New and complementary information on water management derived from new satellite based systems

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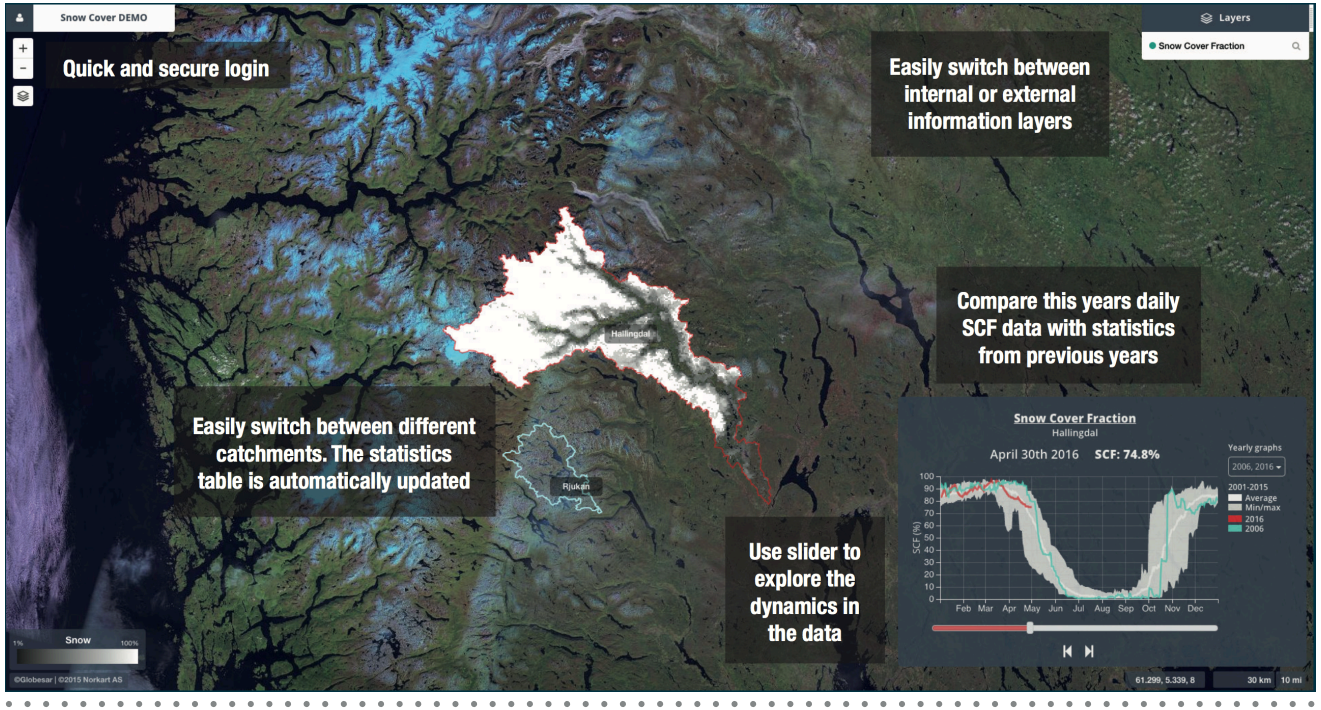
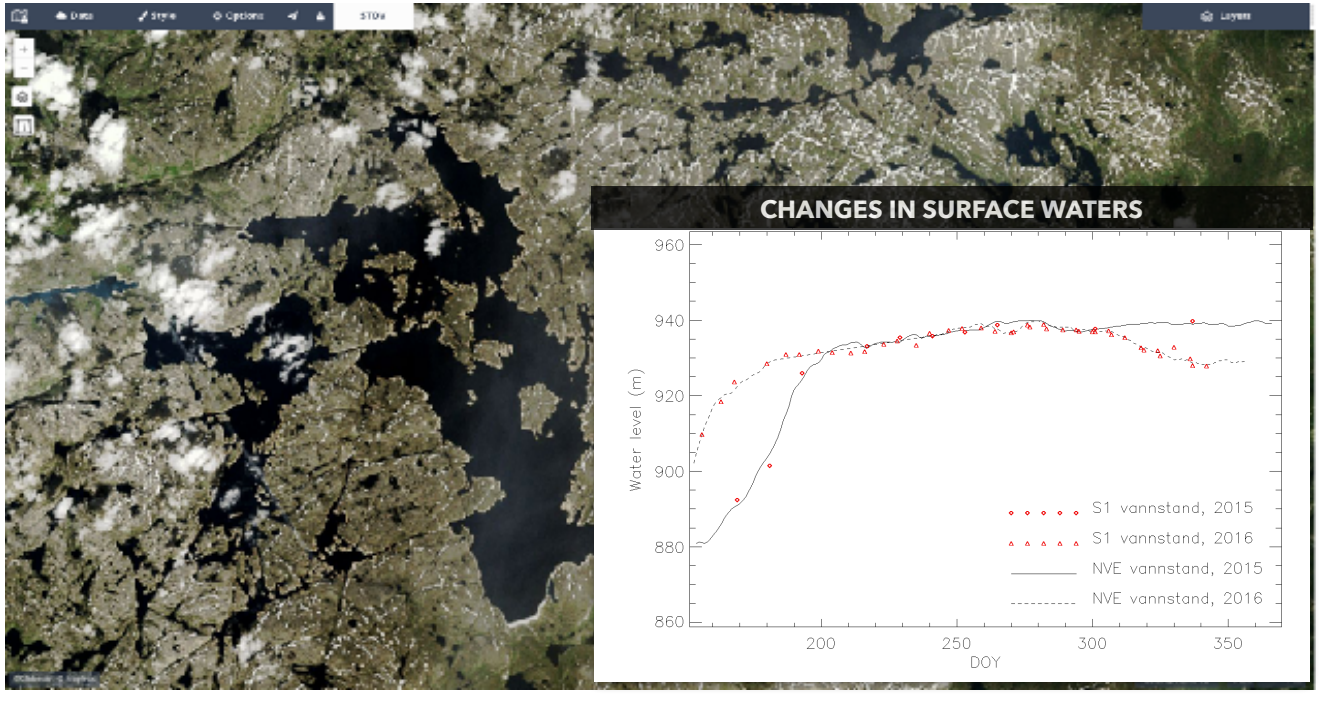
SNOW MEASUREMENTS

