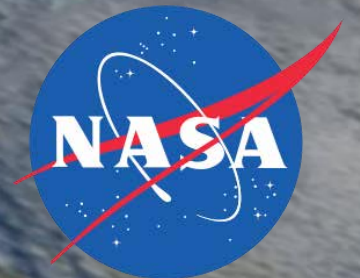


A satellite with two large blue solar panels is in orbit above Earth. A red dot on the satellite's surface indicates the location of the altimeter. A rainbow-colored beam of light extends from the satellite down to the ocean surface, representing the altimeter's measurement path. The Earth's surface shows continents and oceans with a color gradient from blue to green to brown.

The SWOT long-wavelength CalVal using the on-board Nadir altimeter

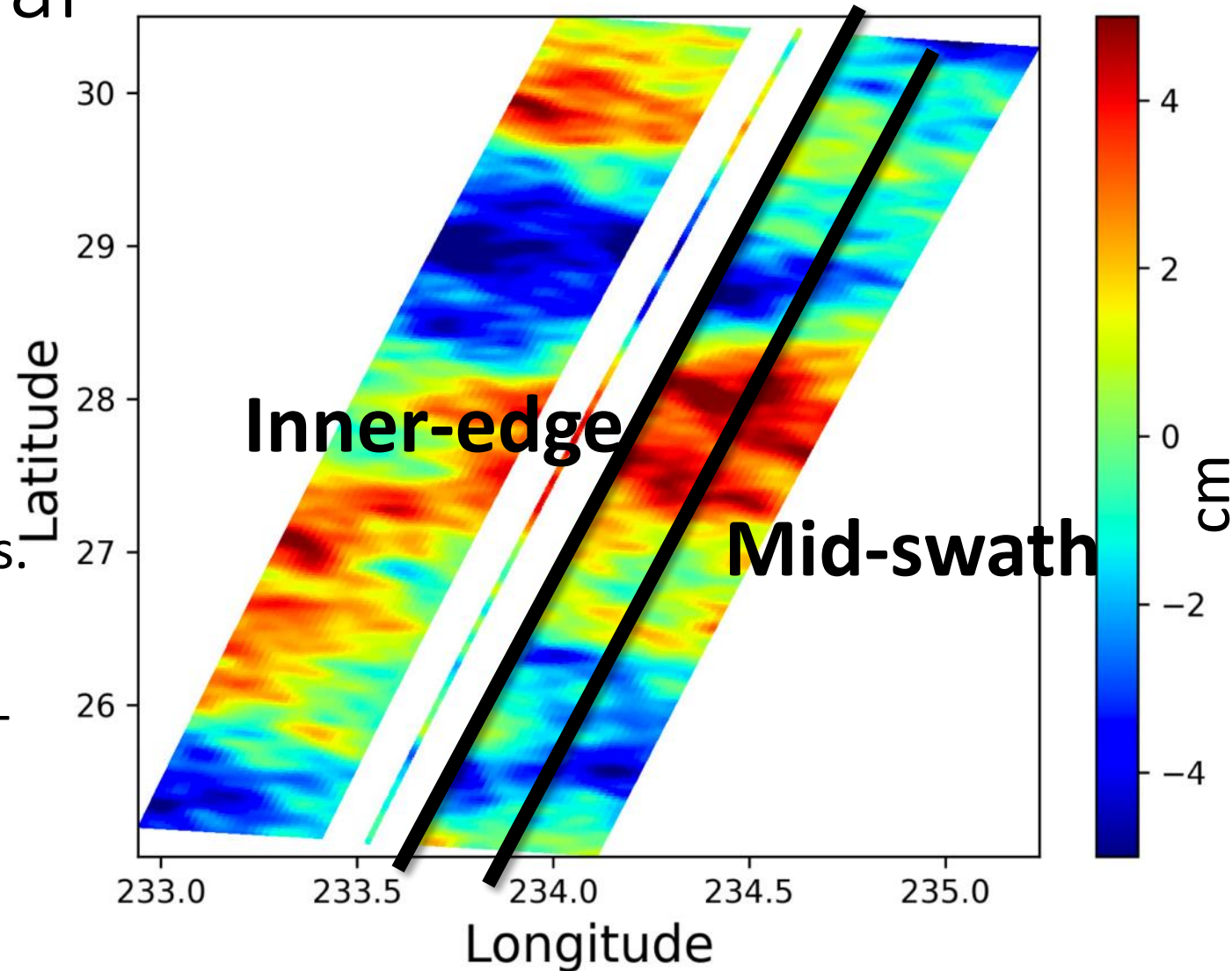
Jinbo Wang, Lee-Lueng Fu
Jet propulsion Laboratory
California Institute of Technology
SWOT ST Meeting, Montreal, Canada
June 29, 2018



