



BROWN

Early characterization of SWOT ka-band backscatter behavior for water extent mapping and classification of small lakes

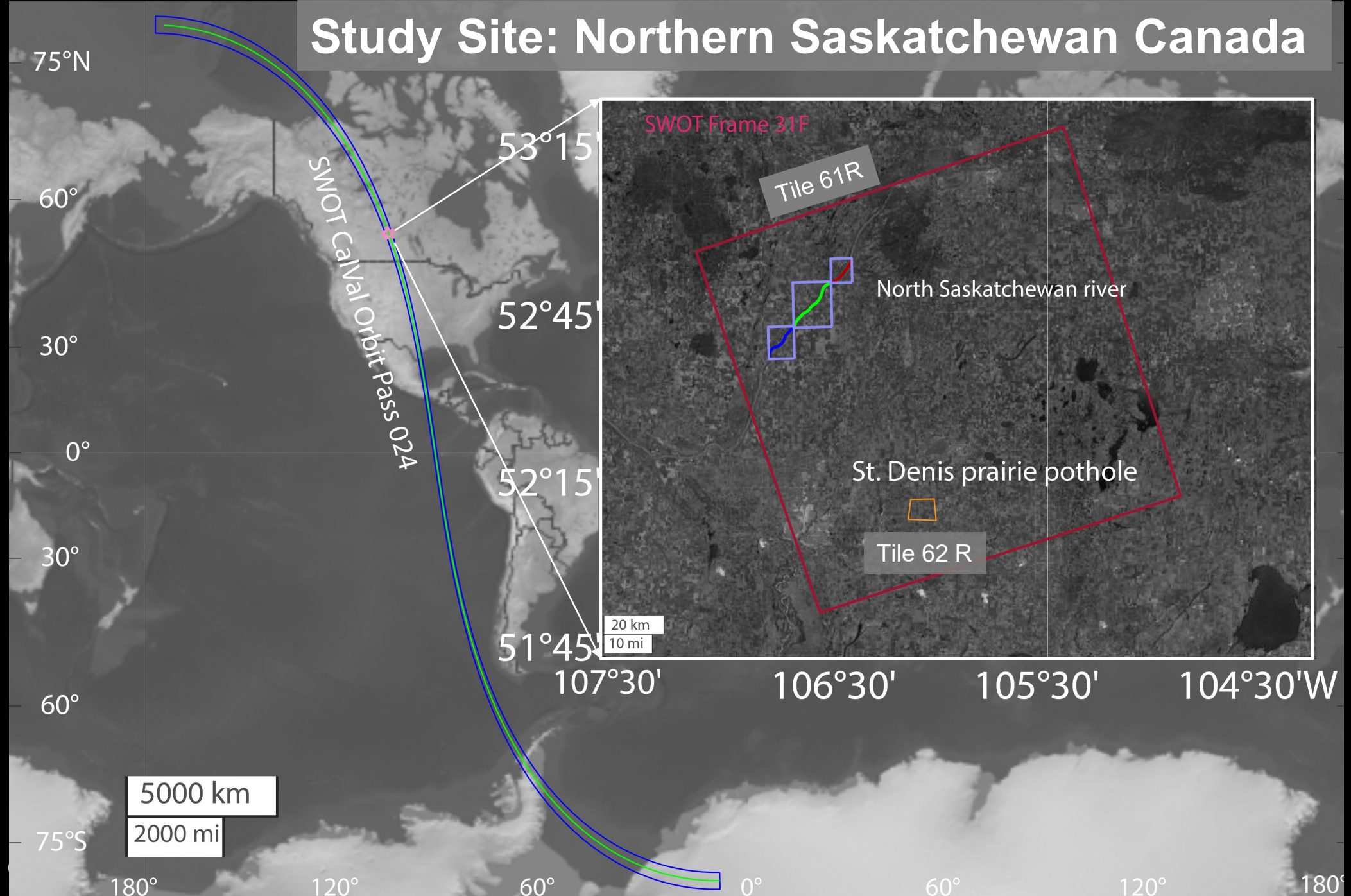
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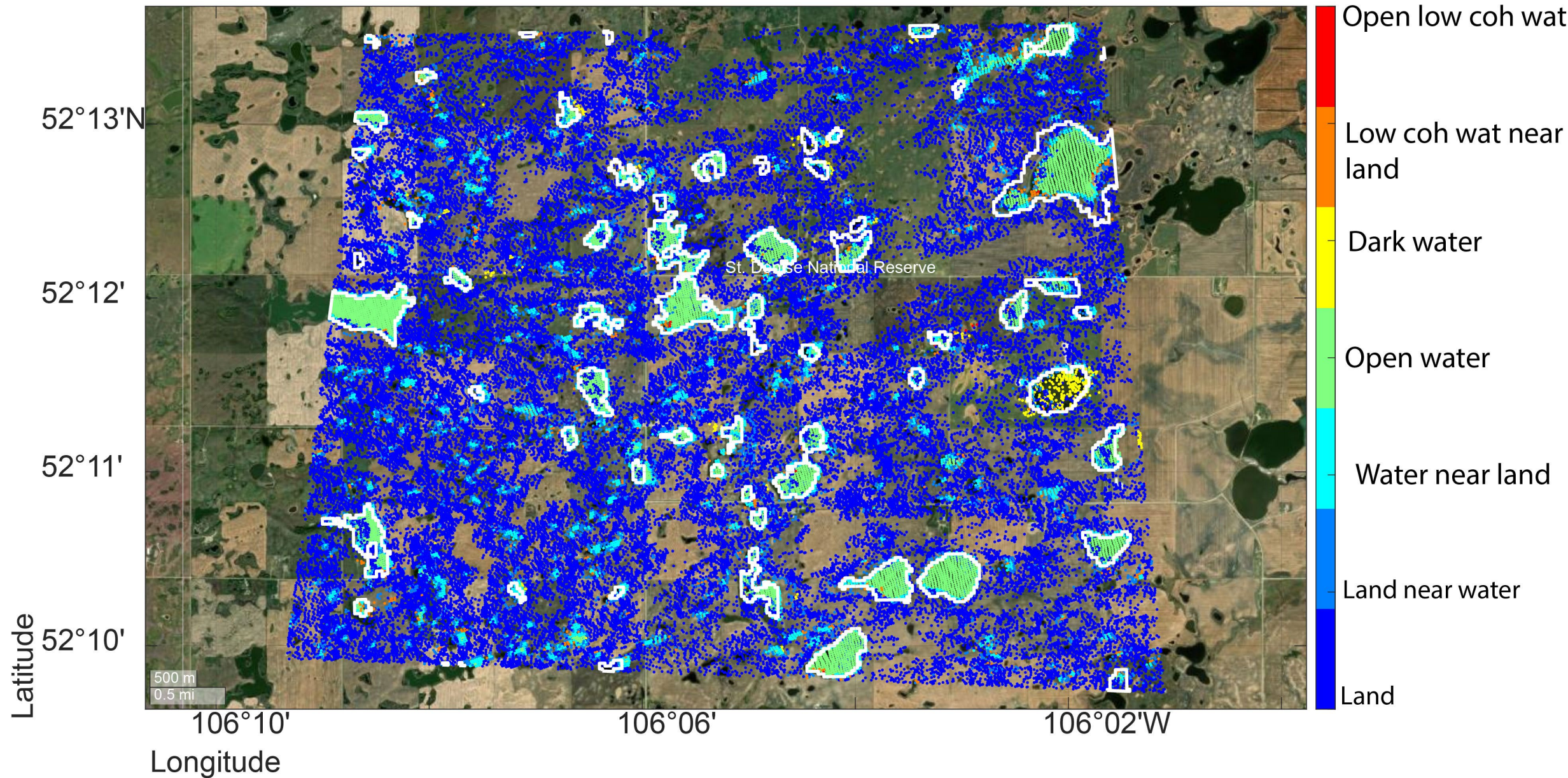
Brown University

