

Irrigation, land-atmosphere

Crops, streamflow

Mountain snow

Deforestation, moisture, salinity

Tropical peatlands

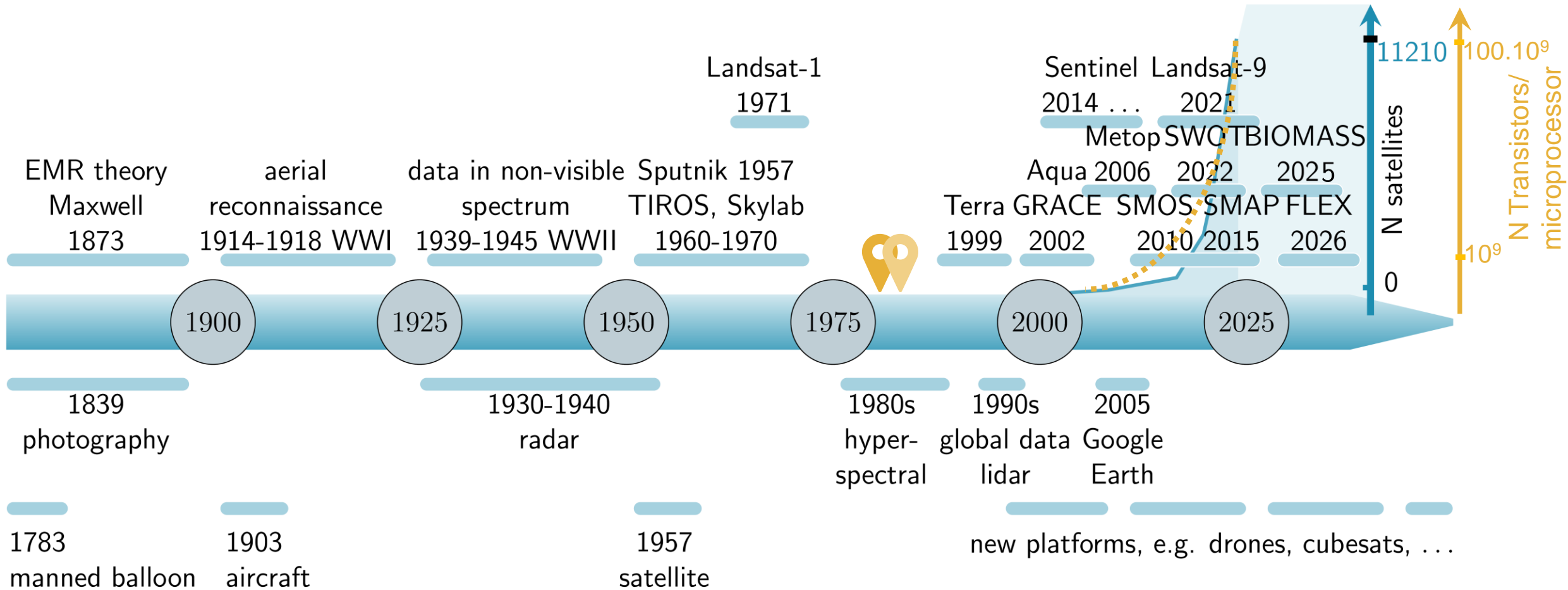
# 40 Years of Belgian Earth