WATER SYSTEM MEASUREMENTS

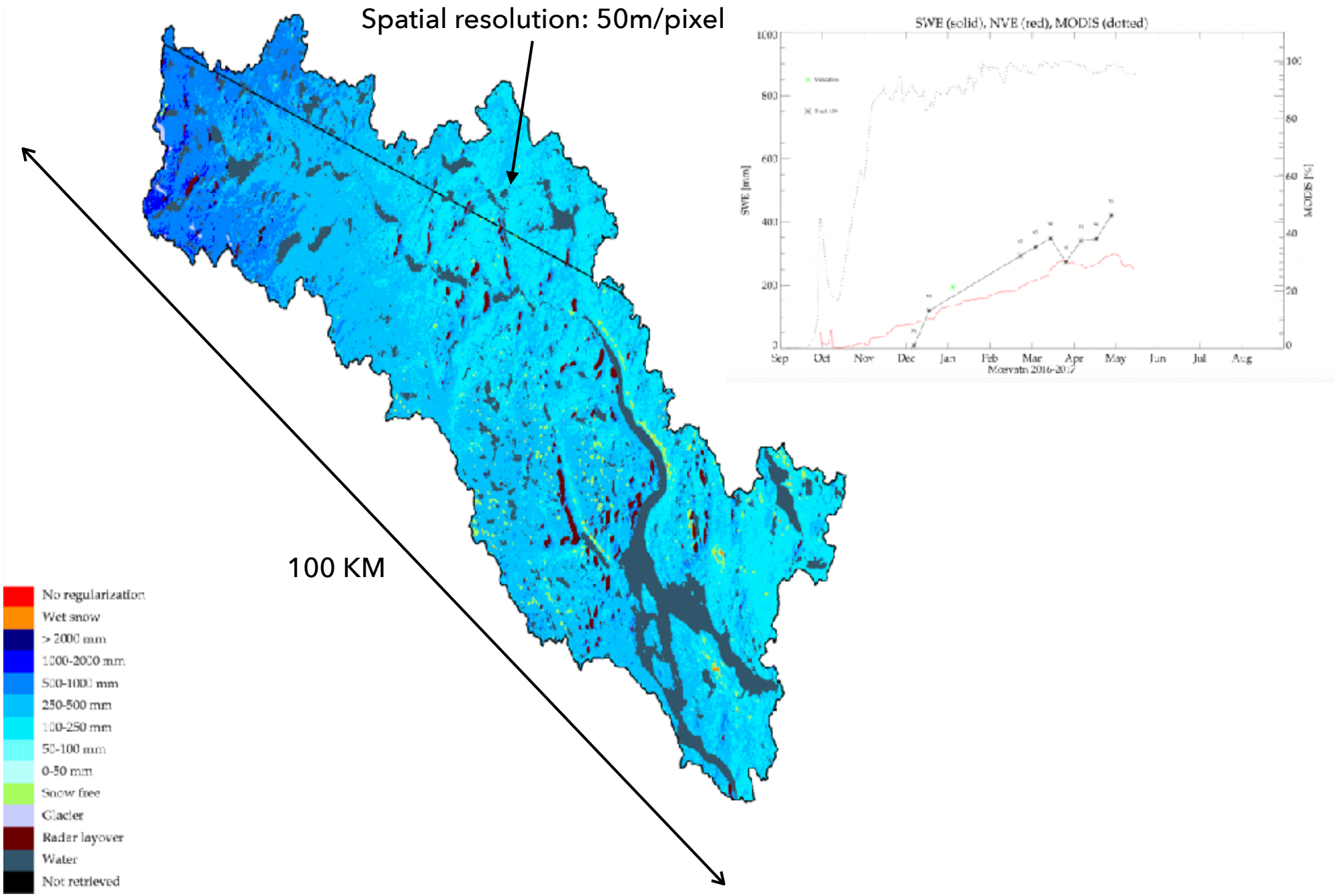
SnowInfo



WaterInfo



SAMPLE PRODUCT - SNOW WATER EQUIVALENT (SWE)