Study Site: Northern Saskatchewan Canada

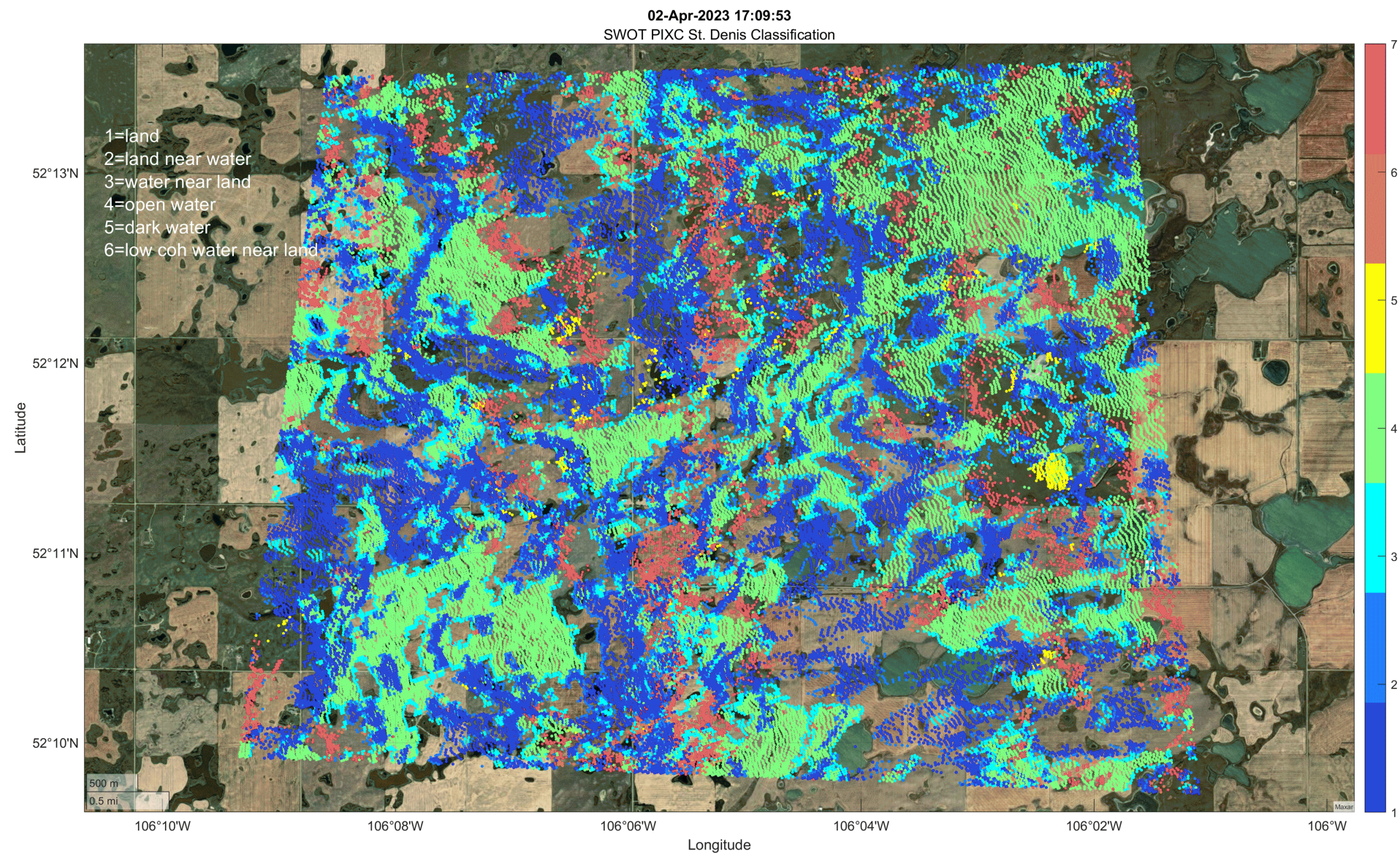


SWOT is able to resolve small prairie potholes.

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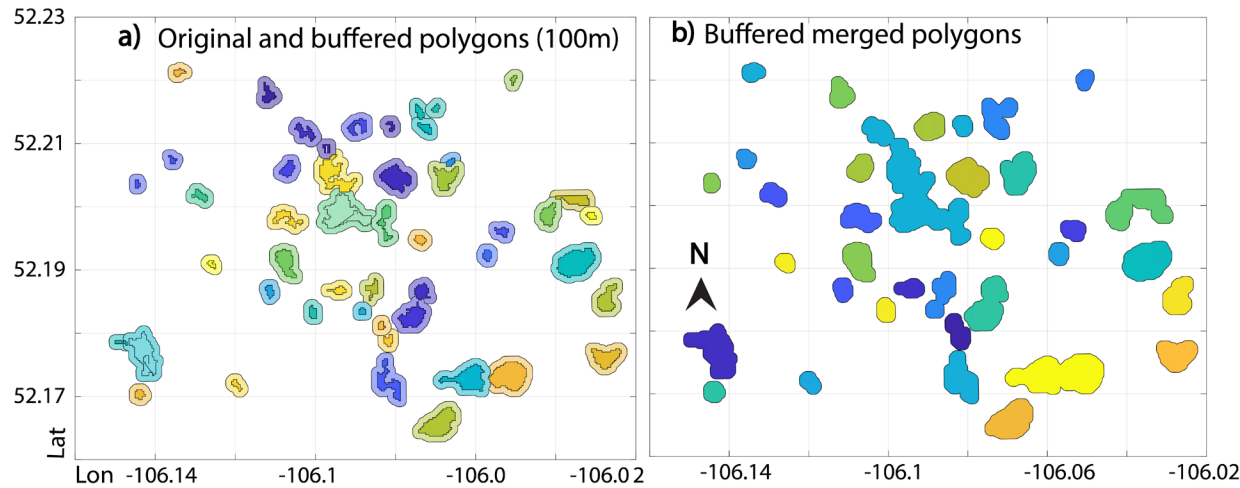
Prairie pothole lakes become visible after the snowmelt period is over.



