

# Cryosphere WG

- About 70 members
- 23 abstracts
- 2 sessions

Cryosphere: every surface that can be covered by ice

- Glaciers and ice shelves
- Polar caps
- Permafrost
- Rivers and lakes in polar regions and mountains
- Polar oceans
- Sea ice

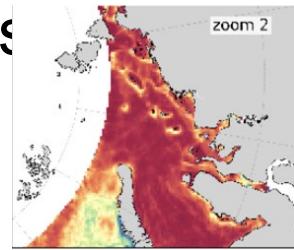
=> need for important interconnections with the other WG

=> usage of nearly of the types of SWOT products

# Emerging and developing SWOT cryo applications

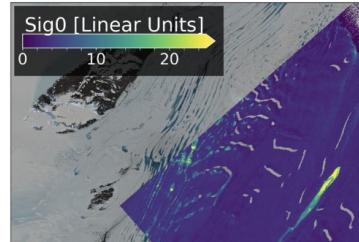
## LR products

- Ice type and thickness, lead detection
- Sea-ice freeboard, concentration, and surface roughness
- Polar ocean and sea-ice dynamics



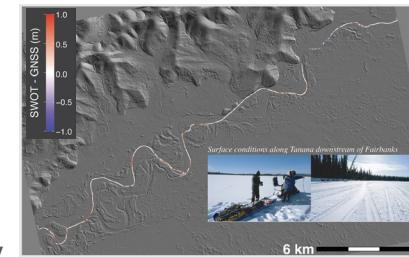
## HR Raster

- Monitoring ice-shelf rift evolution, iceberg detachment, and
- Mapping supraglacial meltwater and drainage networks
- Quantifying alpine glacier change
- Resolving ocean dynamics and fine-scale ice-ocean interactions



## PIXC

- Tracking glacial-lake outburst floods and proglacial lake evolution
- Monitoring river and lake dynamics in polar and high-mountain regions
- Fine-scale discriminating between lake/river ice and open water surfaces



## Scientific implications

- Enables land-ice and hydrologic monitoring essential for assessing ice-sheet stability and cryosphere–hydrosphere coupling
- Provides 2-D, high-resolution elevation and backscatter observations through persistent cloud cover
- Offers unprecedented temporal and spatial detail for capturing rarely observed variability and process-level dynamics in polar environments

# SWOT validation and needs

Great SWOT performance for ice shelf rifts and surface heights [HR], lake/river ice [HR and PIXC], surface classification [all], and sea ice freeboards and concentrations [LR]

Major needs for SLC to HR:

- Open L1B processing pipeline and tools for phase unwrapping issues
- Tools to process the SLC (HR)
- Updated inclusion mask
- Add variables and flags in Rasters: phase\_noise\_std, DEM, DAC, holistic ice class

Major needs for L2, L3:

- Mean sea surface improvements and product coastline updates around the ice sheets
- Snow/ice penetration depth for Ka vs other methods
- Arctic dynamic ocean topography product (annual?)
- Crossover correction improvements in L2
- AVISO allowing open mirroring of L3 datasets
- Field observations: snow depth and properties, sea ice freeboard/thickness

Future plans:

- New products ideation
- SLC processing
- Ice/snow differentiation and flags
- Evaluation sea ice drag and impacts on tides and DAC