DEVELOPMENT OF THE WATERINFO SERVICE

- **Goal:** Develop and demonstrate a service that provides continuous data on **water surface area** for lakes/ reservoirs
  - Automatic production
  - Time-series of information
  - Scalable system
    - >100 lakes
- Project length 2017-2019
- Supported by European Space Agency & Norwegian Space Centre

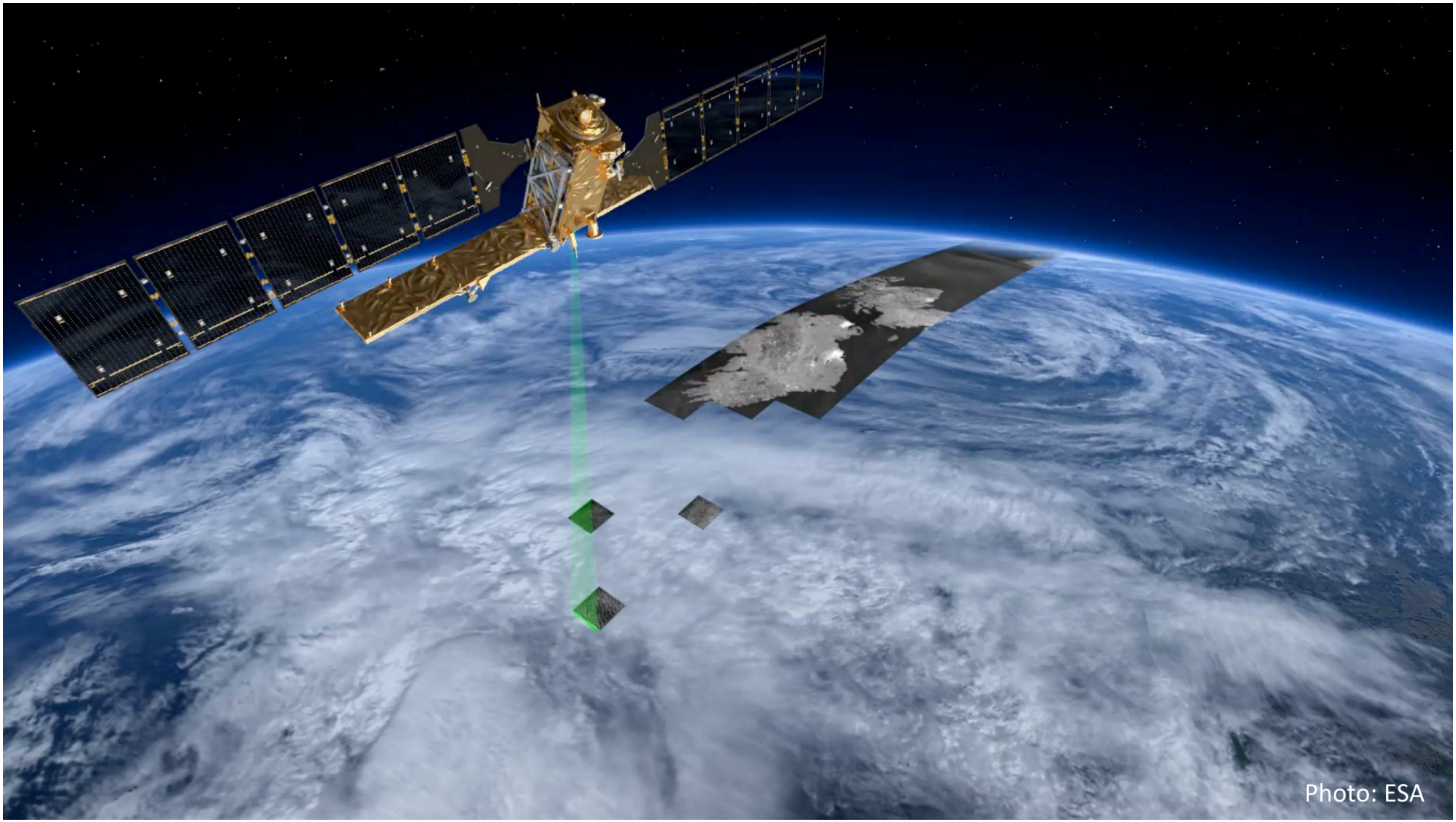
norut NORTHERN RESEARCH INSTITUTE

NORWEGIAN ENVIRONMENT AGENCY

Norsk Romsenter NORWEGIAN SPACE CENTRE

esa

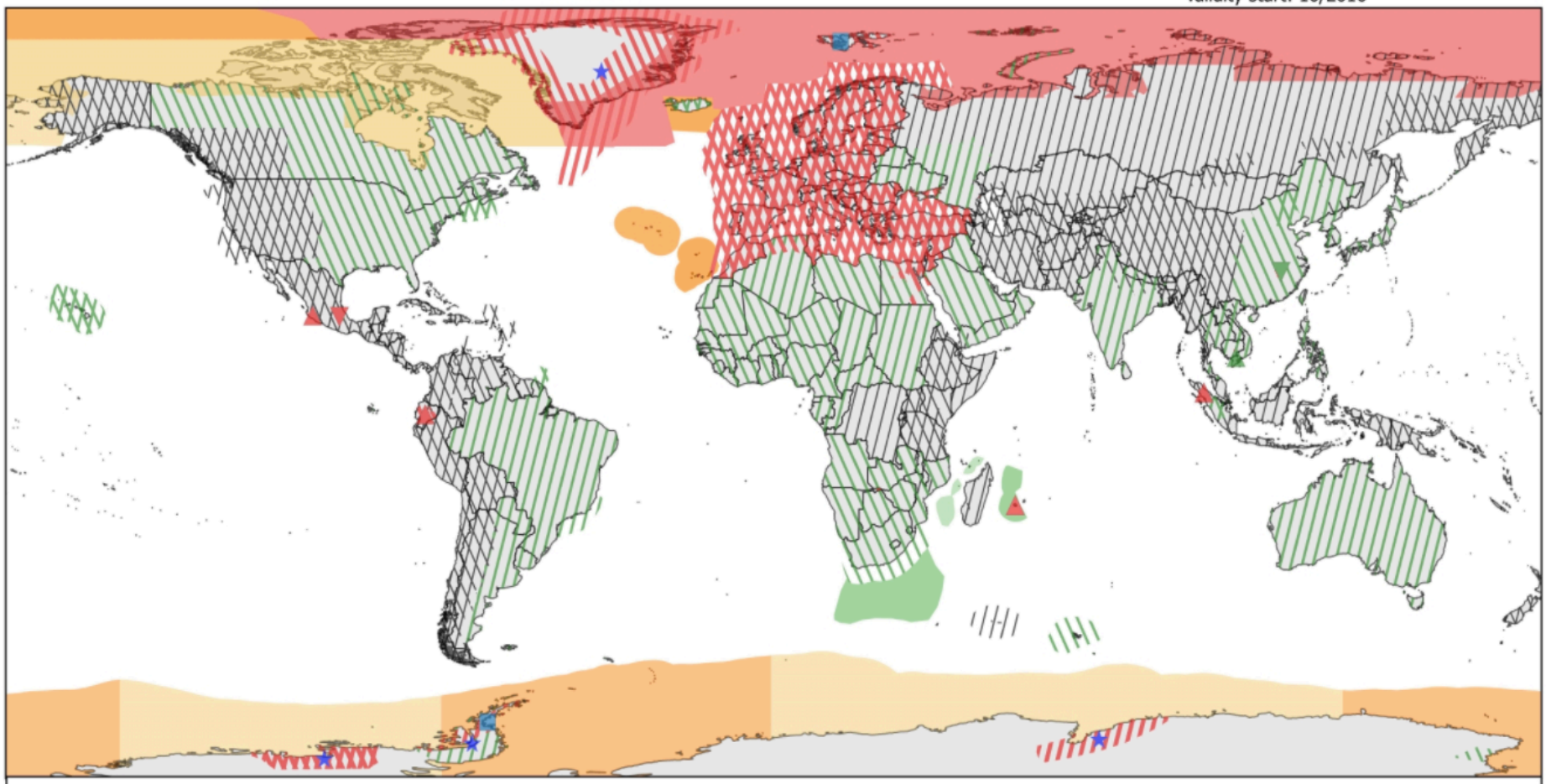
FREE AND OPEN DATA FROM THE SENTINEL SATELLITES



