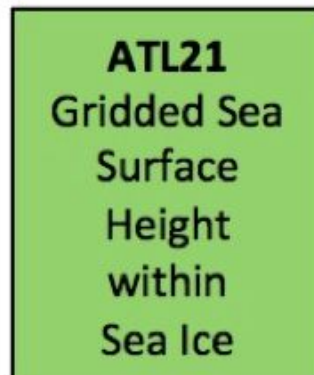
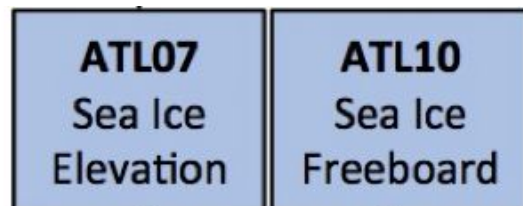


ICESat-2 Sea ice data products

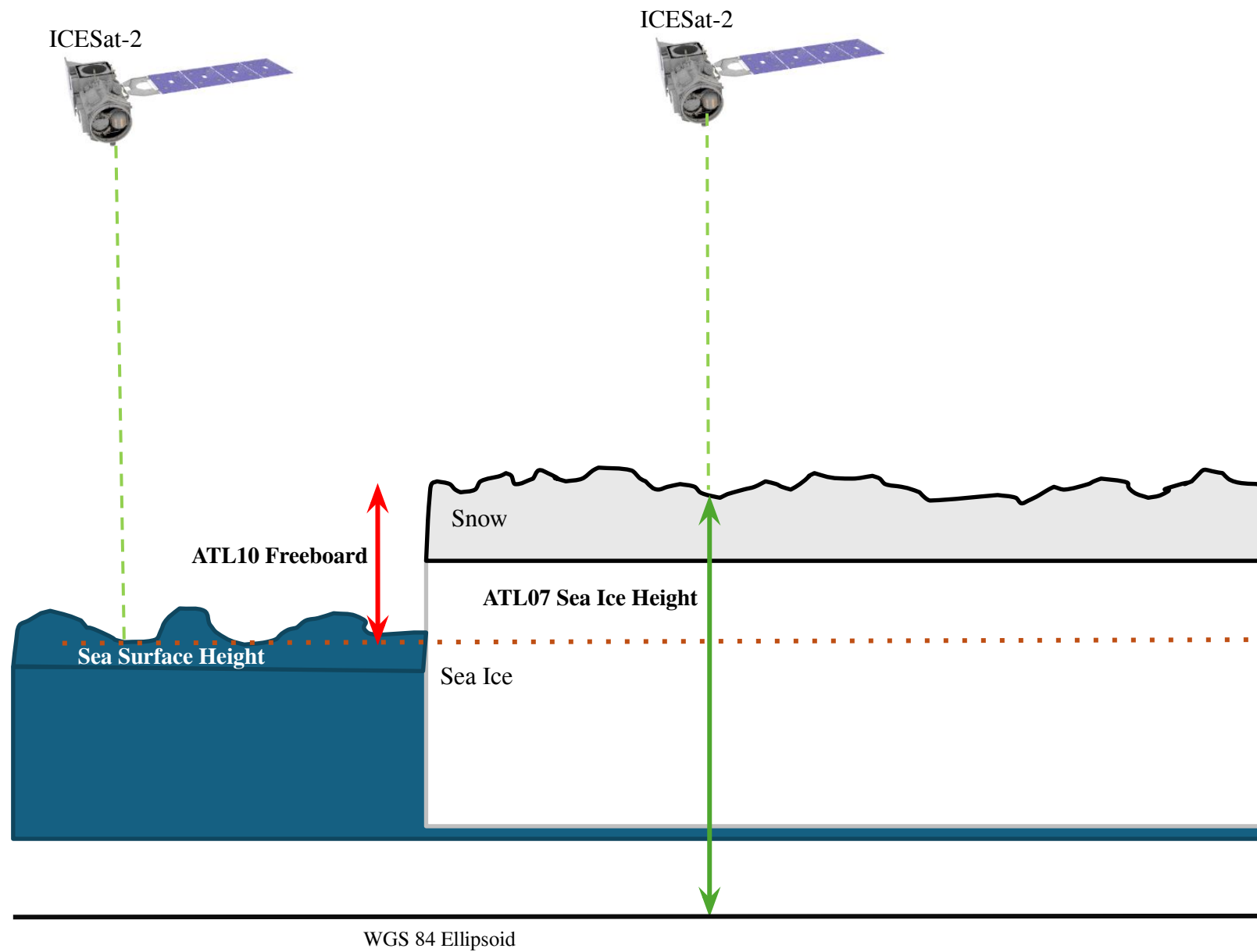
Along-track



*Gridded (Daily
and Monthly)*

ATL[xx]-[hh]_[yyyymmdd][hhmmss]_[tttt][cc][nn]_[rrr]_[vv].h5

- **xx**: ATLAS product number
- **hh**: Sea ice hemisphere flag (01=north, 02=south)
- **yyyymmdd**: year, month and day of data acquisition
