

# Hydrology Wrap-Up

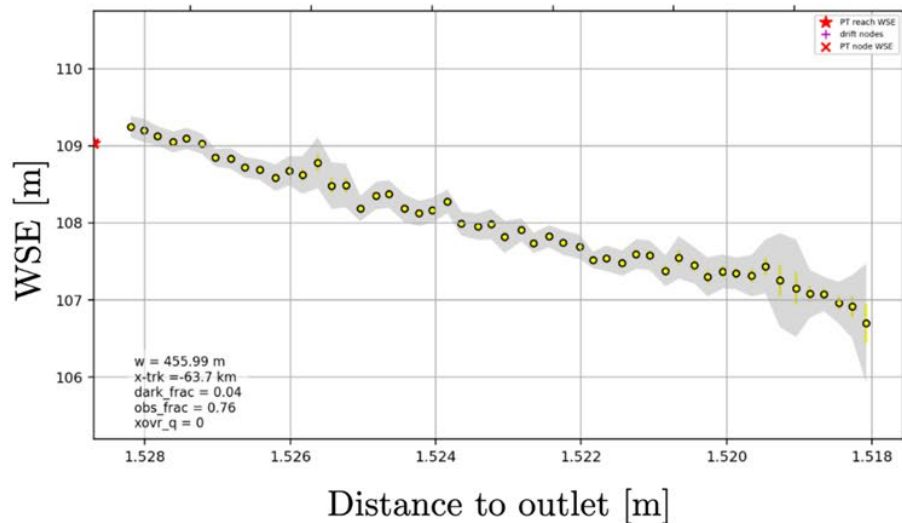
Hind Oubanas  
Tamlin Pavelsky

## Is SWOT meeting pre-launch expectations and scientific needs?

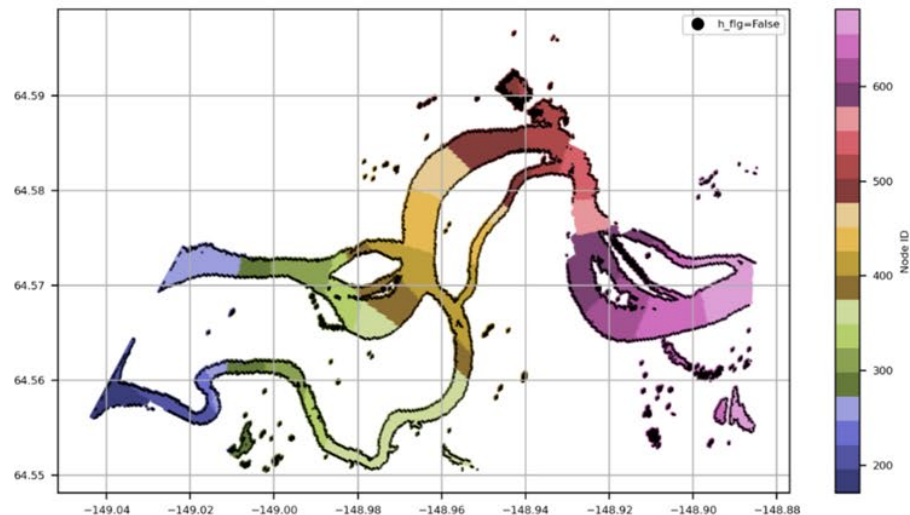
- Clearly yes for water surface elevation (exceeding in many cases)
- Inundation extent for rivers and lakes needs some work, but the community has strong confidence that this will improve in the upcoming reprocessing.
- The discharge product is a work in progress, but we see glimmers of promise and have MANY avenues to work on going forward
- There are some really promising results over surfaces that were uncertain before launch (e.g. wetlands, snow/ice)

