SNOWTRANE

Snow mass retrieval by training machine learning algorithms with EO data

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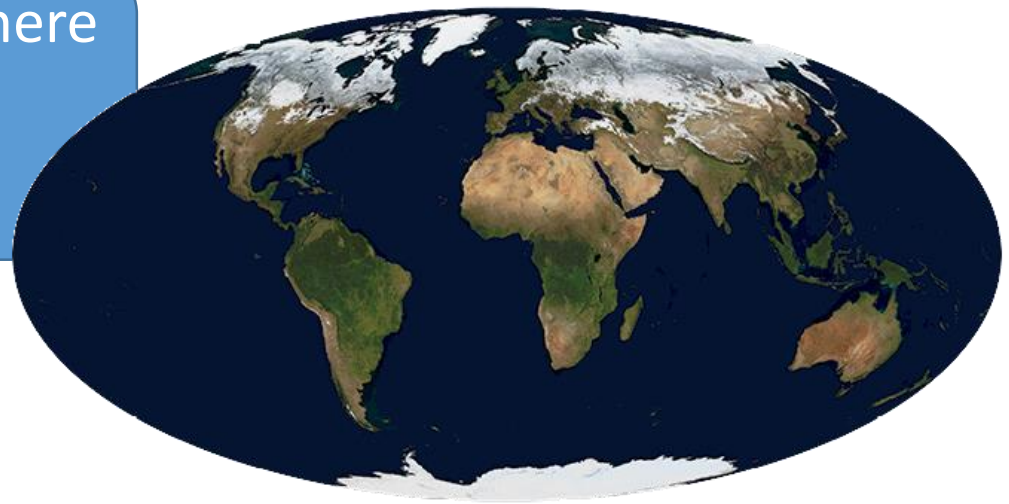
Importance of snow vs limited data

- Snow covers almost half of the Northern Hemisphere
- Cooling effect on our planet
- Critical water resource



Shortage of data:

- Optical: only cover, not water
- Passive microwave: too coarse, not in mountains
- Lidar: only local

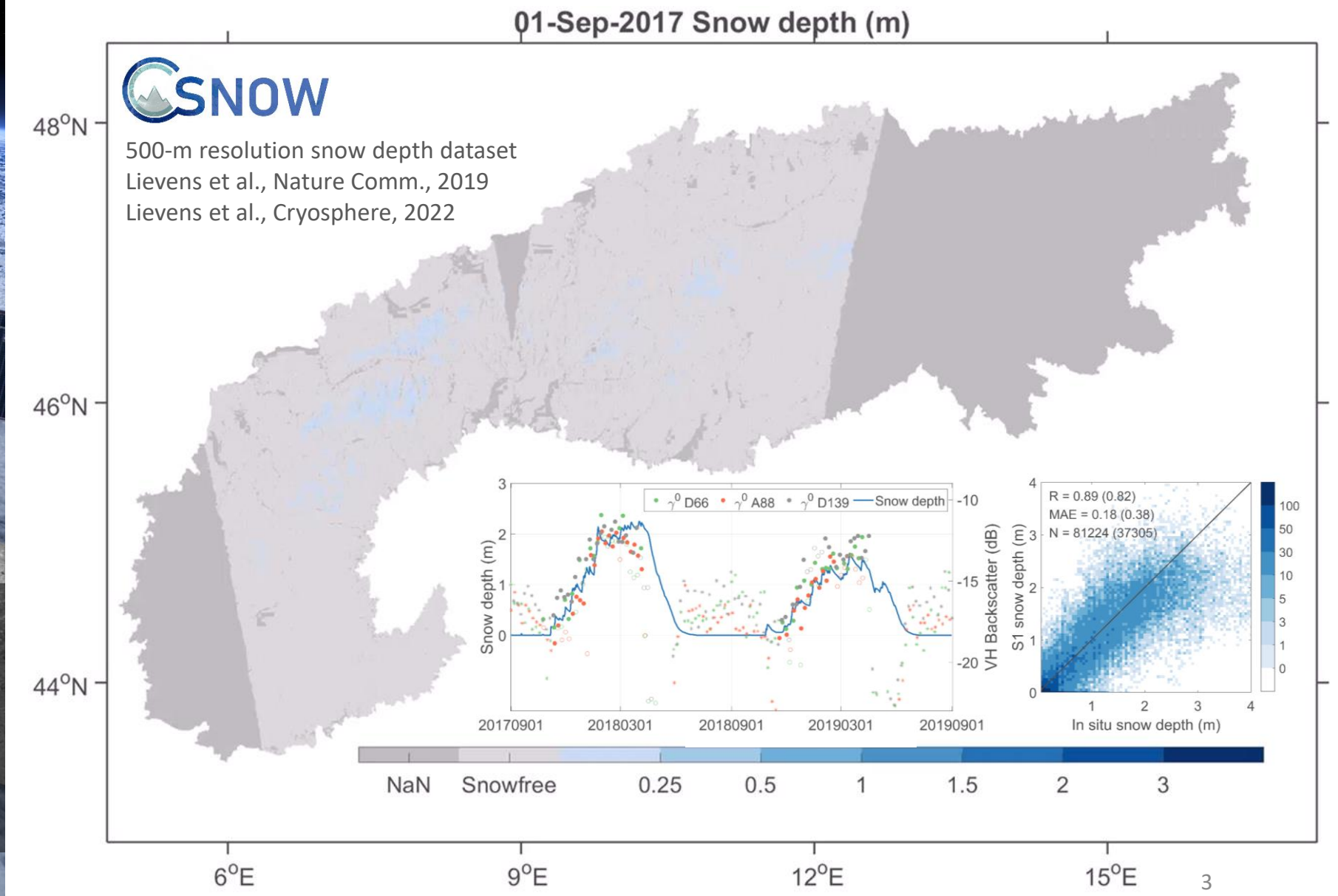
Solutions:

- Opportunity C-band Sentinel-1
- New mission proposals

The BELSPO STEREO III C-SNOW project

Sentinel-1

2 satellites A & B (B ended)
Continuation with C & D
C-band (5.4GHz) VV+VH radar
5x20 m resolution
6-day repeat cycle



Snowtrane objectives

Overall hypothesis: (1) improved snow retrievals from S1 backscatter

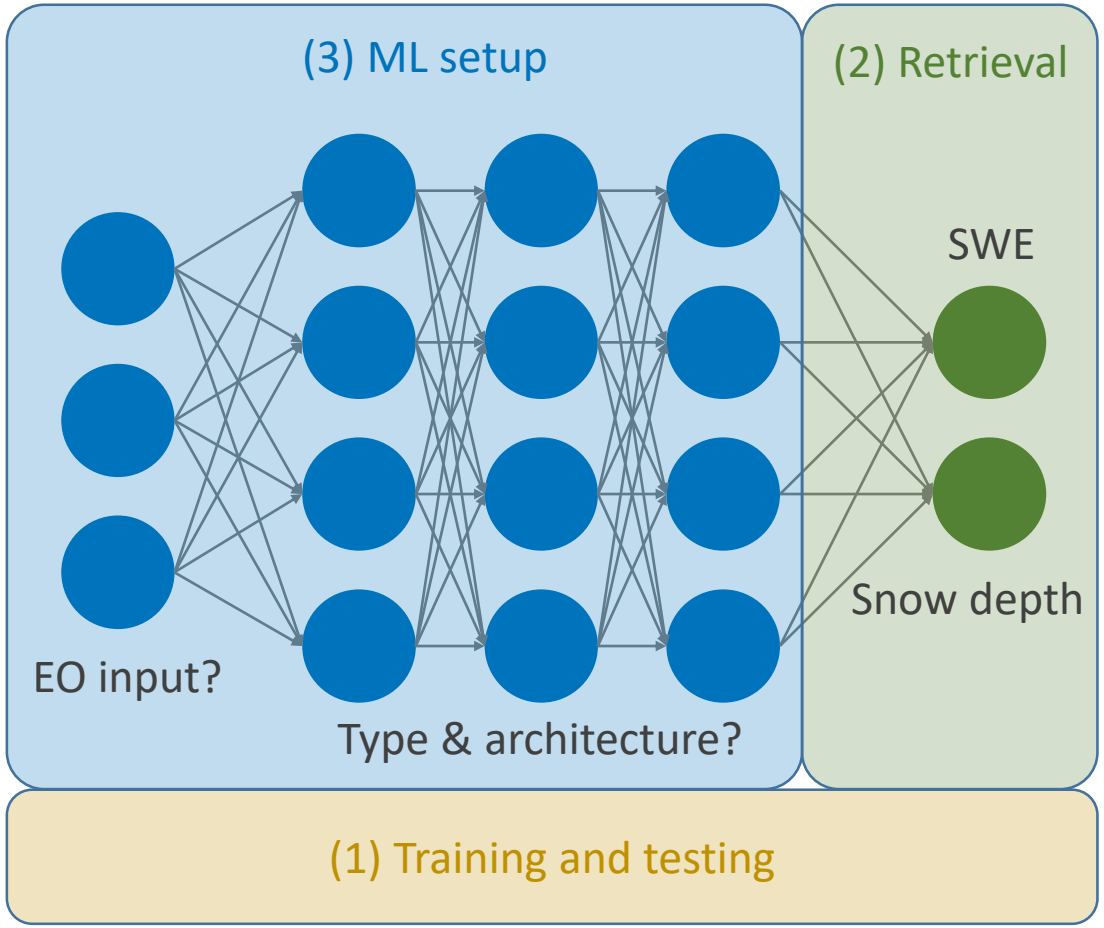
- **Machine Learning (ML)** instead of change detection
  - Inclusion of **auxiliary EO data**
- Test site: **European Alps**