- **hhmmss**: start time, hour, minute, and second of data acquisition (UTC)
- **tttt**: Reference Ground Track (RGT, ranges from 1–1387)
- **cc**: Orbital Cycle (91-day period)
- **nn**: Granule number (always 01 for sea ice products)
- **rrr**: Data release number
- **vv**: Data version number



◆ ATL07 – Along-track Sea Ice Heights

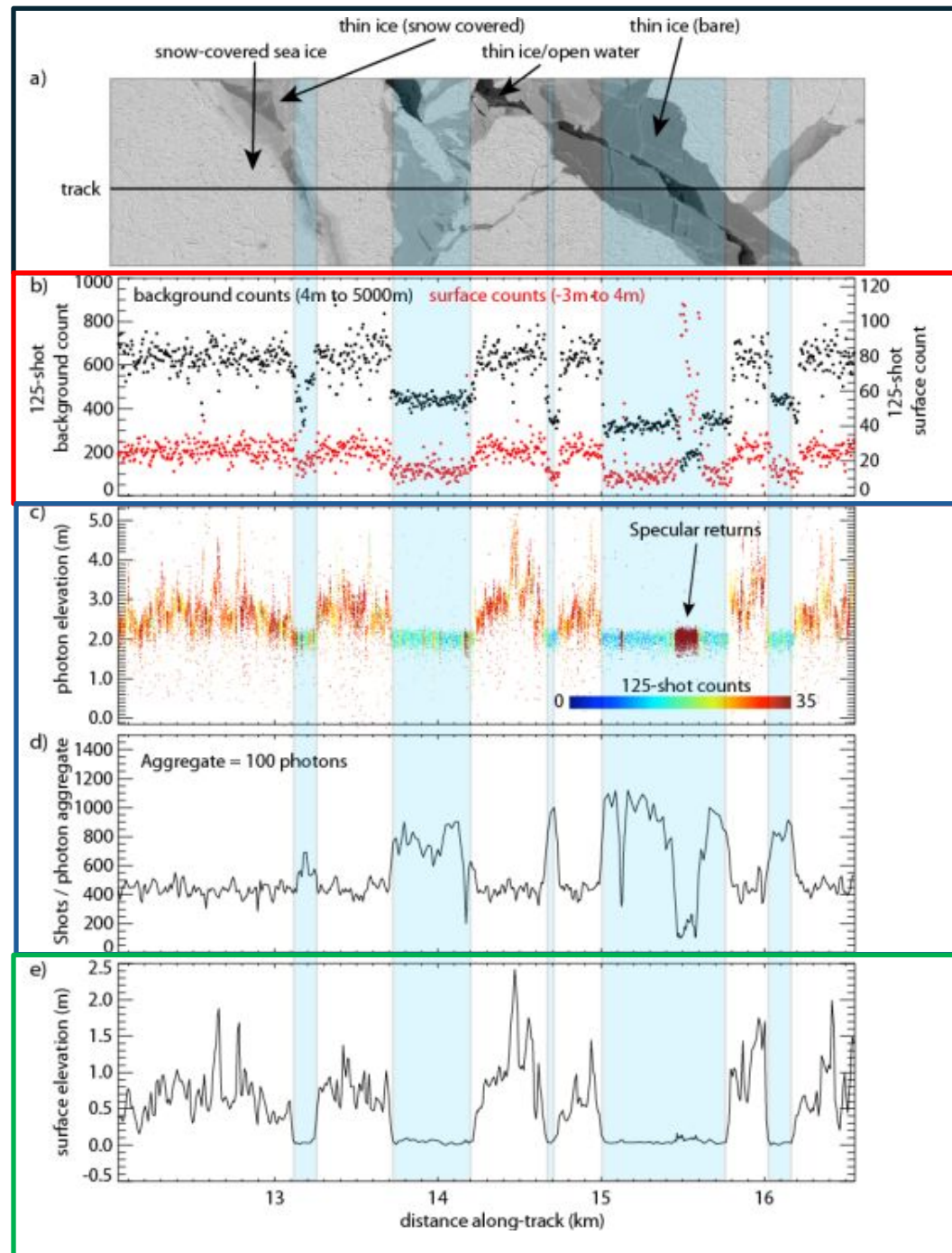
Key Features:

- Segments are variable in length; ~150 photon aggregated

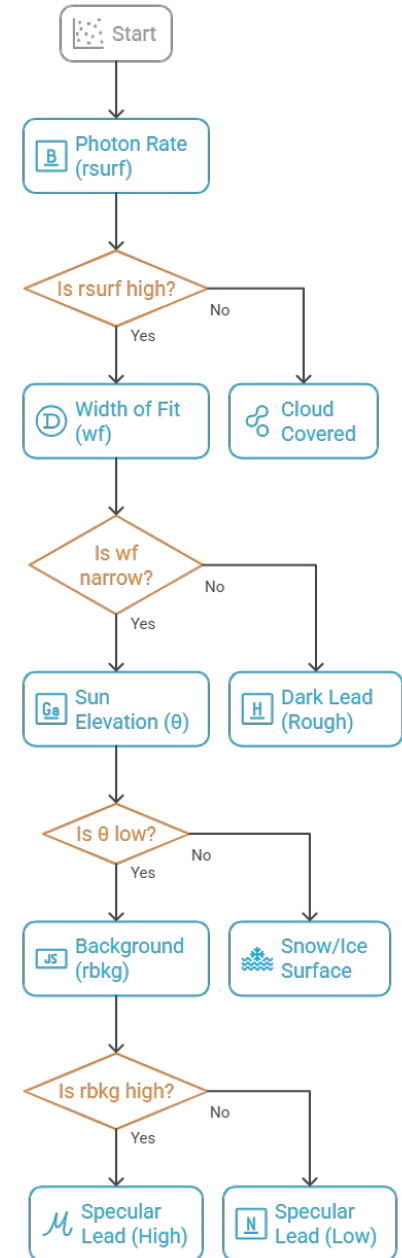
- Each segment is classified (sea ice, lead/open water, or invalid) based on the photon rate, background photon rate, width of the photon distribution, surface elevation

