

# Automated Tracking of Glacial Lake Outburst Floods in Norway

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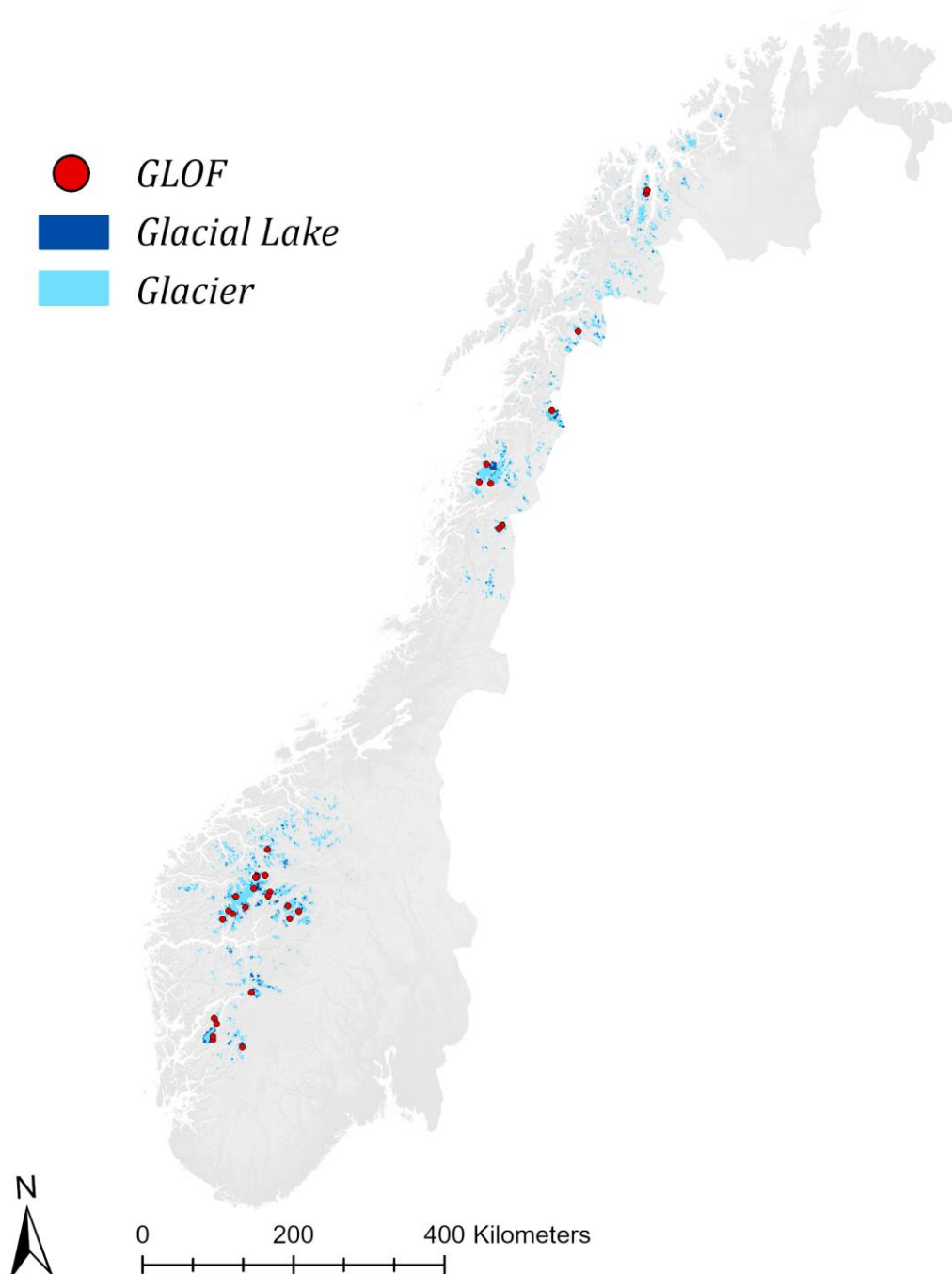
Photo: Idar Aaboen