Sentinel-1 Constellation Observation Scenario: Revisit & Coverage Frequency

sentinel-1

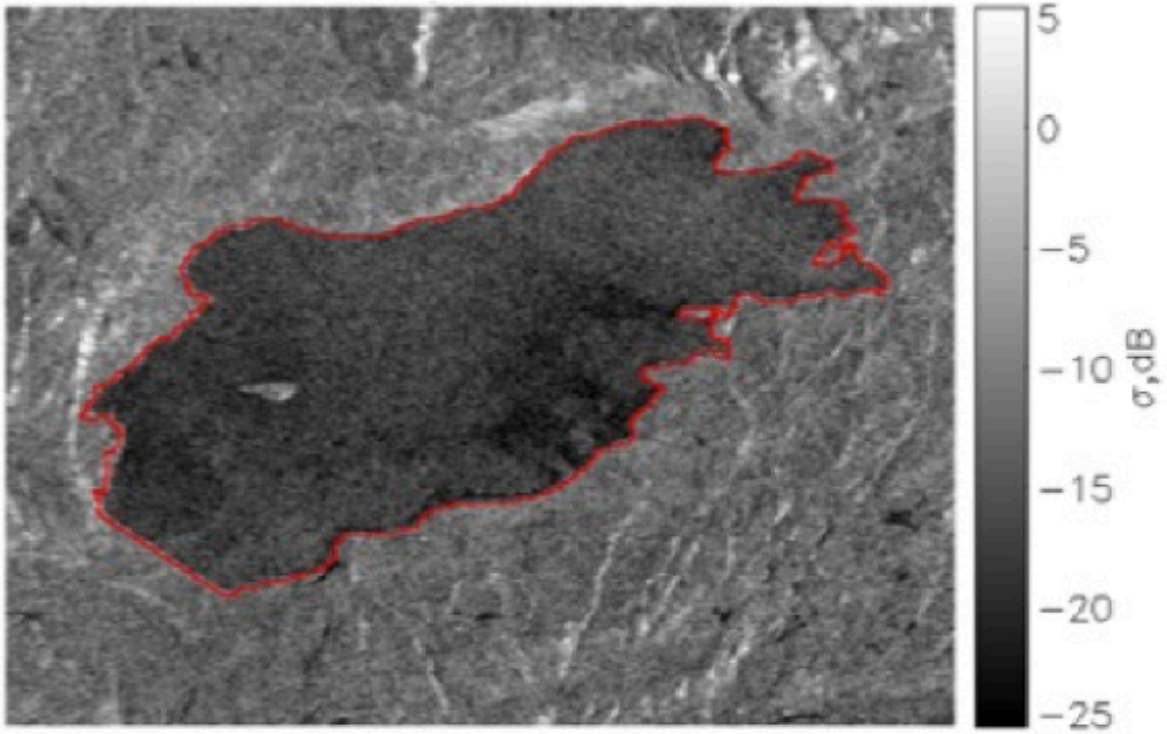
validity start: 10/2016



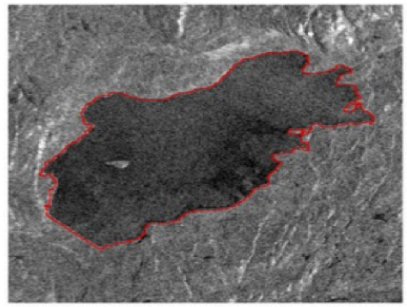
QUANTIFYING SURFACE WATER EXTENT USING RADAR MEASUREMENTS