# What new results have been revealed? (what do you love about SWOT)

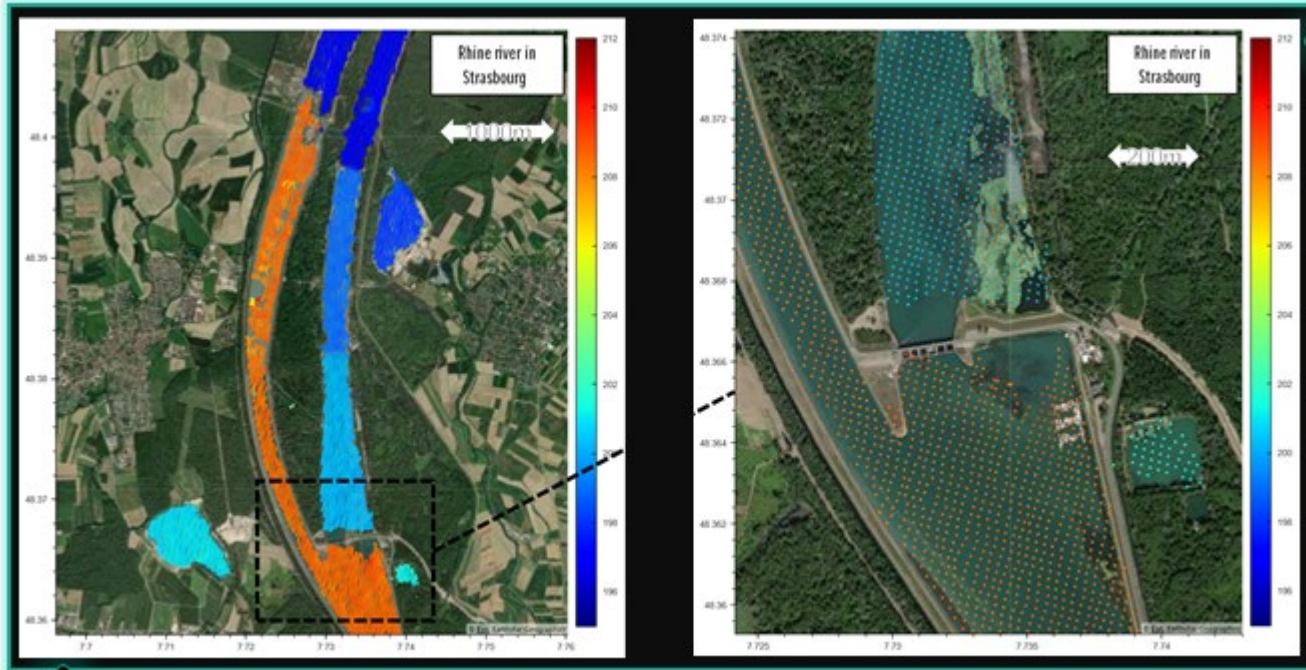
## River Height Profile



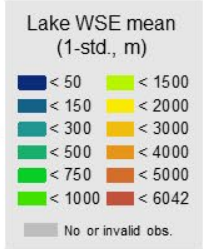
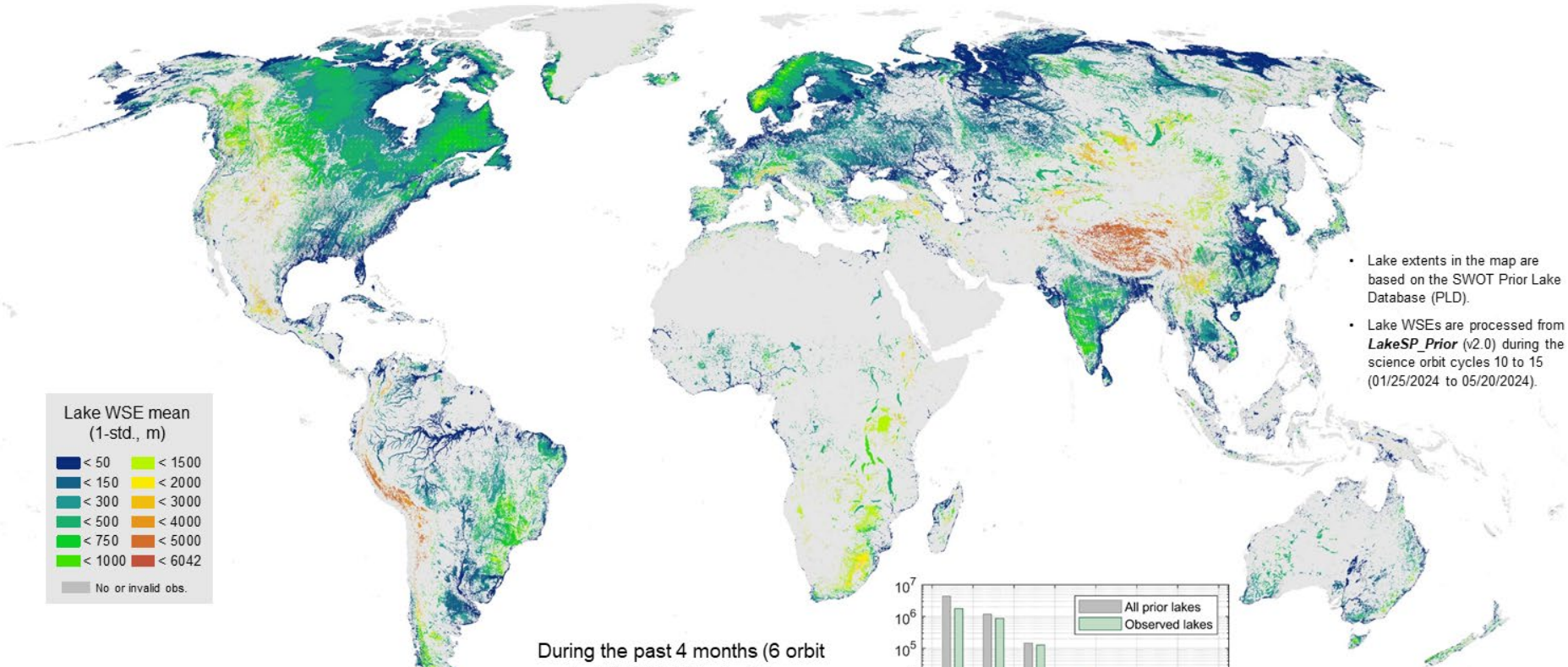
## Pixel Cloud River Assignments



What new results have been revealed? (what do you love about SWOT)



# SWOT-measured mean water surface elevation on global lakes during January to May 2024

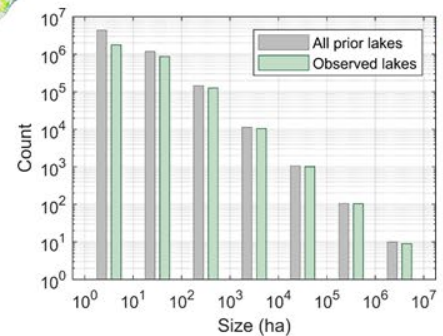


- Lake extents in the map are based on the SWOT Prior Lake Database (PLD).
- Lake WSEs are processed from *LakeSP\_Prior* (v2.0) during the science orbit cycles 10 to 15 (01/25/2024 to 05/20/2024).