- Sea Ice concentration greater than 15% (AMSR2 product) considered as sea ice

- Coastal Buffer of 25 km



Surface Classification Decision Tree

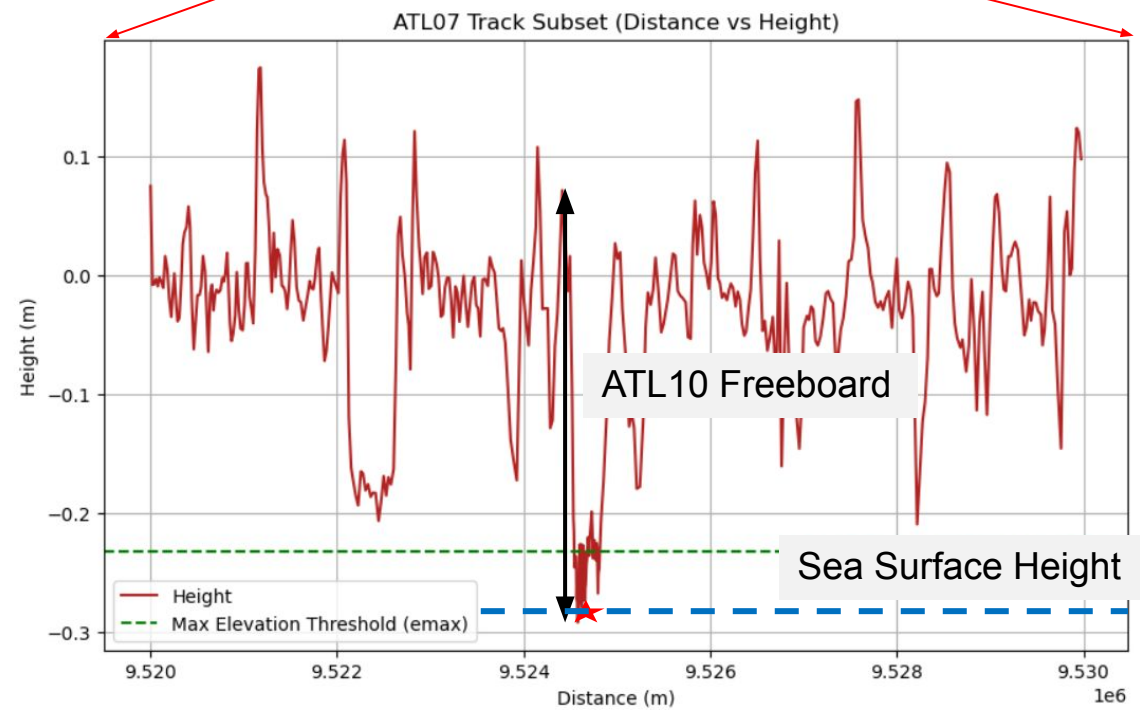
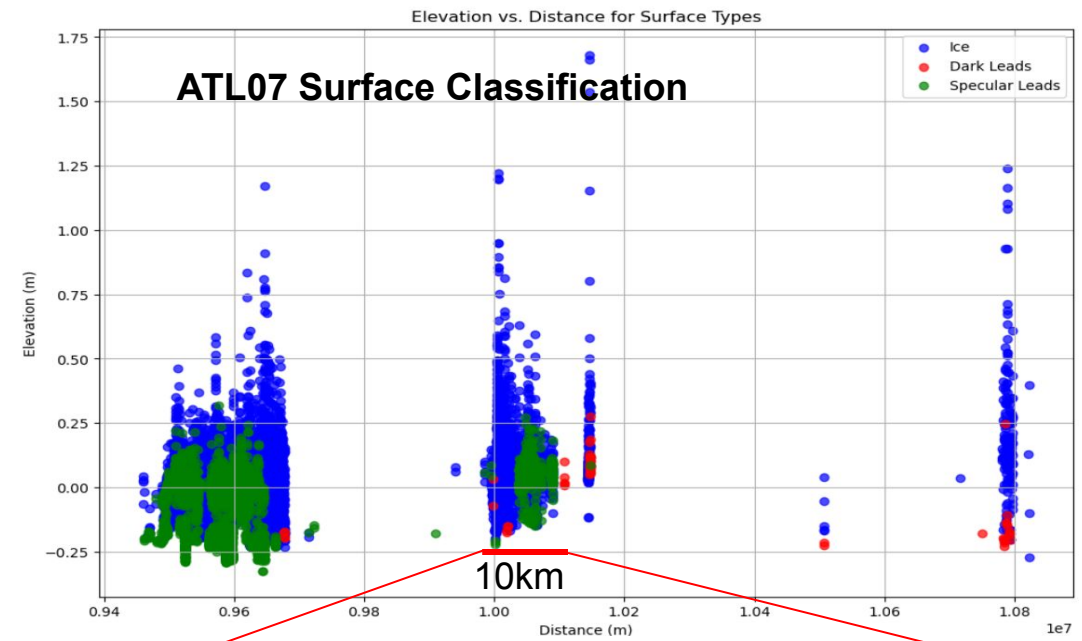
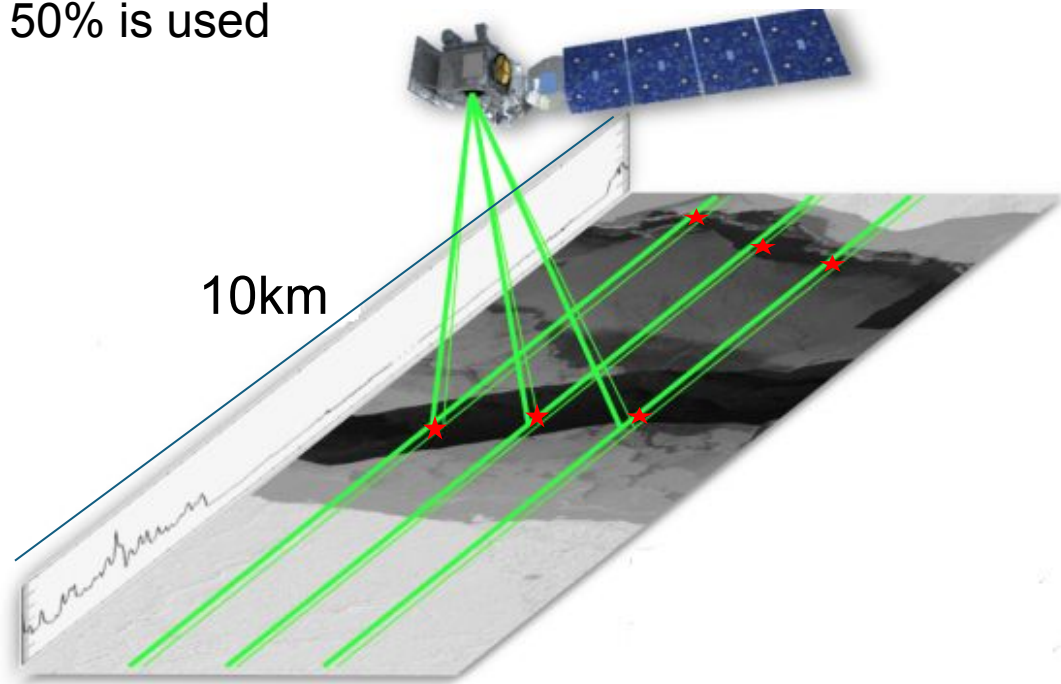