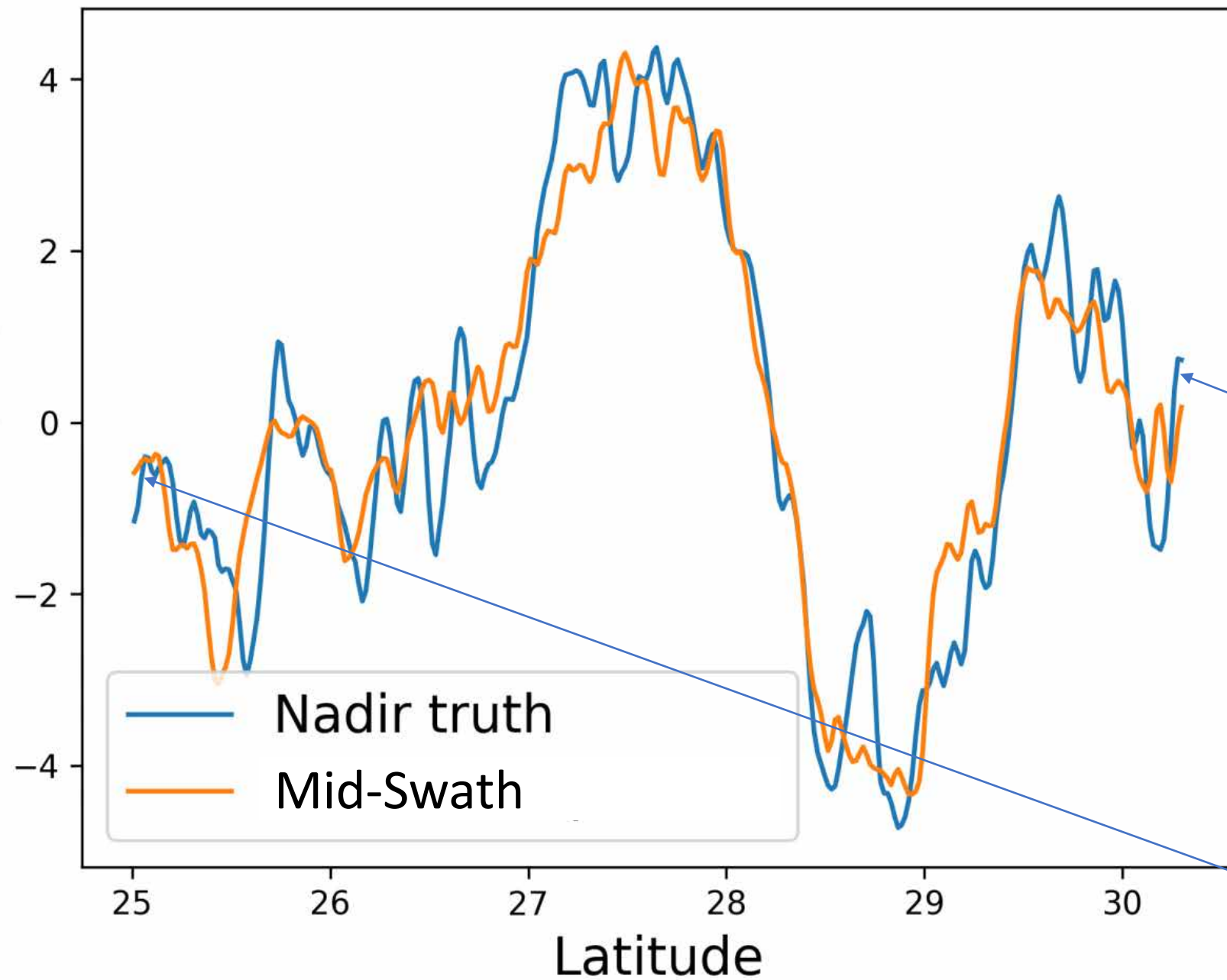
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Long-wavelength CalVal