Valid observations exclude

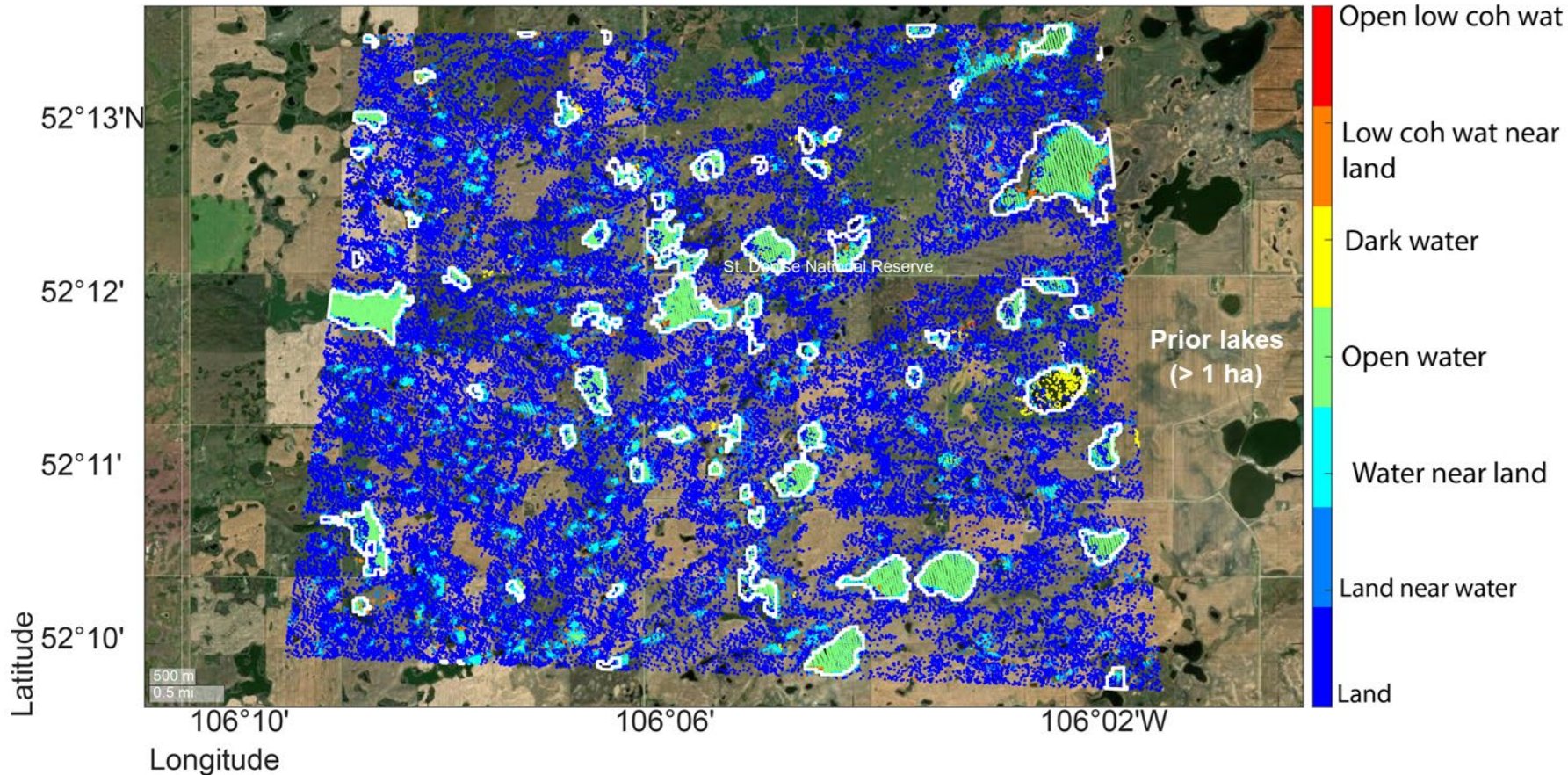
- 1) statistical outliers, and
- 2) off-nominal measurements.

During the past 4 months (6 orbit cycles), 2,872,216 out of the 5,898,331 prior lakes, accounting for **89% of the global lake area** with a minimum size of 1 ha, were observed with at least one valid measurement by SWOT.