Scientific objectives: (2) retrieval

- Improved snow depth, by addressing **topography, soil, vegetation, snow microstructure**
- Retrieval of **SWE**
- **Extend** during wet snow conditions

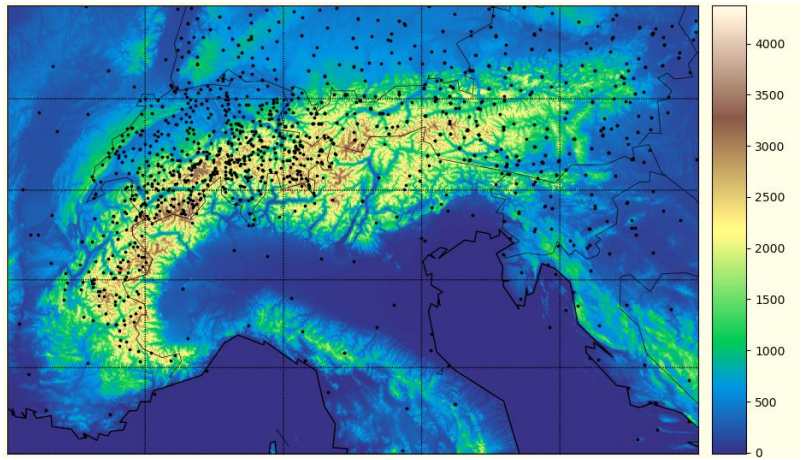
Scientific objectives: (3) ML setup

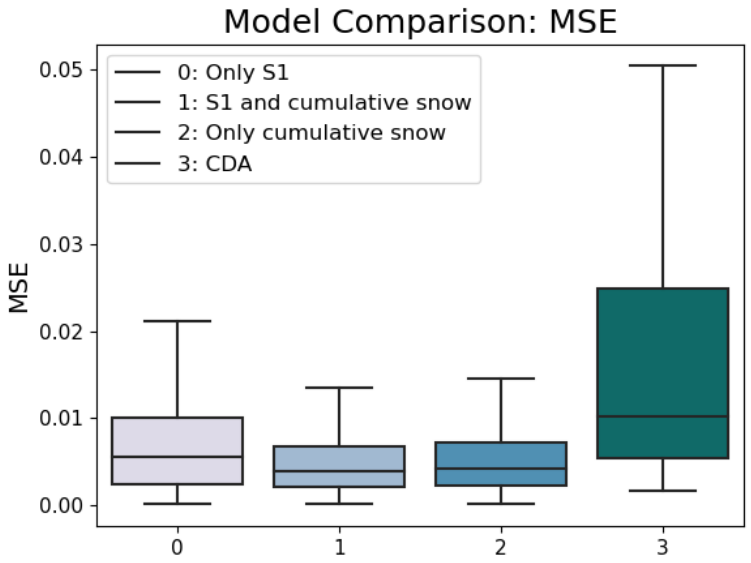
- EO **input** data
- ML **type** and **architecture**