Observation

Prof. dr. ir. Gabriëlle De Lannoy

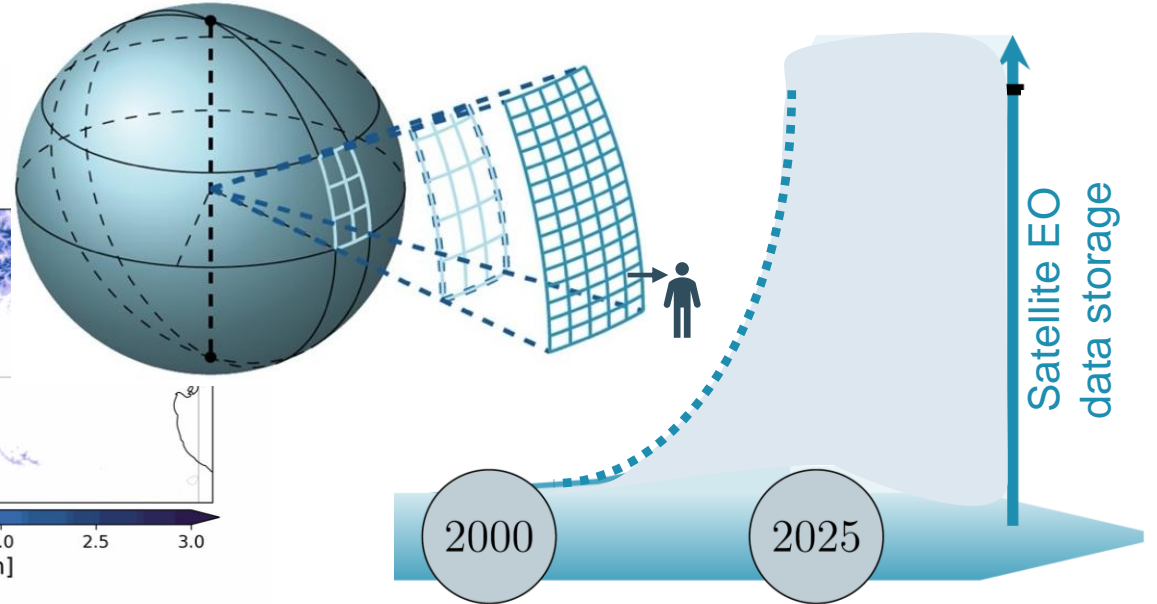
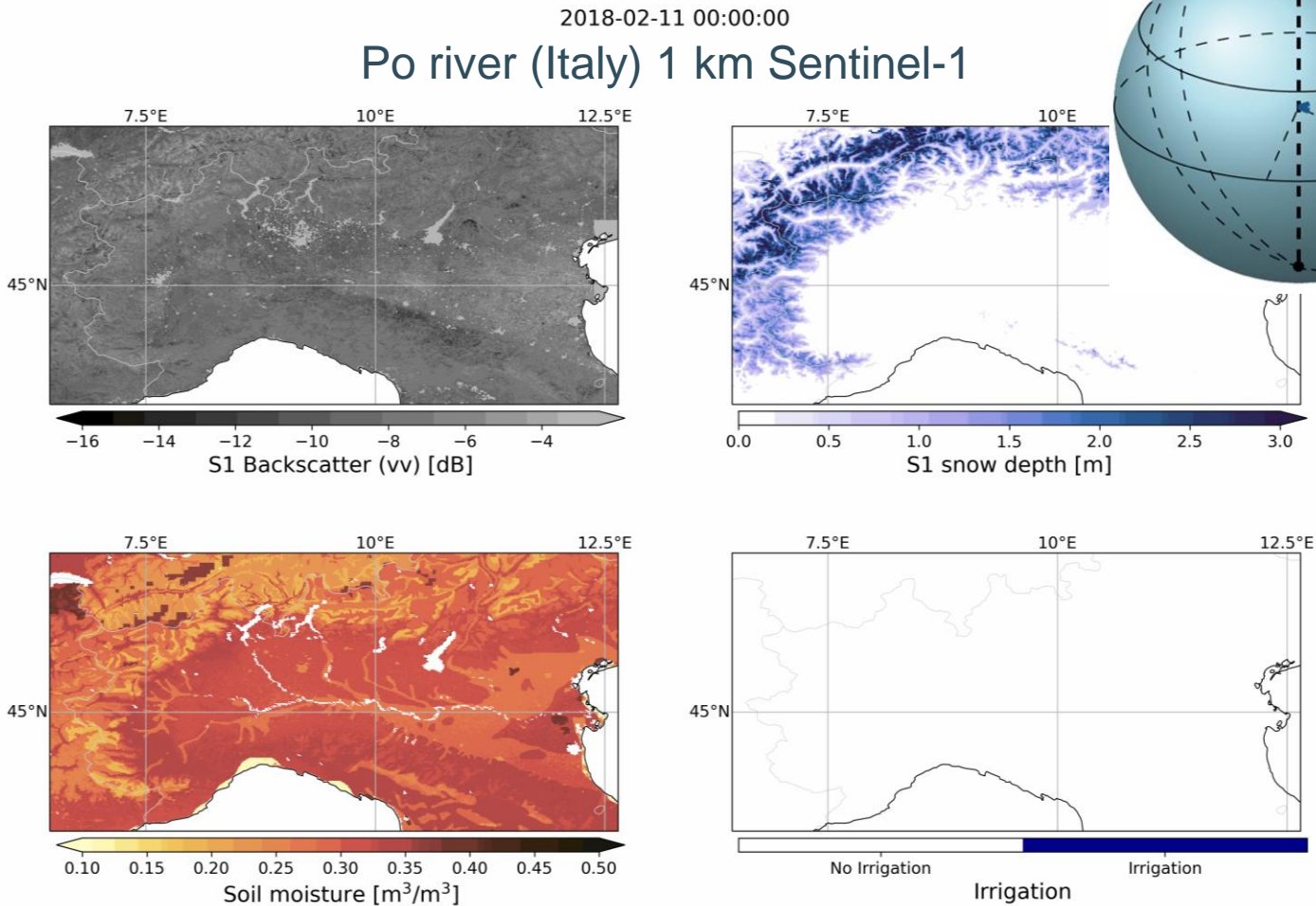
KU Leuven, Department of Earth and Environmental Sciences, Belgium