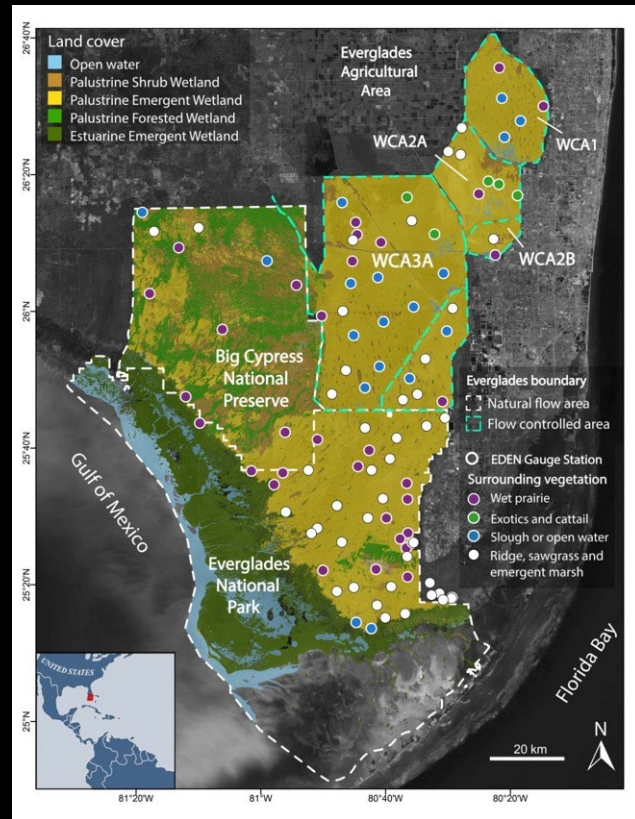
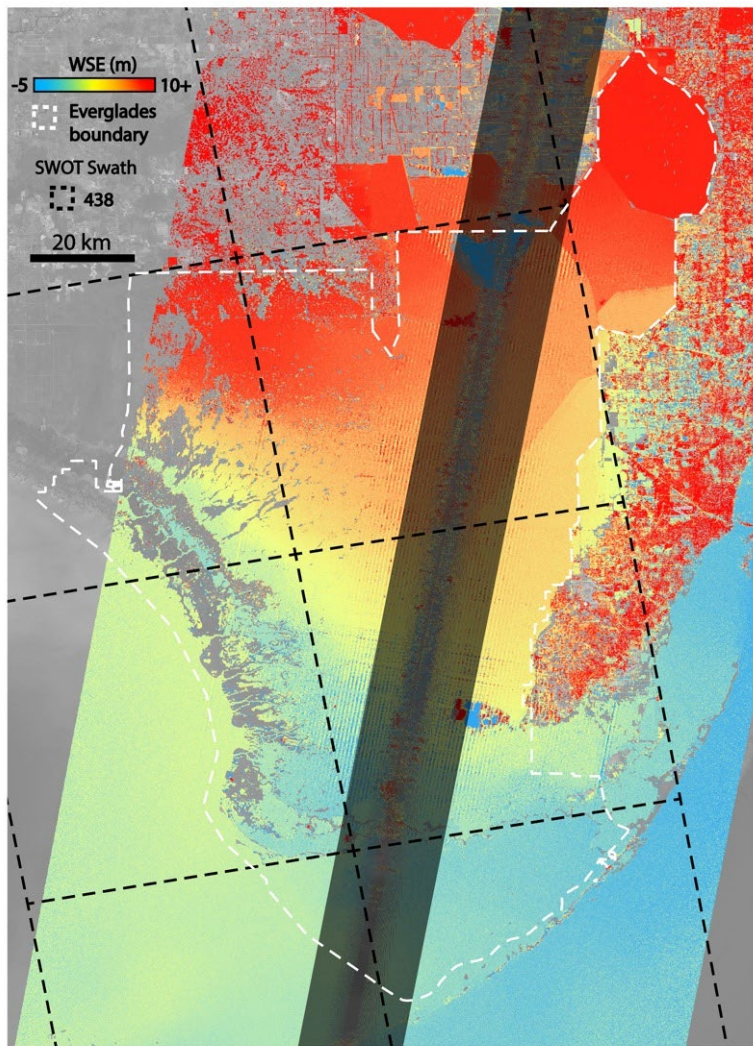