EGU General assembly 2022  
Session: CR2.9/CL5.2.7/GI1.6/HS13.5  
Thursday, 26 May 2022, 14:05–14:12



Sharing is  
encouraged



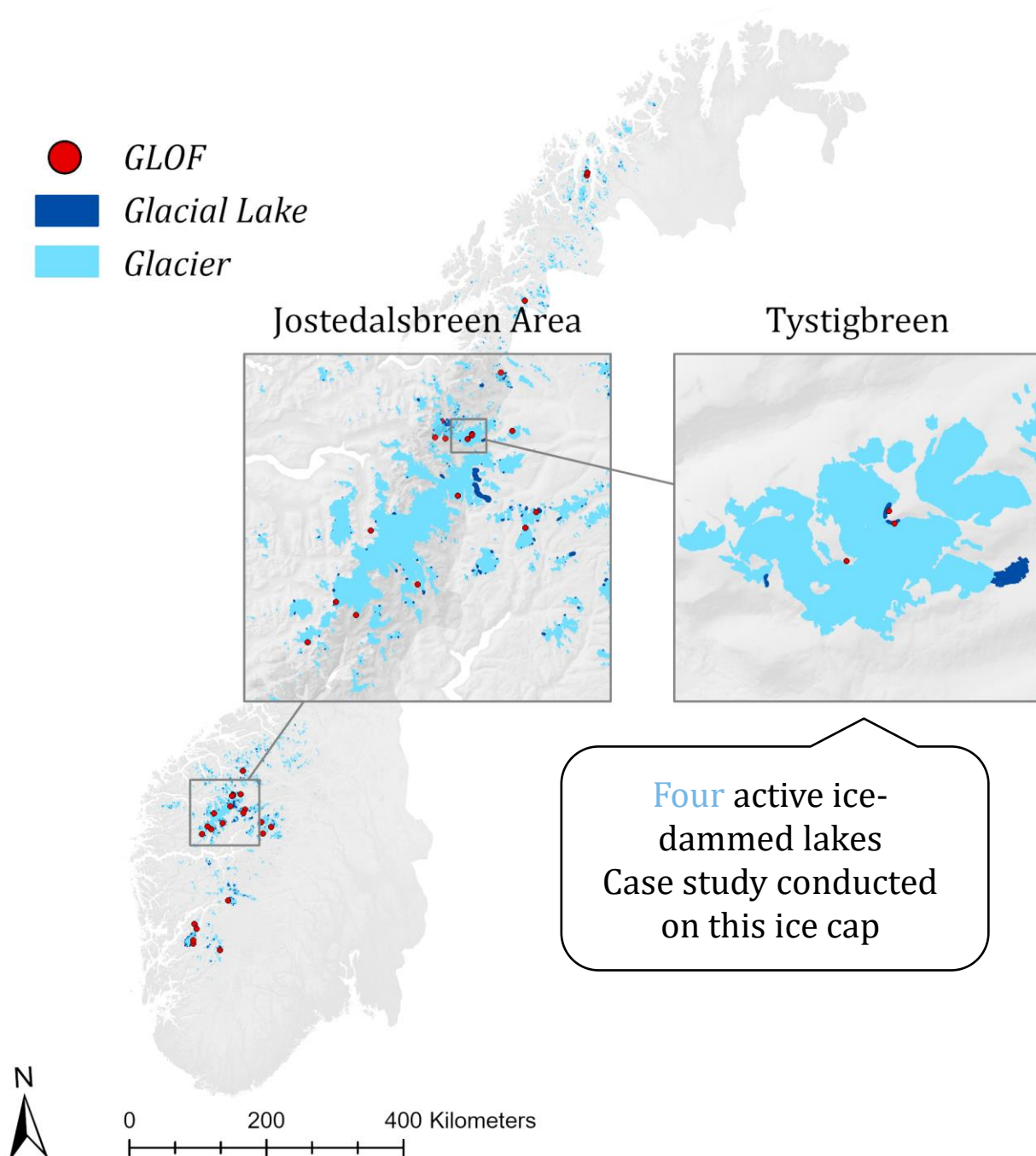
Source: NVE, Geonorge

- High concentration of ice-dammed lakes
- Need for consistent inventories and complete glacial lake outburst flood (GLOF) event database