# Exponential growth



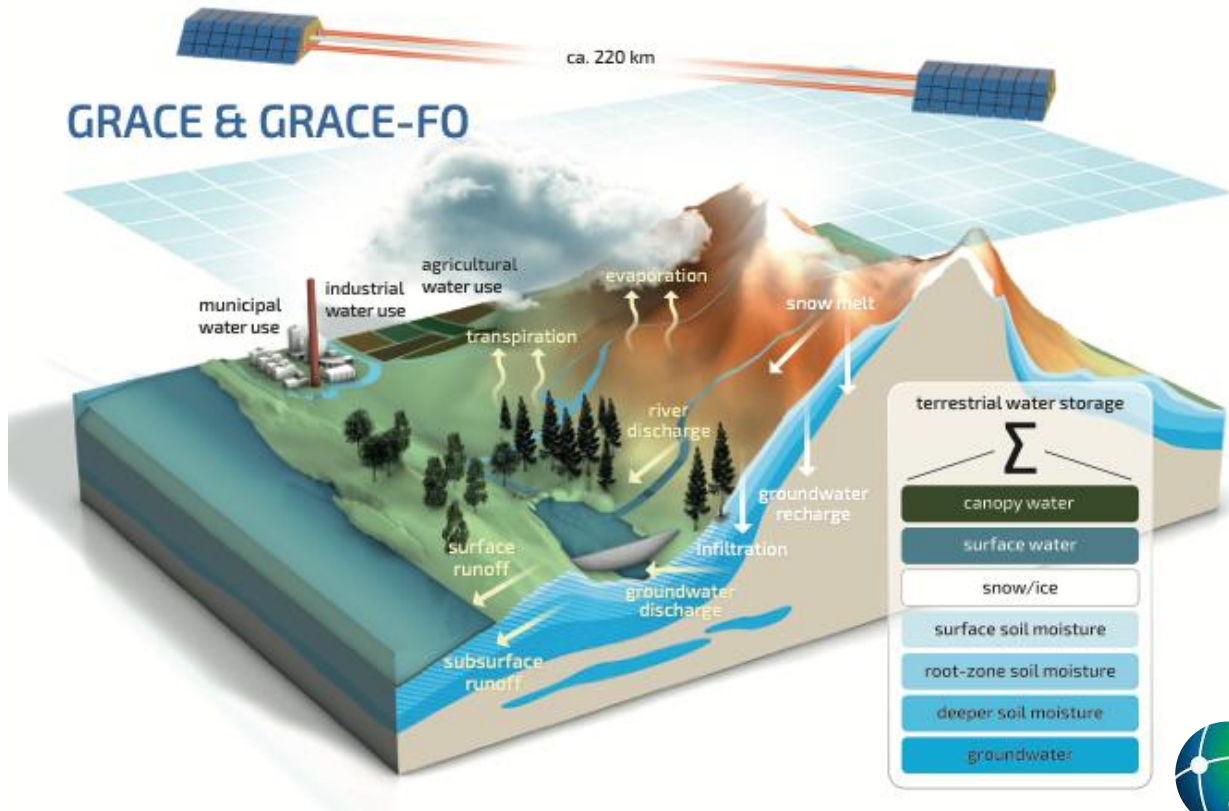
# Exponential growth



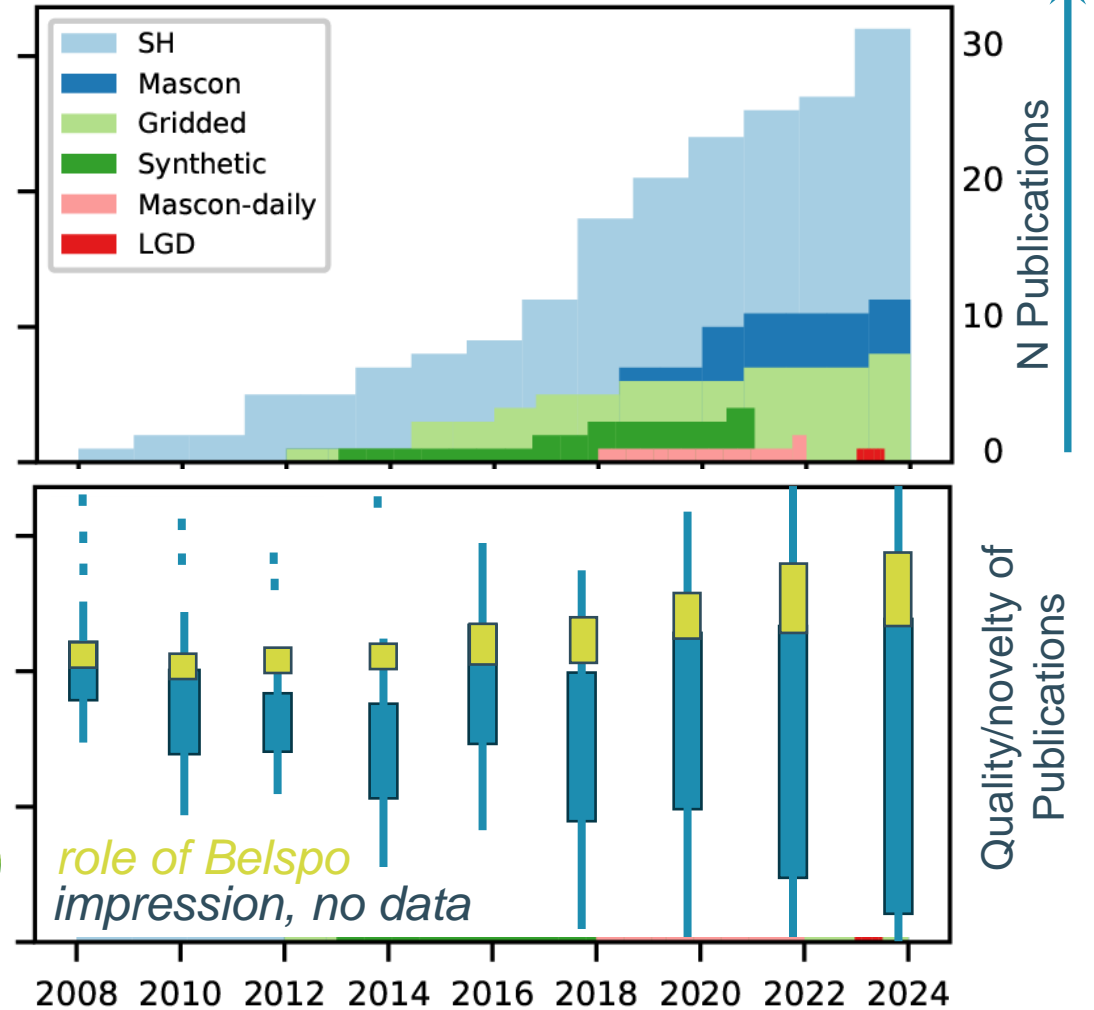
- ➔ Increasing spatial, temporal, radiometric and spectral resolution
- ➔ Increasing range of products