◆ ATL10 – Along-track Sea Ice Freeboard

- Uses lead returns (open water) to estimate local sea surface reference.

- Only specular leads are used for calculating the freeboard

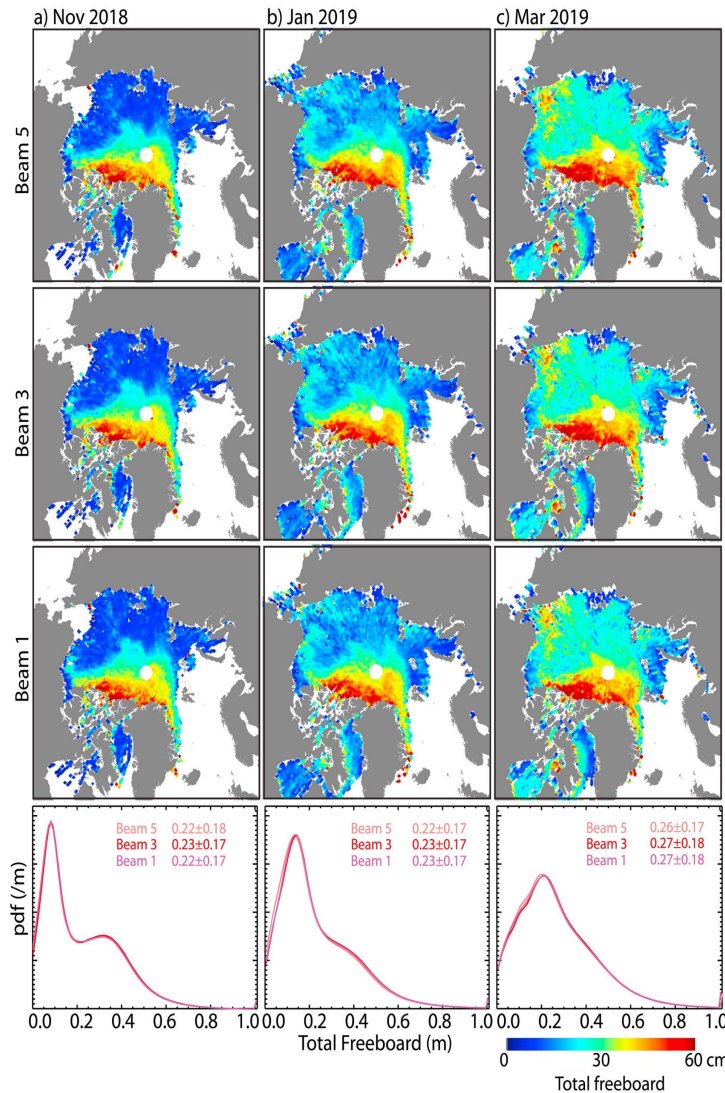
- Sea Ice concentration greater than 50% is used



◆ **ATL20 – Gridded Monthly Sea Ice Freeboard**
Purpose: Provides gridded sea ice freeboard on a daily/ monthly basis.

Key Features:

- Grids ATL10 freeboard values into regular 25-km cells in NSIDC Northern polar stereographic projection.
- Separate grids for Northern and Southern Hemispheres.
- Ensures spatial averaging and improved large-scale analysis.