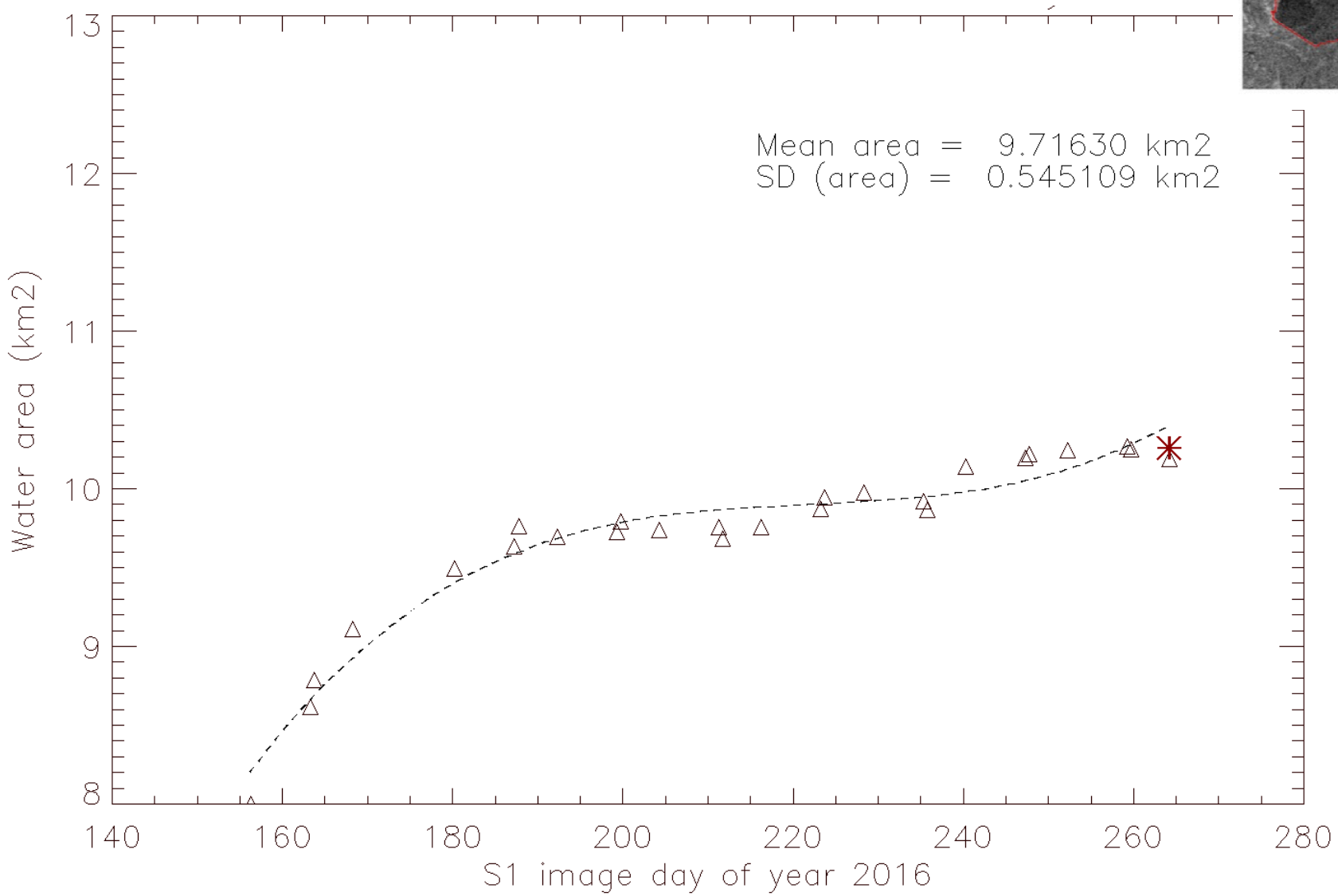
Satellite: Sentinel-1a/b
Pixel resolution: 5mx20m