# Exponential growth

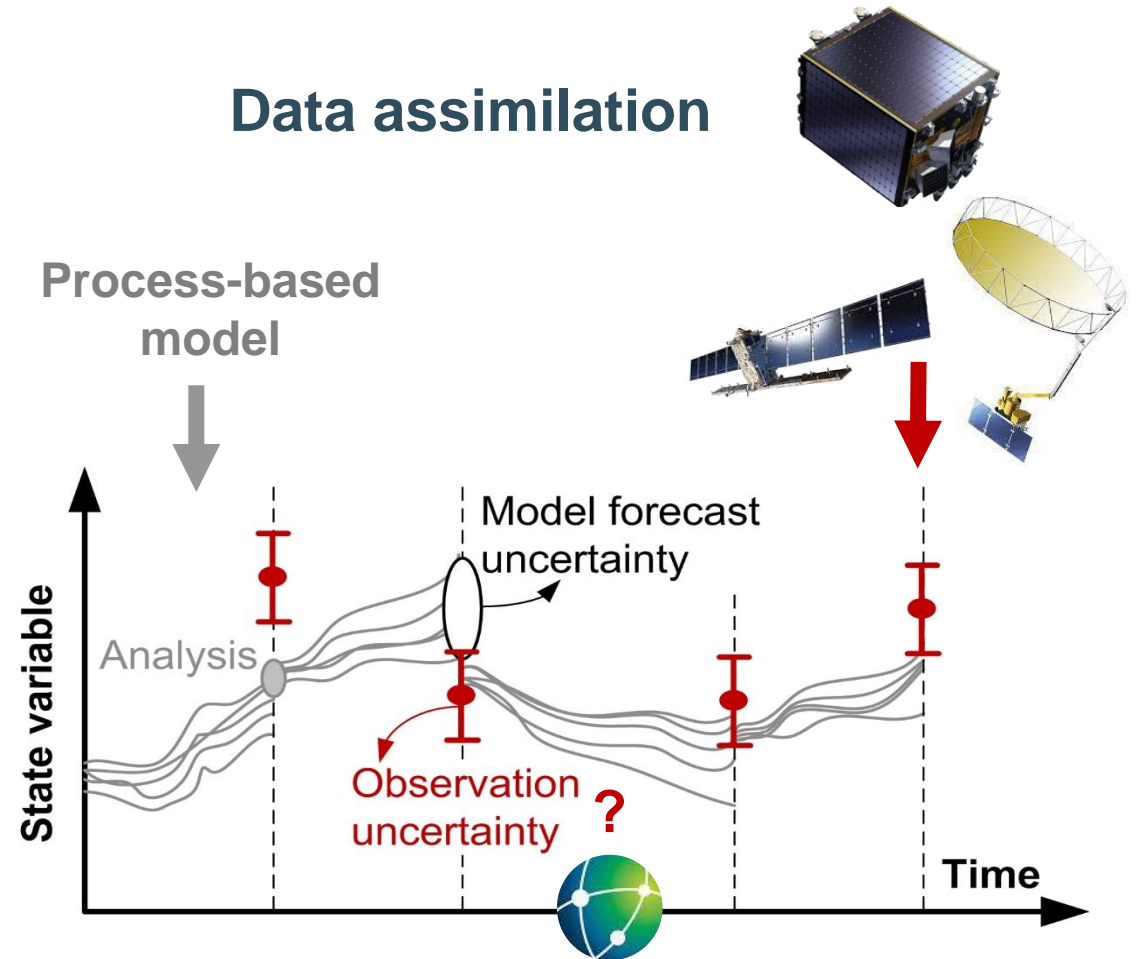