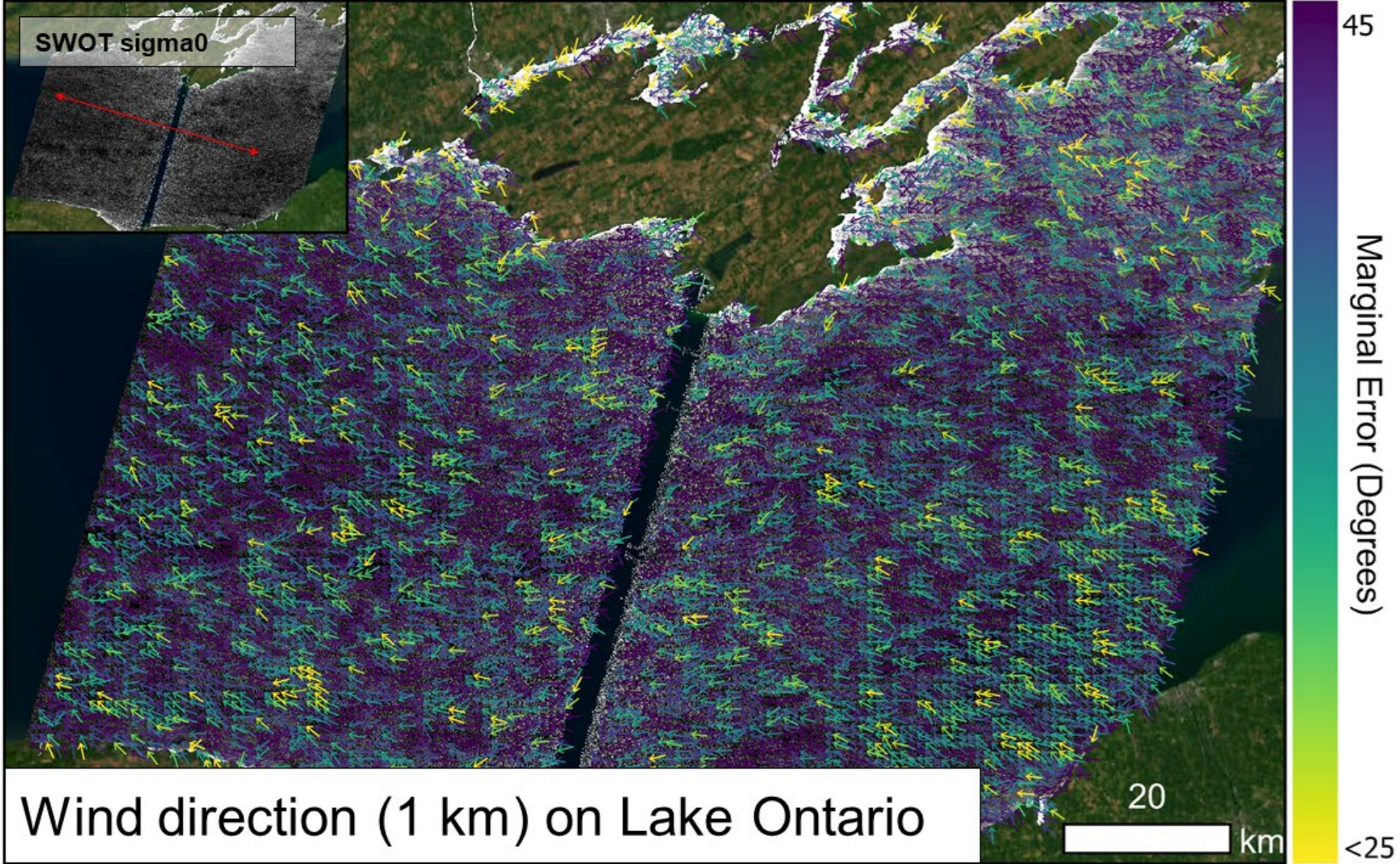
# SWOT is able to resolve small prairie potholes.

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# Example of SWOT WSE Data over the full Everglades.