### *Objectives:*

- Advantages and challenges in developing an automated GLOF tracking tool
- Value of additional sources of information to detect unknown and increase timing precision of known GLOF events
- Pros and cons of different satellite products and automated image classification methods





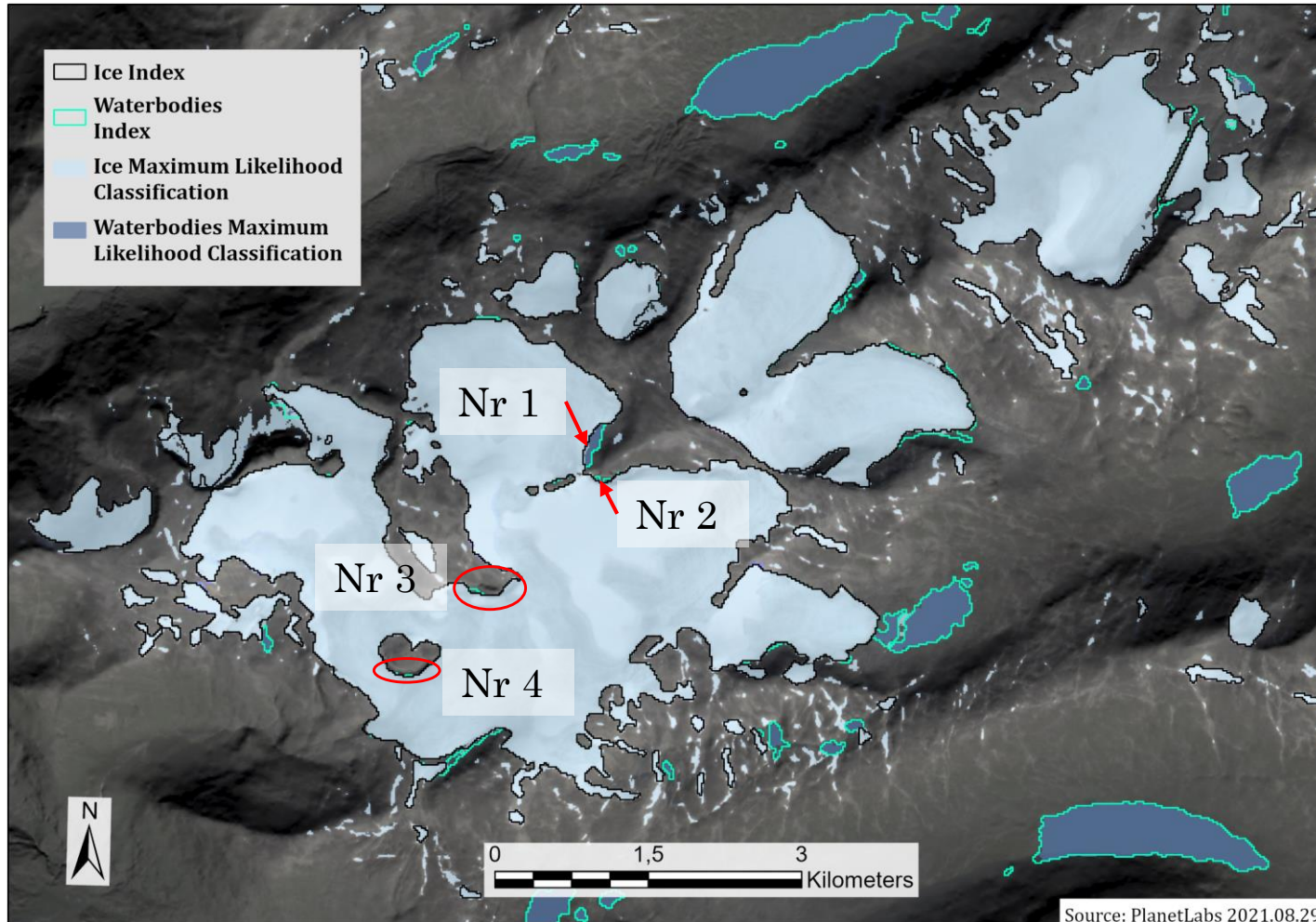
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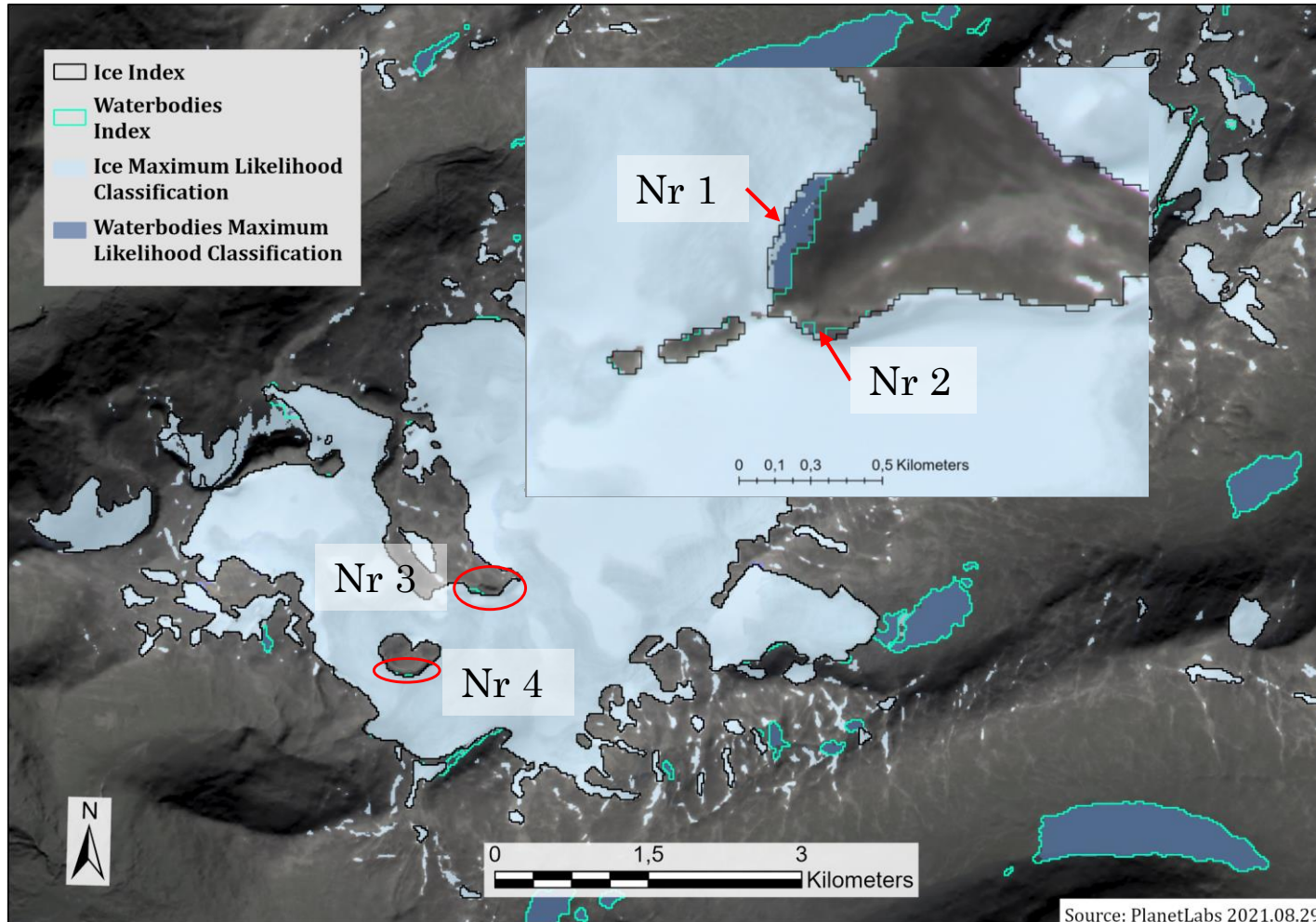
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# Maximum Likelihood Classification vs. Threshold and Index calculation