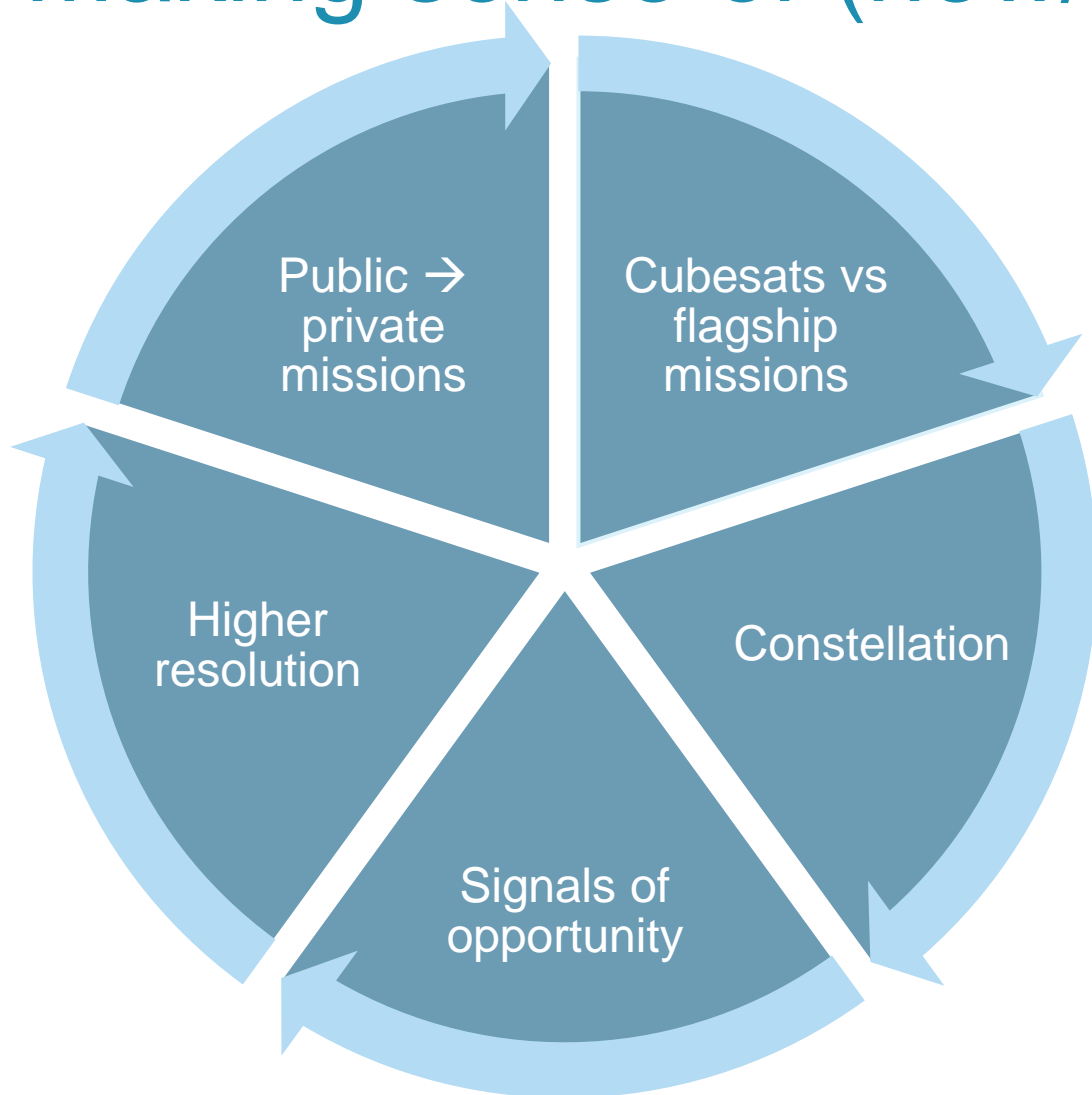
## GRACE & GRACE-FO