Methods: SWOT area calculation

Step 1

Create
buffer
mask



Step 2

Image selection/filtering

Obtain median classification qual. value of all images.

Select images with a median value that is less than ≤ 1 .

Obtain median pix num.
Select images with pixel number in the mask > 50 th percentile.

Step 3

Compute area

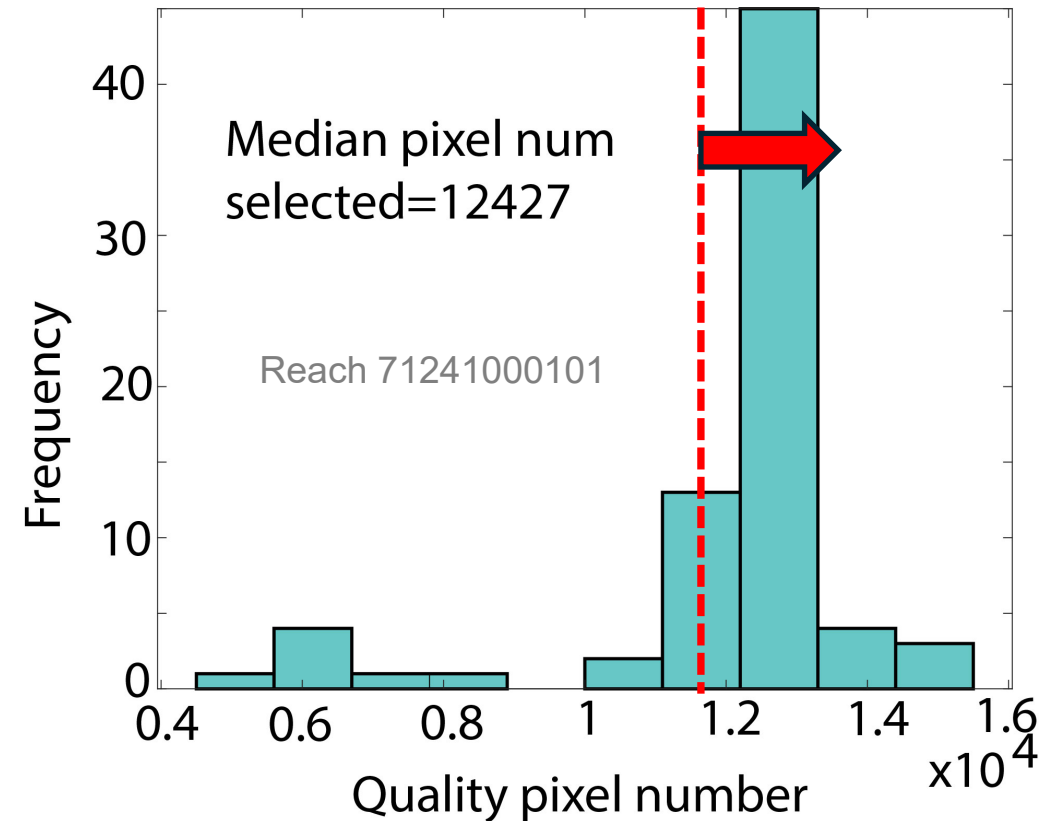
All water classes as 1 except water near land

Use mean of water fraction value for water near land

Keep only Water fraction values within 1 and 0.