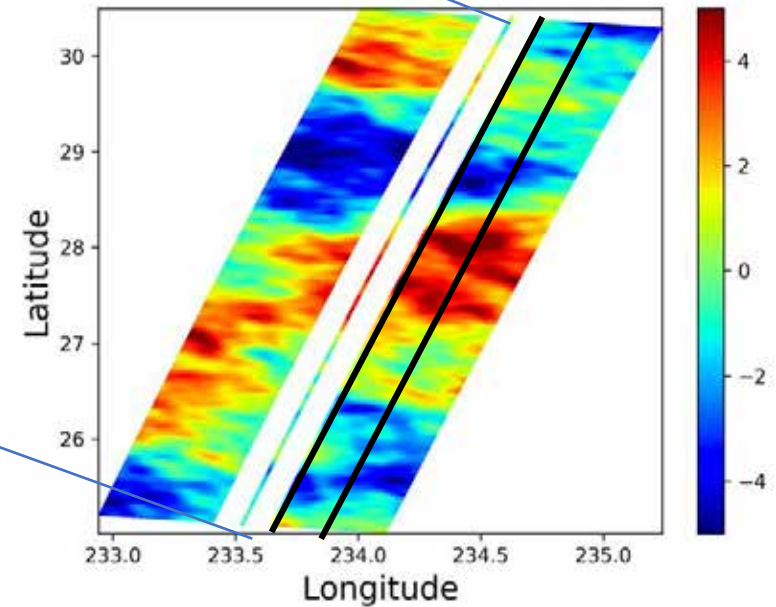
- Long-wavelength CalVal relies on the on-board Nadir altimeter.
- The Jason-class Nadir altimeter resolves $>\sim 70\text{km}$ wavelength,
- but the KaRIn measurements are **off-Nadir** leading to representation errors.
- At what wavelength can we rely on the Nadir altimeter for off-Nadir long-wavelength CalVal of KaRIn (signal only)?



SSH (cm)