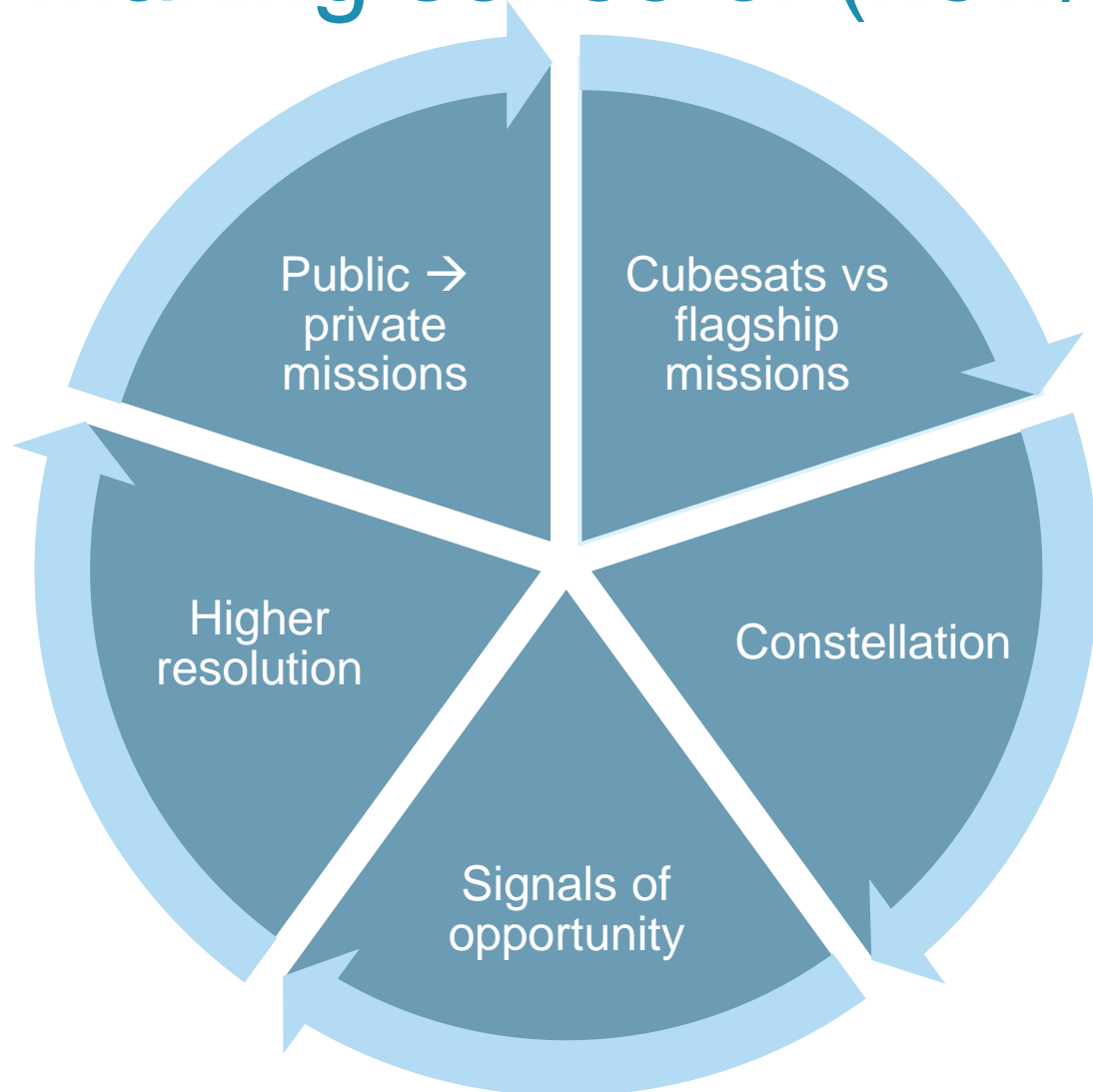
GRACE analysis approach



# Making sense of (new/more) EO



# Making sense of (new/more) EO



## Artificial intelligence



Tools & brains  