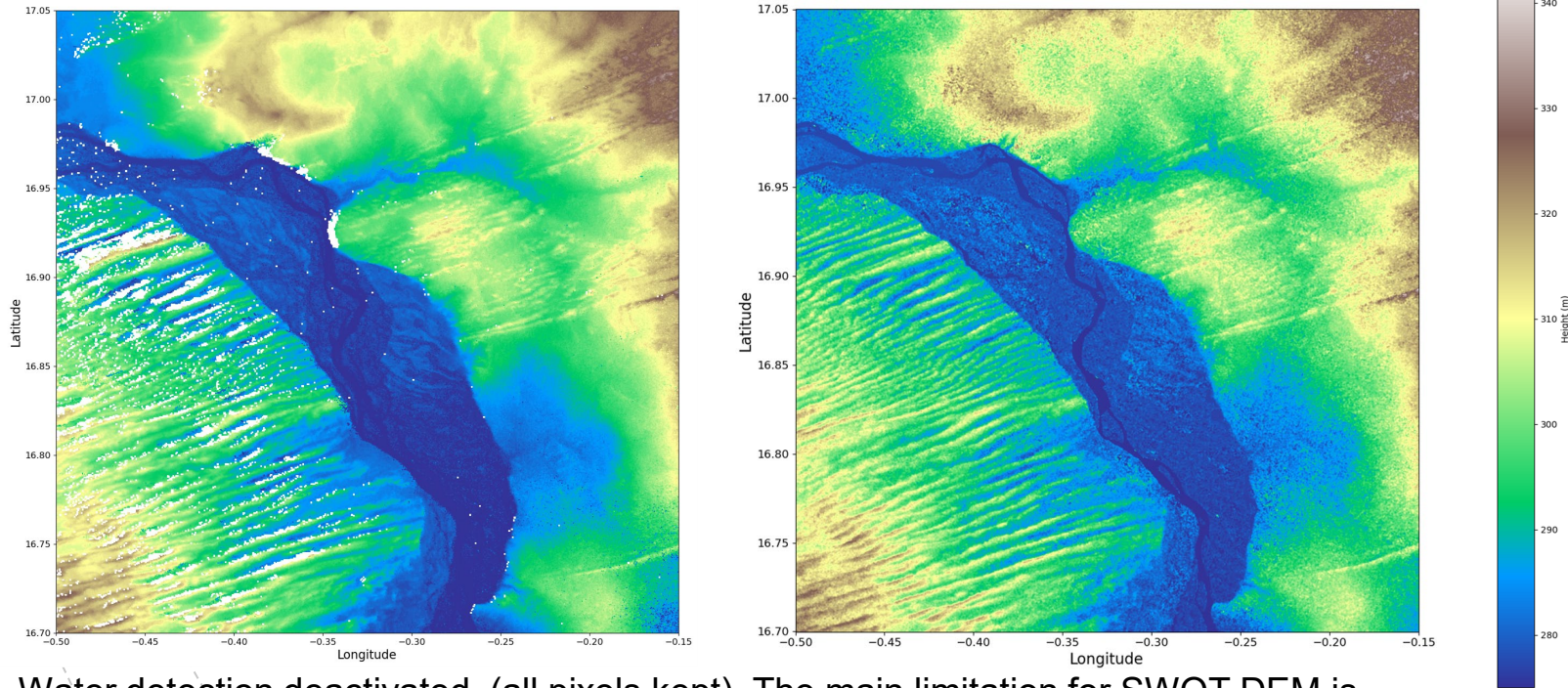




# DIRECT HEIGHT EXTRACTION

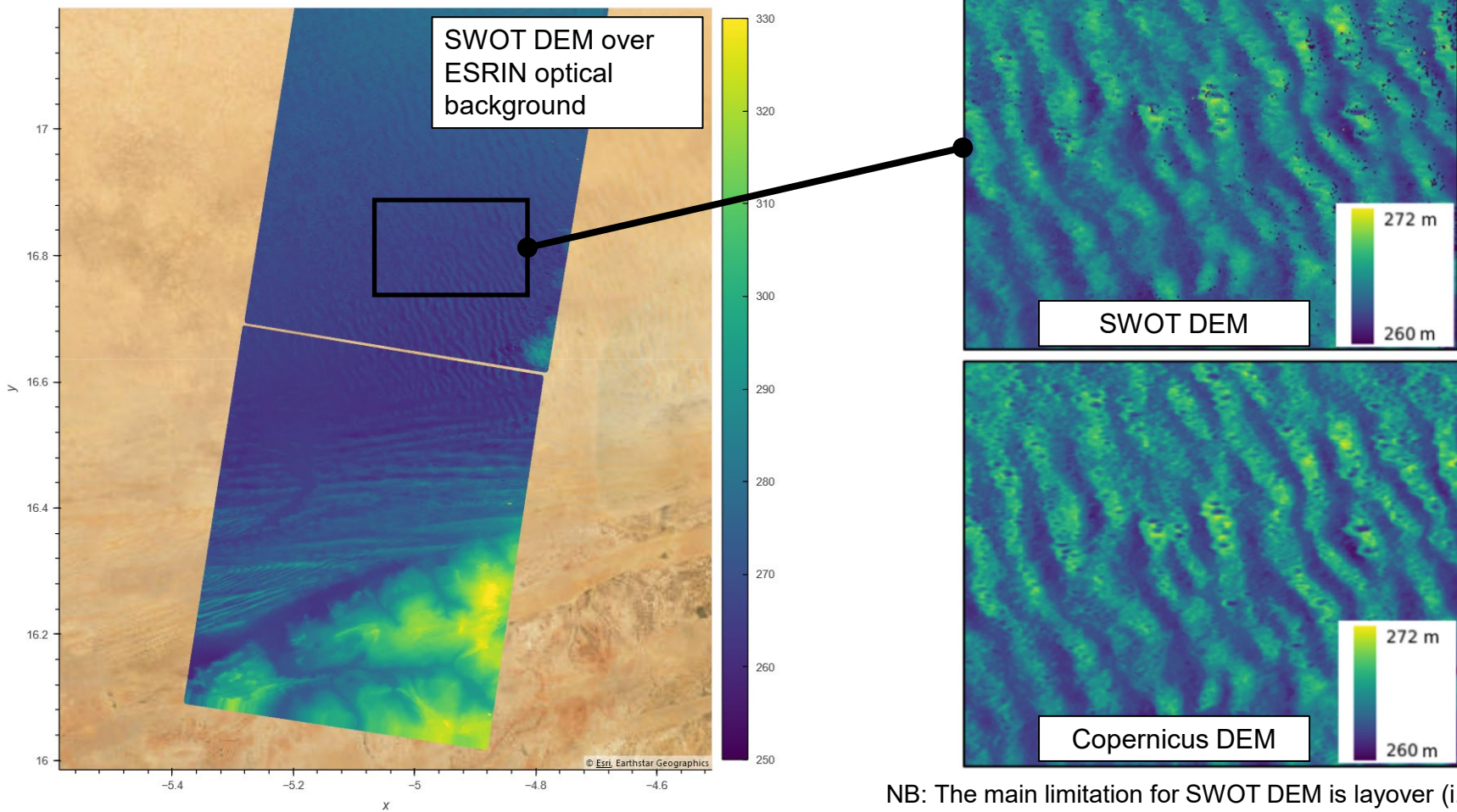
DIRECT HEIGHT EXTRACTION

Example: Niger River – SWOT DEM (left) vs. SRTM (right)



Water detection deactivated (all pixels kept). The main limitation for SWOT DEM is layover (white areas).

# Sahara Dunes & SWOT DEM



## Challenges remaining : steps forward

- Low-level products (e.g. pixel cloud) have fewer obvious problems than higher level products.
- For both rivers and lakes, improvements in area/width are key focuses going forward.
- The community has a MUCH better understanding of data quality/quality flags after this meeting
  - Read the Manual, For Shame
  - Perhaps find a way to have more frequent interactions between project/science team on technical details?
- We are just starting SWOT hydrology science, but the community sees opportunities for major advances in the next 18 months on:
  - Understanding global patterns of river discharge
  - Global reservoir dynamics and interaction with humans
  - Contributions of SWOT to understanding the global water balance
  - MANY local/regional/theoretical science questions