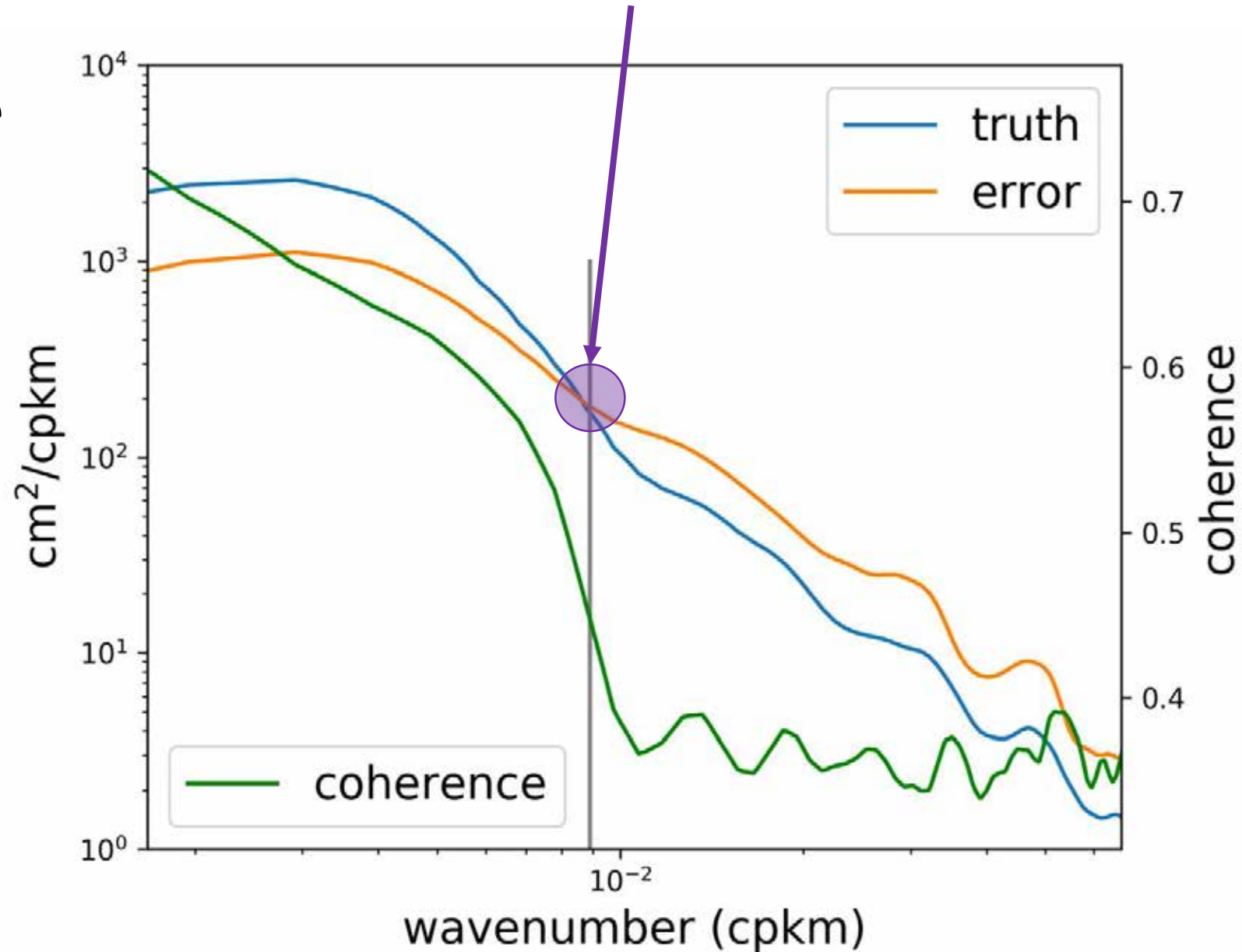


The error: the difference between the nadir truth and the swath.

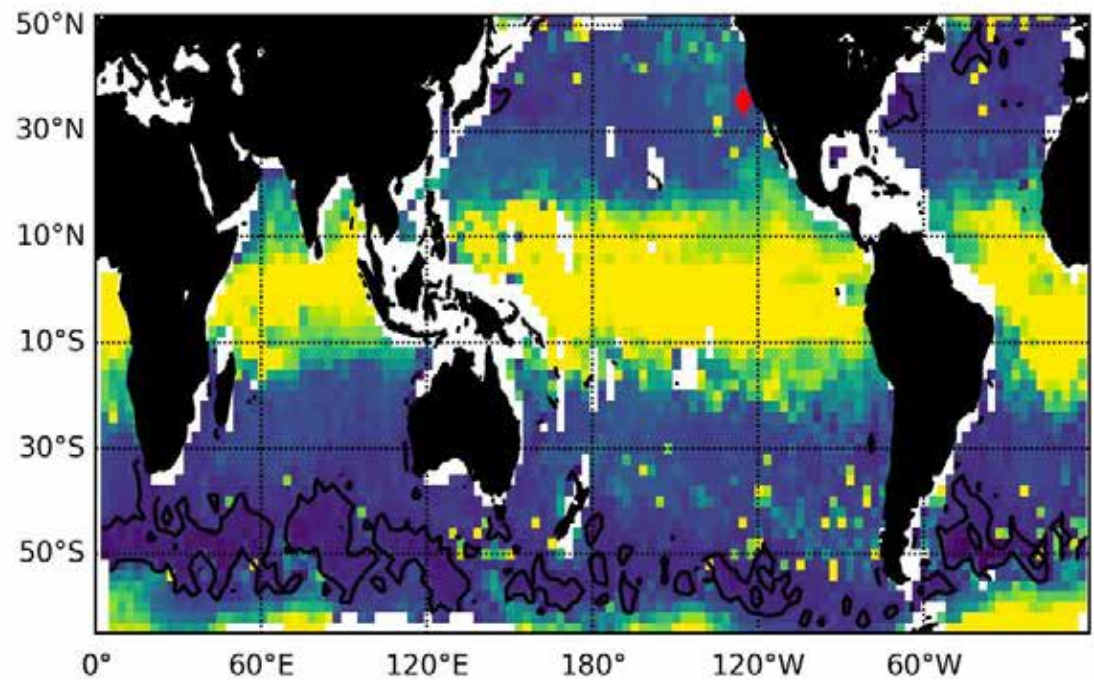


1. The MITgcm 1/48th simulation
2. The daily snapshots are interpolated onto the SWOT swath along the science orbit.
3. No SWOT errors are considered.
4. **Nadir-scale**: the wavelength where SNR=1.