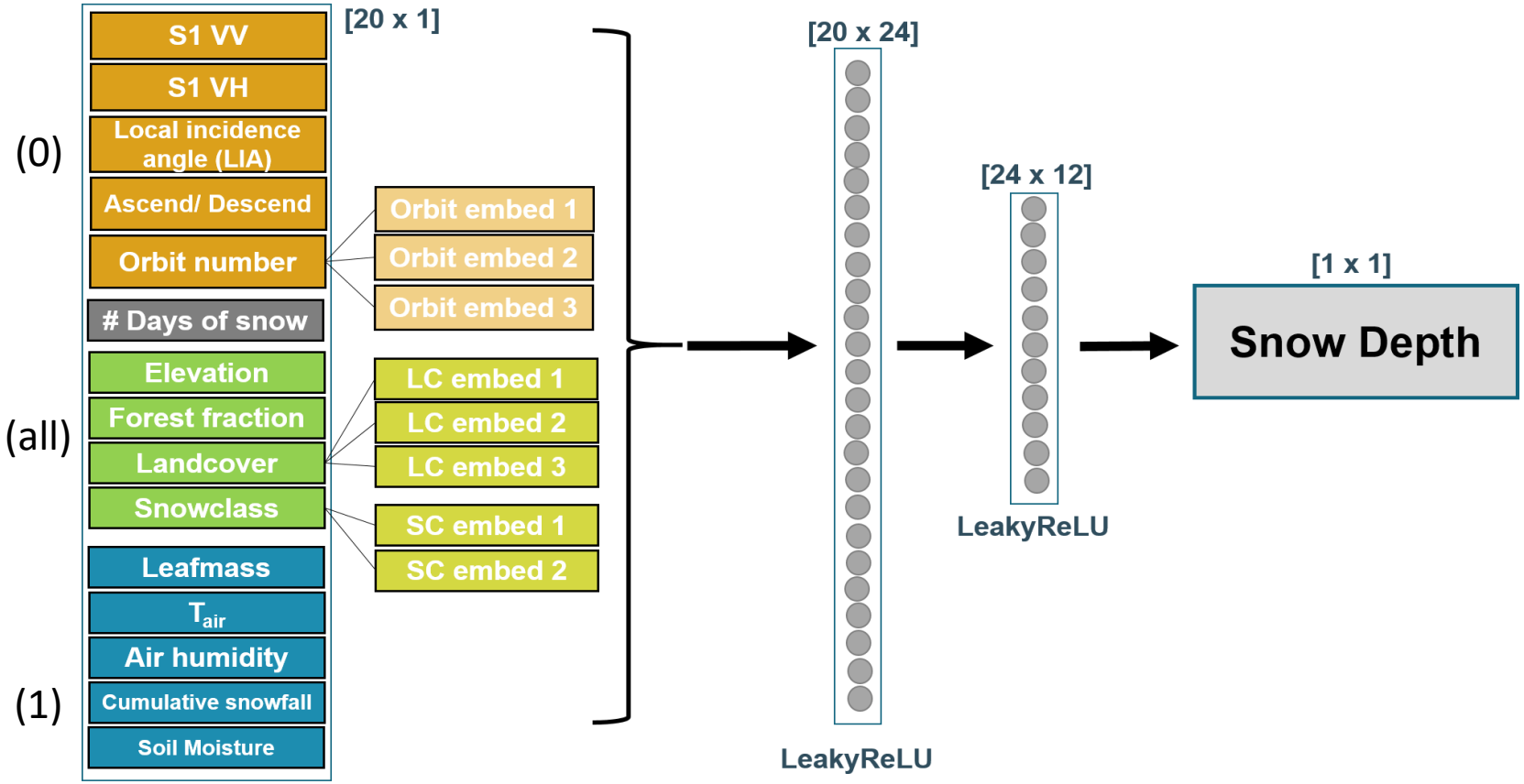


Preliminary results

Elevation [m] and sites







The Snowtrane team

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Prof. dr. ir. Niko Verhoest

MSc 1
S1 InSAR
Morgane de Breuck

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Snow modelling
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Machine learning
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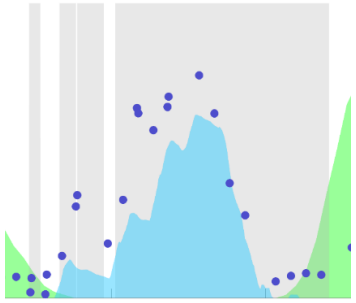
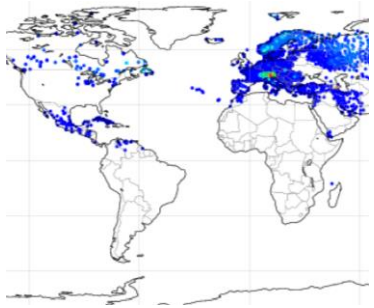
Team expertise

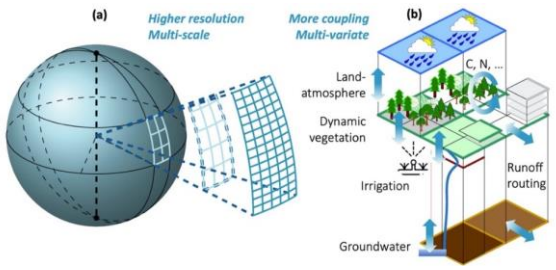
Remote sensing



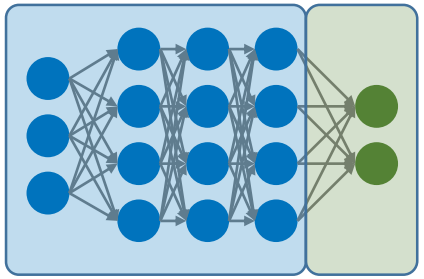
Snow retrieval



Analysis & validation



Modeling & data assimilation



Machine learning

Thank you for your attention

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