Source: Kwok et al,
2019

◆ **ATL21 – Gridded Monthly Sea Surface Height (Ice-Covered Ocean)**

Purpose: Provides gridded sea surface heights under ice-covered regions.

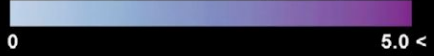
Key Features:

- Derived from ATL10 lead segments (open water).
- Gridded in 25-km cells, monthly resolution.

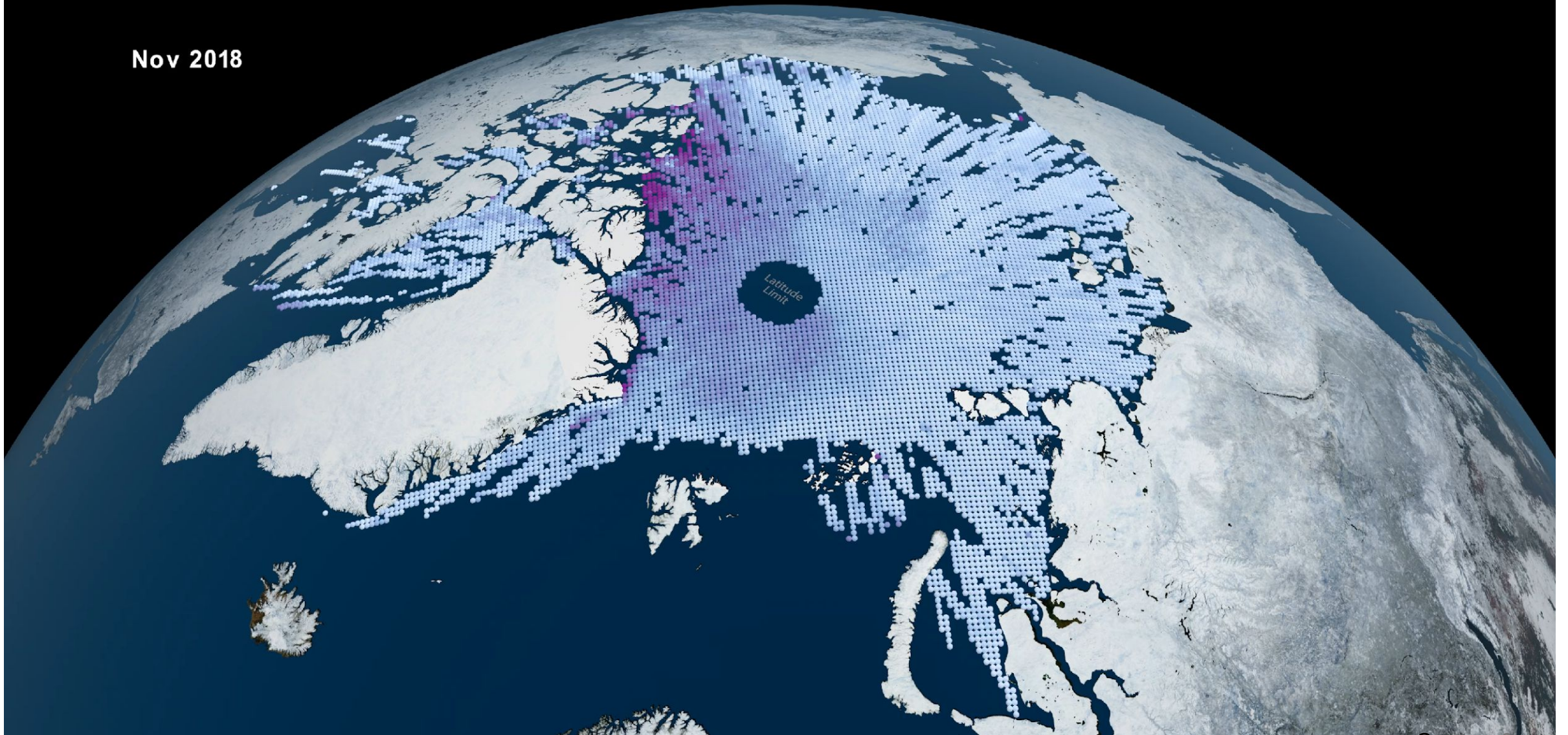
Applications:

- Understanding sea level variability beneath ice.
- Ocean circulation and pressure field studies in polar regions.
- Supports climate diagnostics in sea ice zones.

Sea Ice Thickness (Meters)



Nov 2018



Source: ⁶
NASA/Petty et al.,