- Maximum likelihood image classification
  - More robust results
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# Maximum Likelihood Classification vs. Threshold and Index calculation



- Maximum likelihood image classification
  - More robust results
- Index & threshold calculations
  - Easy to apply → shadowed areas are a problem
- Issues with time of image acquisition
  - Too early in season → ice cover
  - Too late in season → shadow and drained lakes



# Drainage of lake Nr 4 June 2021

## *Interviews with local people:*

- Reported sediment rich water and increased waterlevel downstream
- Assumed drainage of lake 09.06.2021



## *Visual inspection of Planetscope imagery:*

07.06.2021

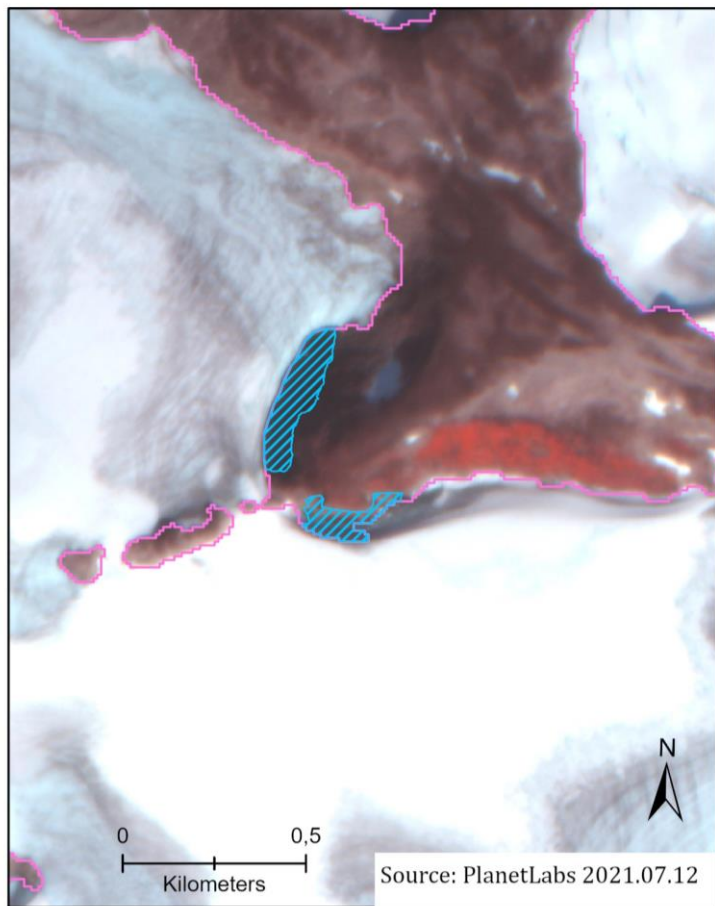


20.06.2021



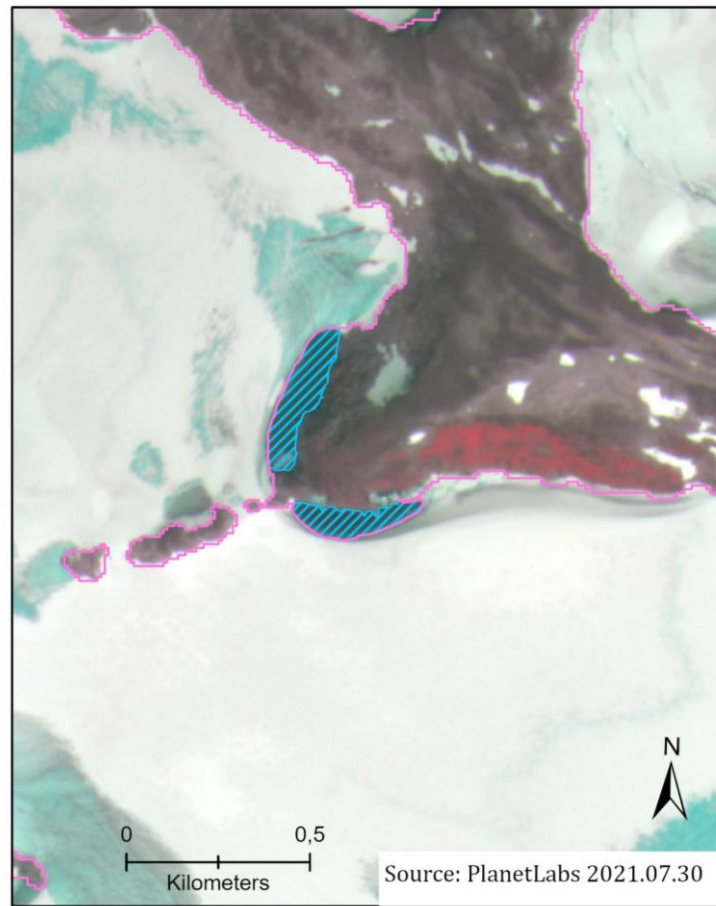
# Development of lake Nr 2 season 2021

12.07.2021



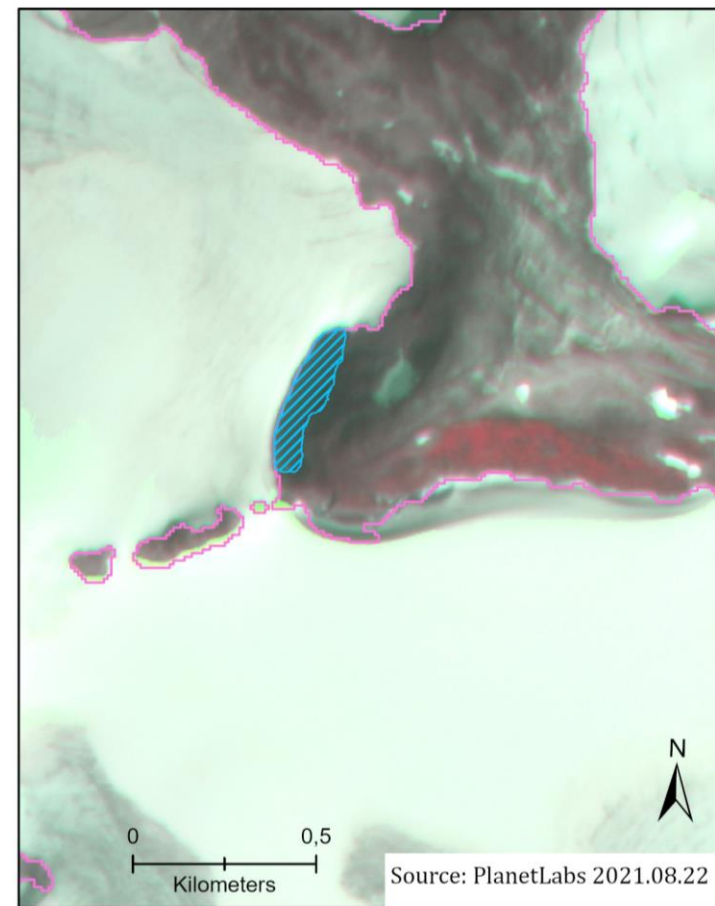
Lake Growing

30.07.2021



Maximum extent

22.08.2021



Lake Draining

Water  
Ice



# Lake Nr 2

22.06.2021



Photo: Jogscha Abderhalden

30.08.2021



Photos: Idar Aaboen

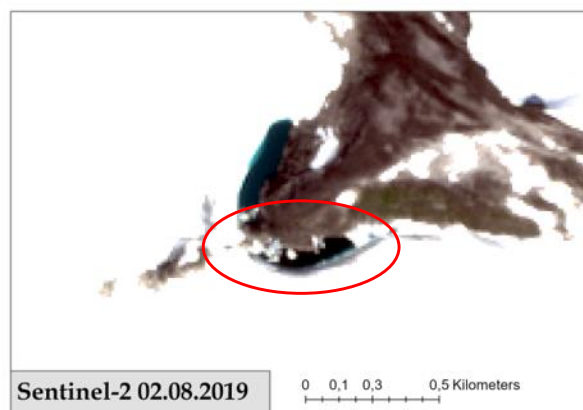


High Resolution → Low Resolution

Planetoscope      Sentinel      Landsat



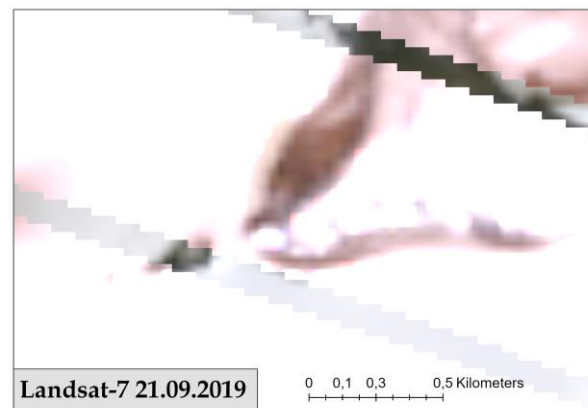
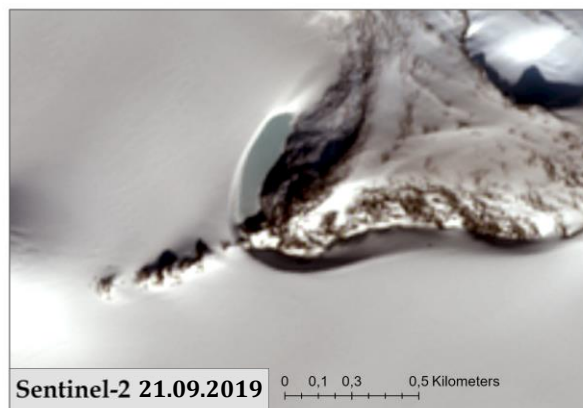
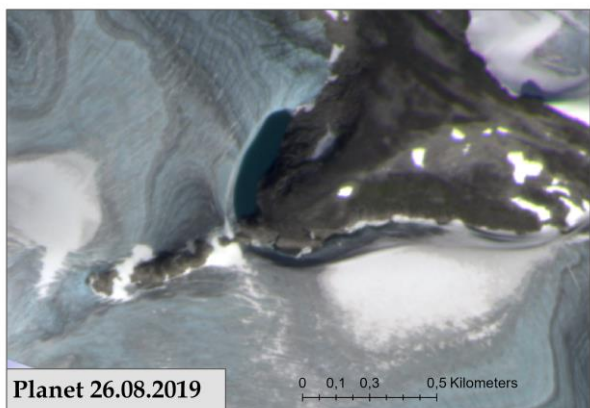
24 days



50 days  
+ snow  
covered



Not detectable





# Thanks for your attention!

## *Summary:*

- Many challenges to be solved to develop a reliable automated approach for GLOF tracking on a country scale
- Undocumented drainage events detected
- This is *work in progress!*

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Related Presentation: Moghaddam, G., Andreassen, L. M., and Rogozhina, I.: Life cycles of glacial lakes in Norway: Insights from machine learning algorithms on Landsat series and Sentinel-2 , EGU General Assembly 2022, Vienna, Austria, 23–27 May 2022, EGU22-10119, <https://doi.org/10.5194/egusphere-egu22-10119>

Photo: Idar Aaboen

