, a portion of the terrestrial HR mask must be removed. We propose to remove a portion of the Canadian Archipelago during the months of December, January, and February. All areas north of 70º N.

Summary

- SWOT can potentially provide useful information on sea ice freeboard, but doing so will only be possible using HR data due to characteristic dimensions of leads.
- We will download ~220,000 km2 of HR data over a characteristically sea ice covered region in the Beaufort Sea.
  - Download during winter (DJF)
- A portion of the terrestrial HR mask covering Banks Island and part of Victoria Island will be removed during DJF to compensate.
- HR mask changes to be made after 1 winter season to facilitate understanding of any interesting terrestrial hydrology signals in the Canadian Archipelago during winter.
- It may be possible to revisit these recommendations after launch depending on usefulness of HR data in sea ice studies and over terrestrial areas during winter.