Open source, transparency  
Data science vs fundamental science

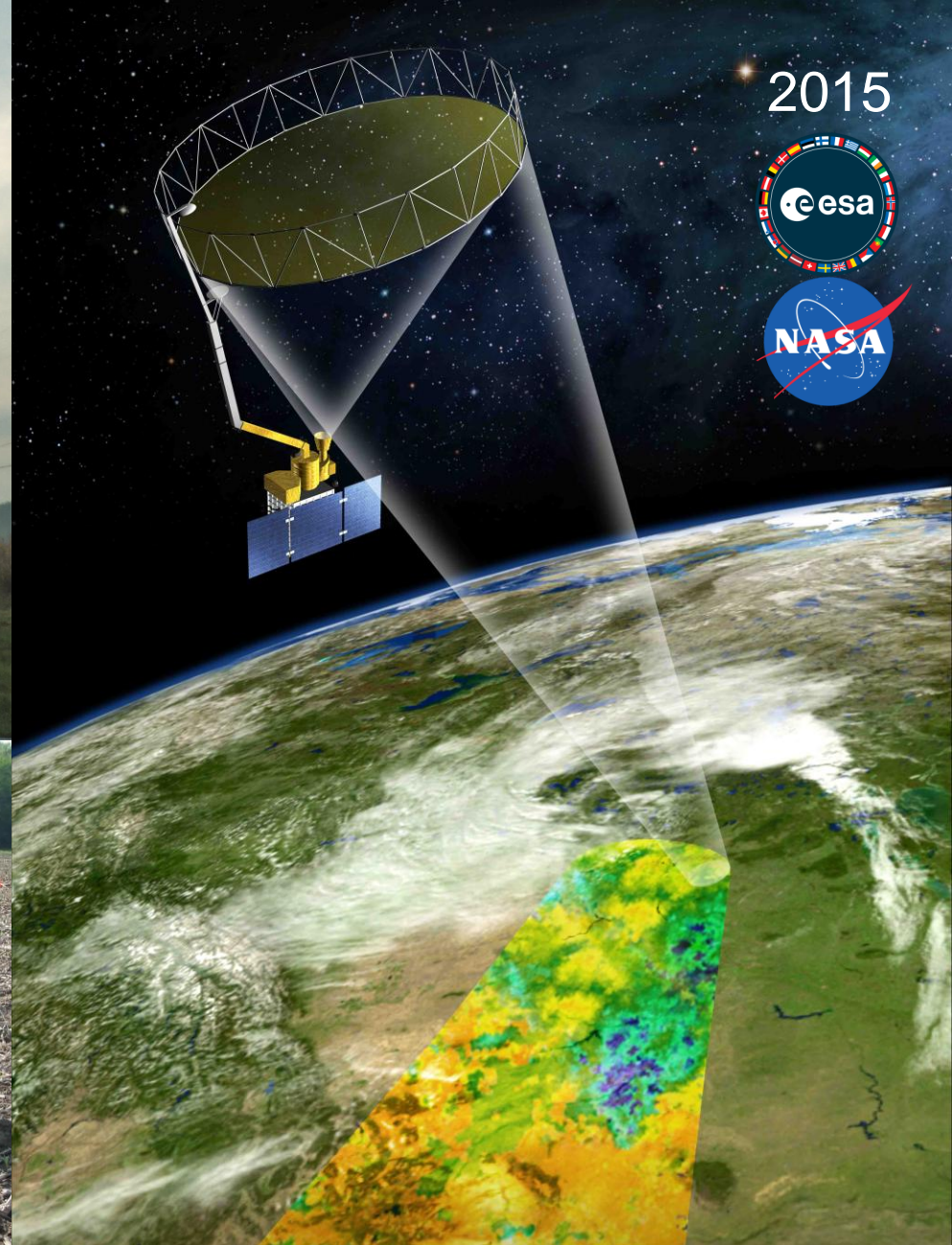
# My path



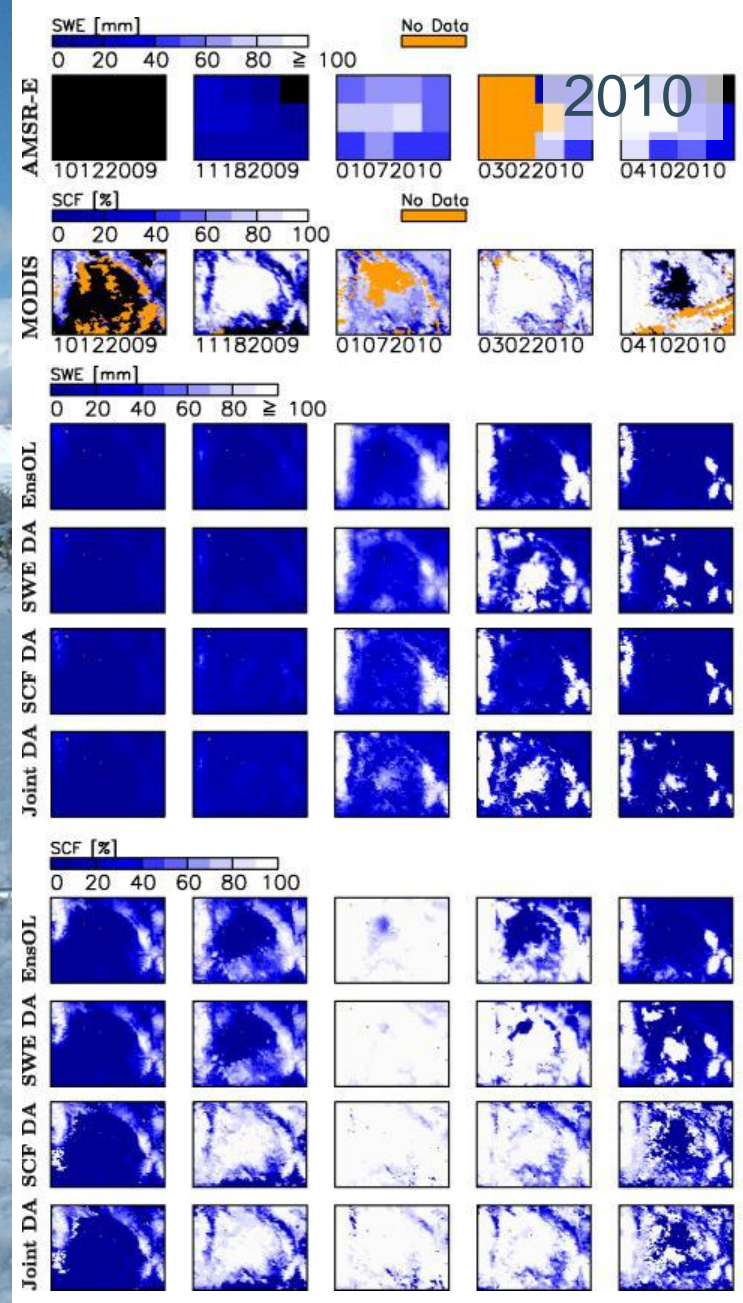
2002



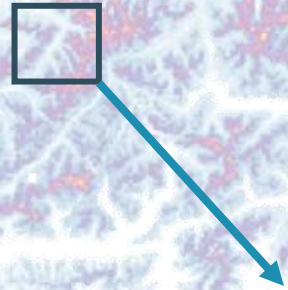