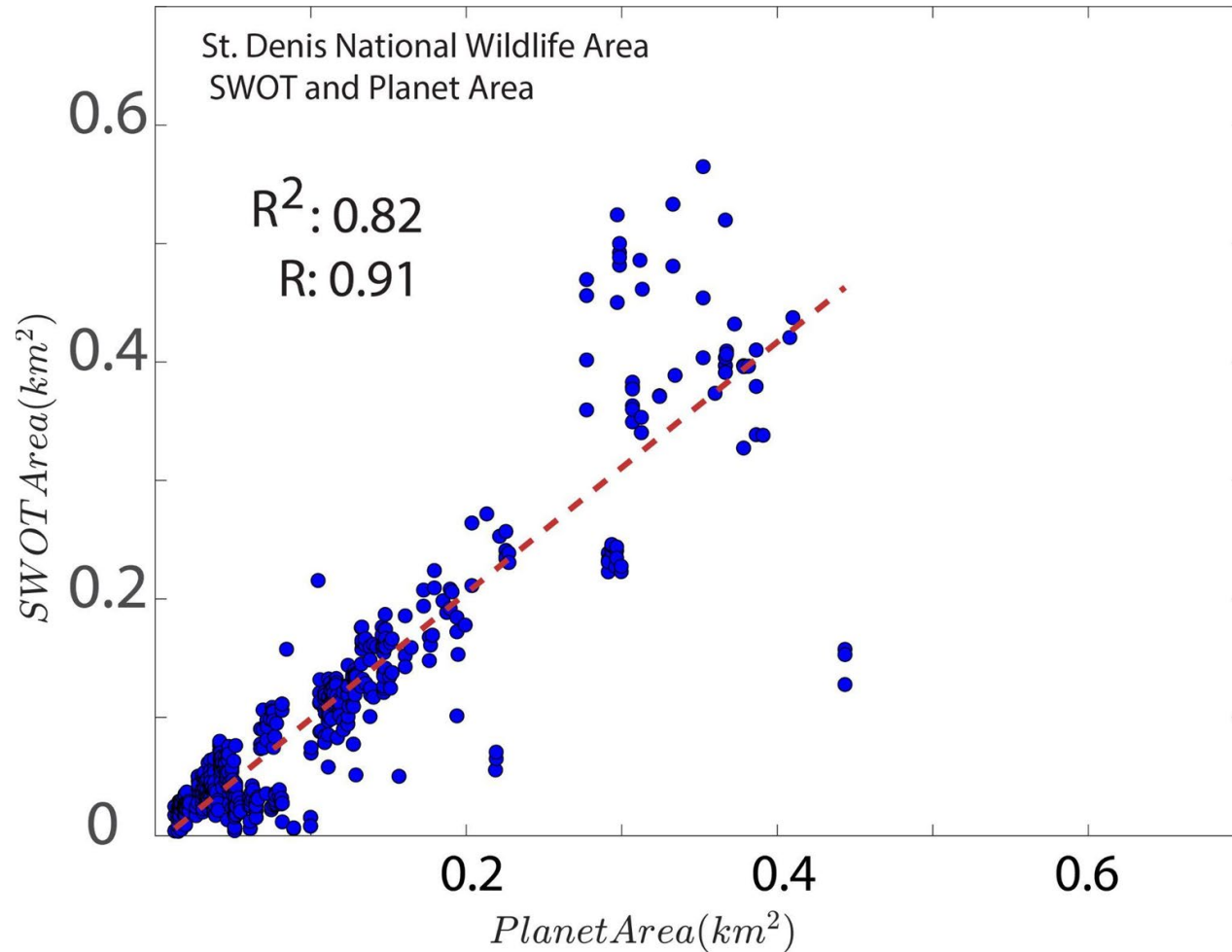
Multiply with pixel area (projected pixel area on the ground)

Identified a median flag of 12427 or higher.



Selection of images with pixel length in the mask > 50 th percentile

Good correlation between St. Denis SWOT vs Planet Area



Summary

Preliminary Results:

- ❑ Volatility may be related to wet soils after snowmelt.
- ❑ Accurate water classification when σ° (dB) > ~40 dB (qualitative).
- ❑ Dark water classification may be useful.
- ❑ SWOT resolves small prairie pothole ponds, showing ~ (R = 0.91) correlation with Planet area.

Challenges/Opportunities

- ❑ Geolocation error, missing pixels (may be corrected in next processing).
- ❑ Large influence of snow in backscatter and thus classification.
- ❑ **Direct influence on the vector products that the user may not see.**