Area (Sentinel-1) = 10.1869 km2

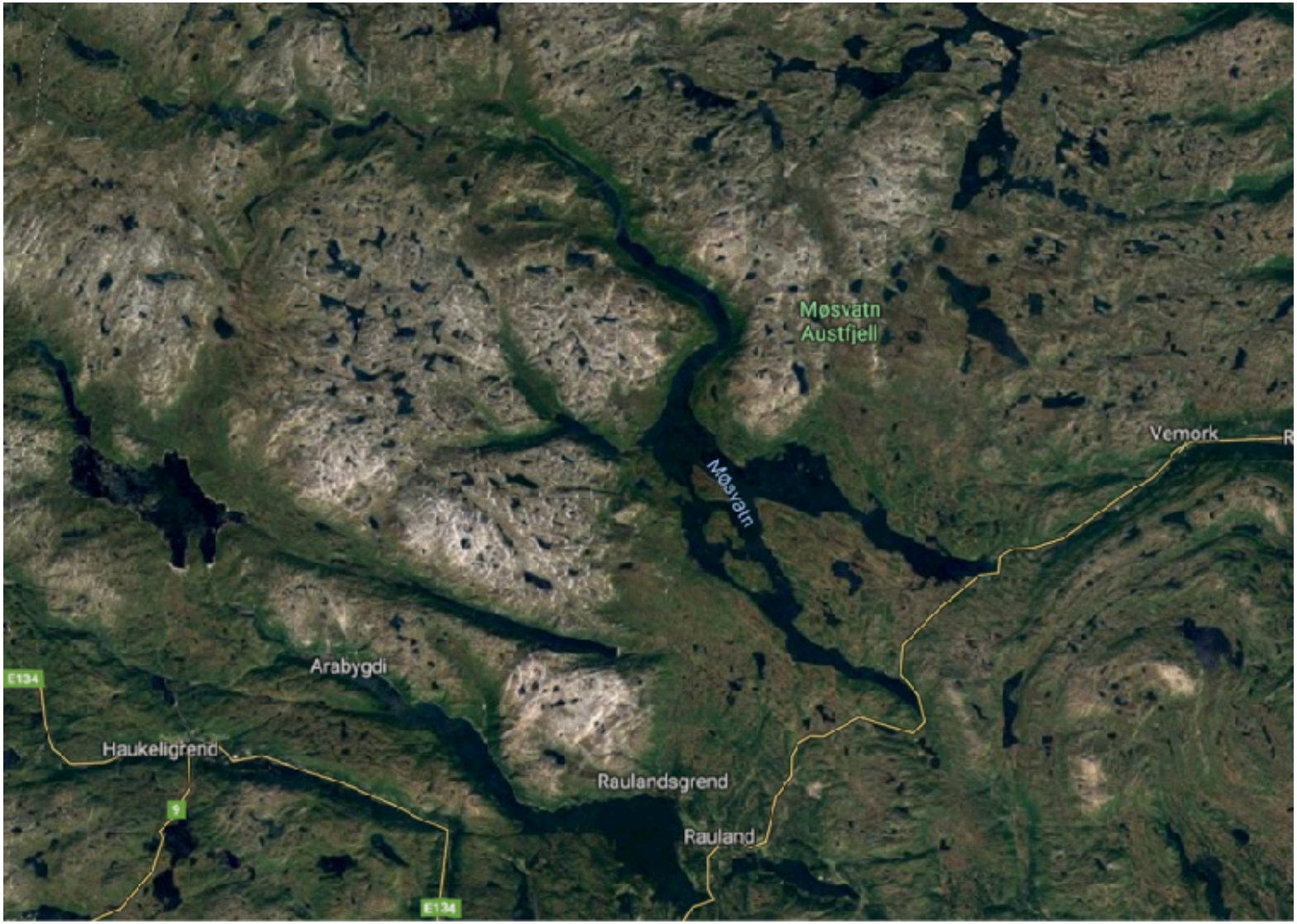


TIME-SERIES OF INFORMATION OF WATER AREA

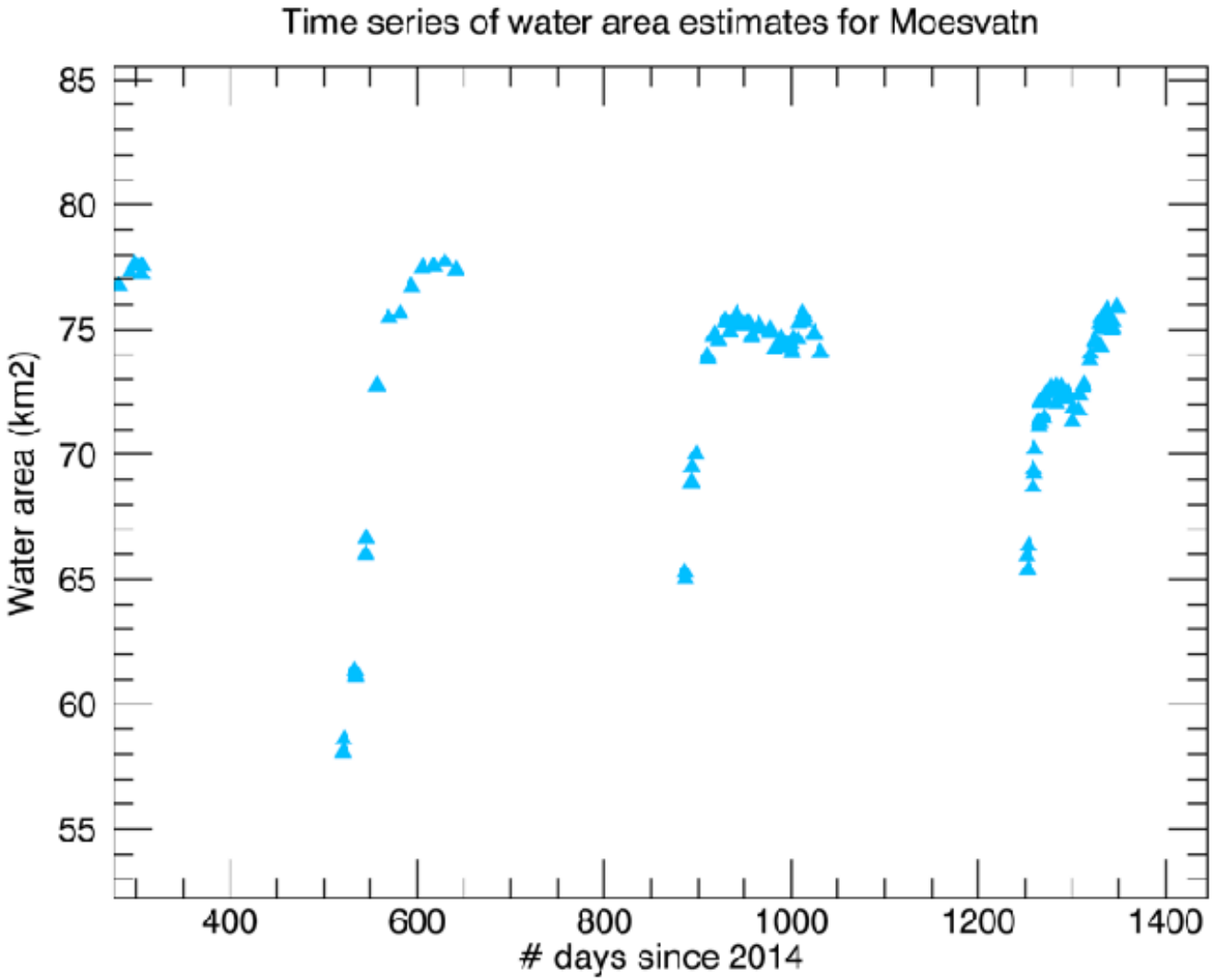




WATER SURFACE AREA MØSVATN



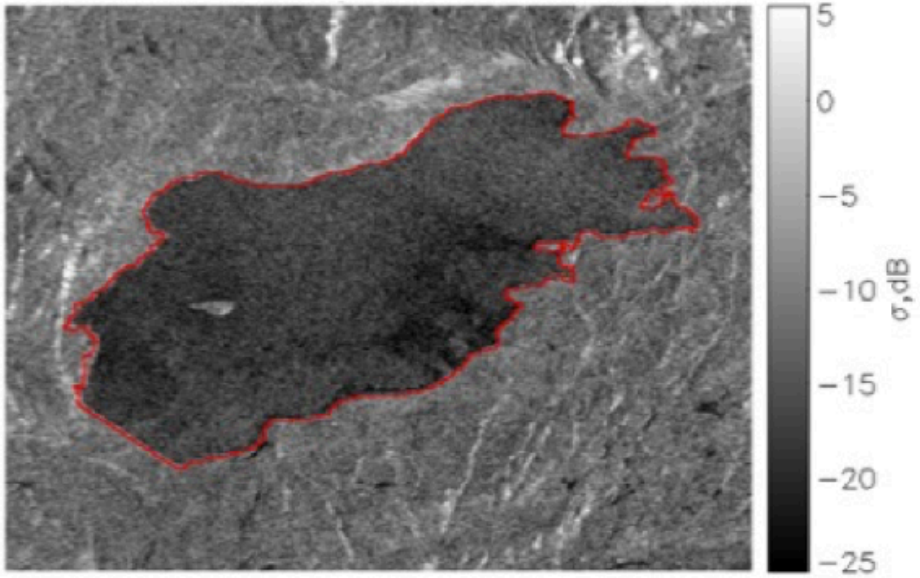
WATER SURFACE AREA MØSVATN, JUNE-DECEMBER MONTHS



SENTINEL MEASUREMENTS VS. HIGH-RESOLUTION

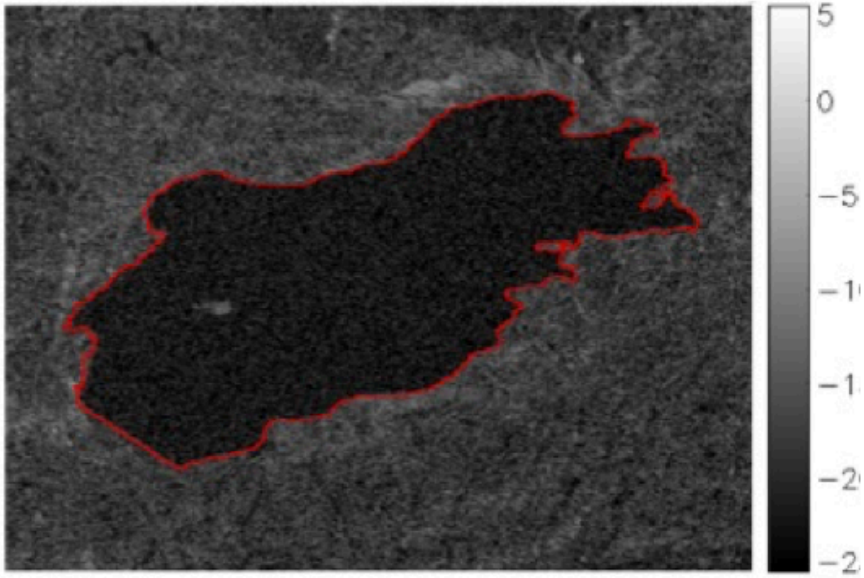
Satellite: Sentinel-1a/b
Pixel resolution: 5mx20m

Area (Sentinel-1) = 10.1869 km2



Satellite: Radarsat-2
Pixel resolution: 3mx3m

Area (Radarsat-2) = 10.2595 km2



Difference = 0.06km^2, or 0.7% av RS2-areal

TECHNOLOGICAL CHALLENGES

- Data management and processing
- Ice on lakes
- Melting period
- Windy days/waves
- Low water levels
- Layover/shadowing

	Møsvatn 2014-2017
# geocoded	451
# classified	218
# rejected	65 (6)
# retained	147

PRESENT EXPERIENCE

- Radar satellite measurements can be used to efficiently map/monitor changes in water surface areas
- Methodology constantly improving
- Global coverage
- Develop databases of information to;
  - Complement existing sources: “Innsjødatabasen” (NVE)
  - Strengthen understanding on environmental impact from hydropower operations

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