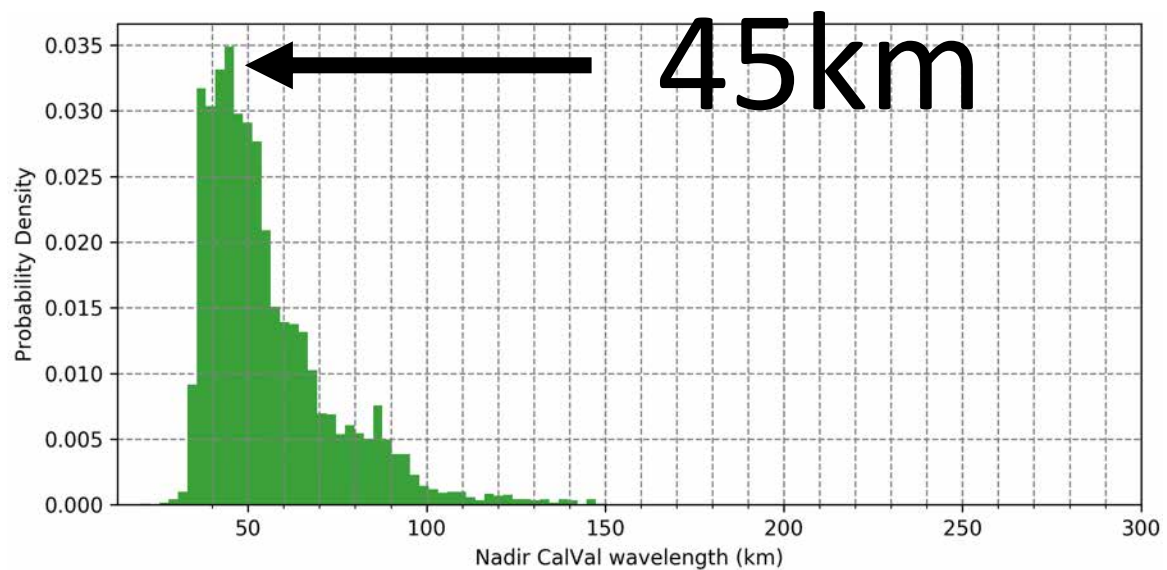
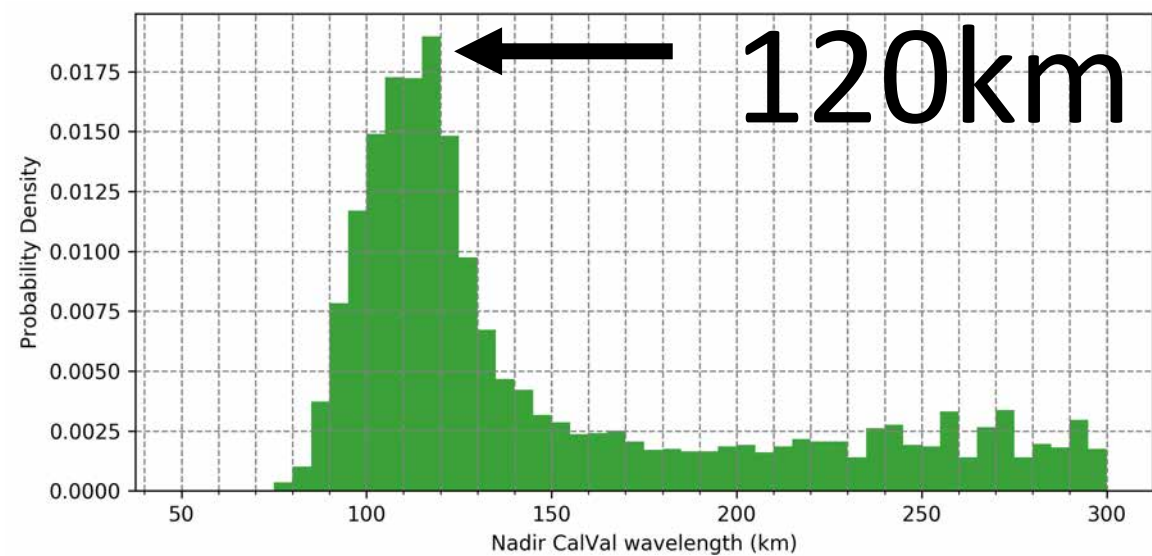
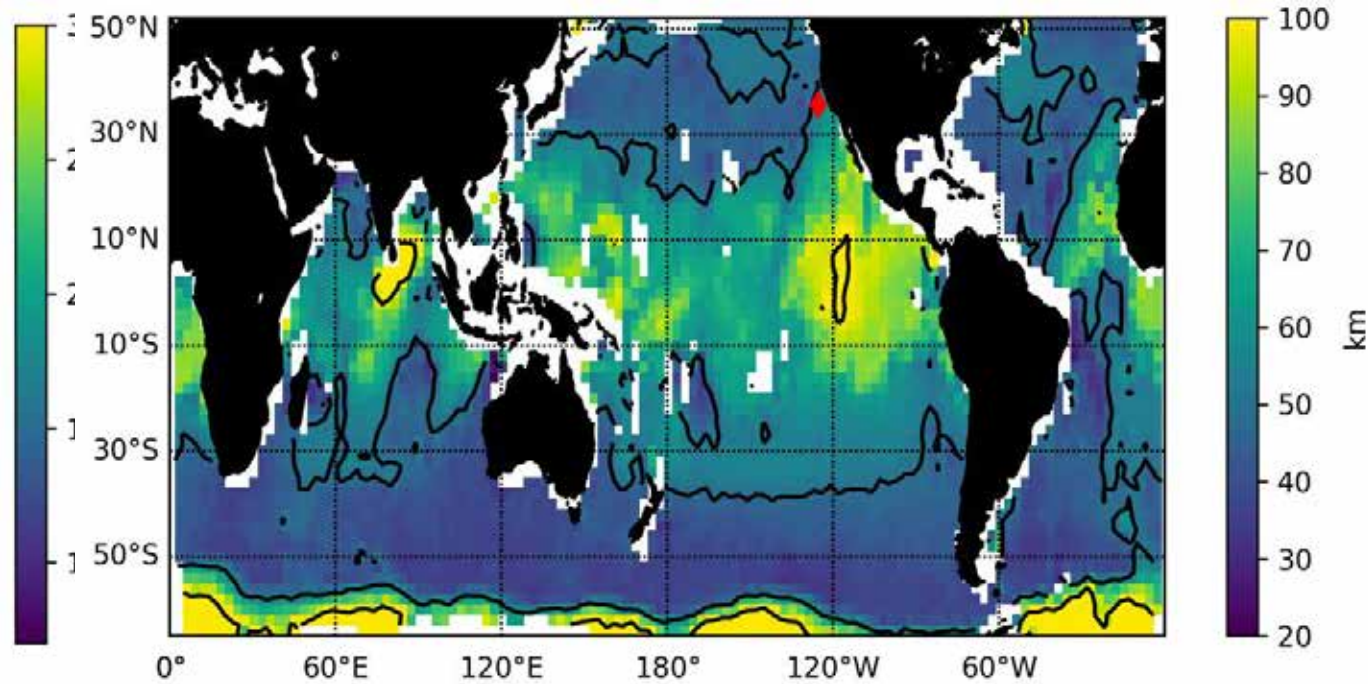
Defining Nadir-scale



Mid-swath



Inner-edge



Conclusions

1. The true Nadir SSH can represent the SSH along the inner-edge and mid-swath down to 45km and 120km, respectively, without considering the instrument noise.
2. The lower limit is set by the resolution of the on-board Nadir altimeter, $\sim 70\text{km}(?)$.