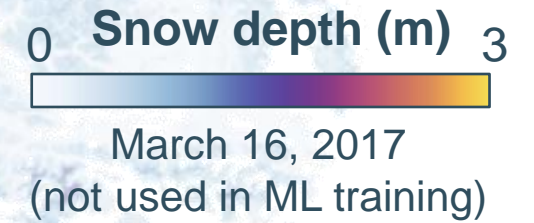
2015



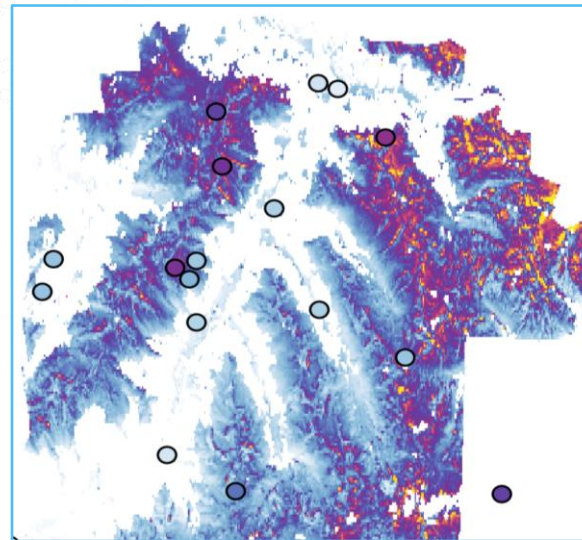
2002



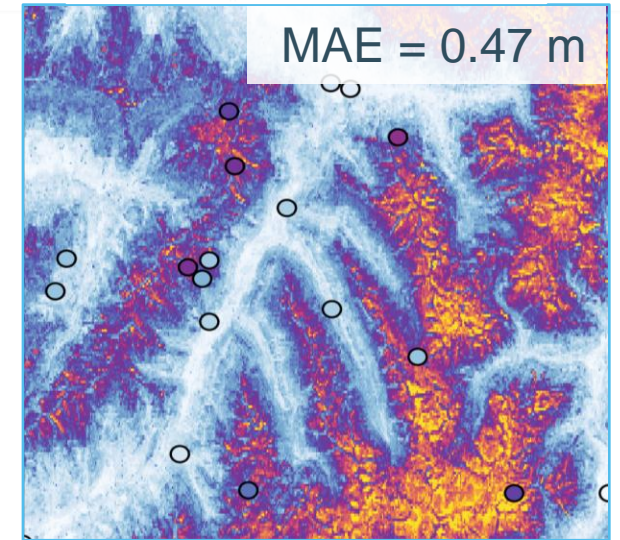
# Mountain snow



Photogrammetry SD



ML SD 100 m



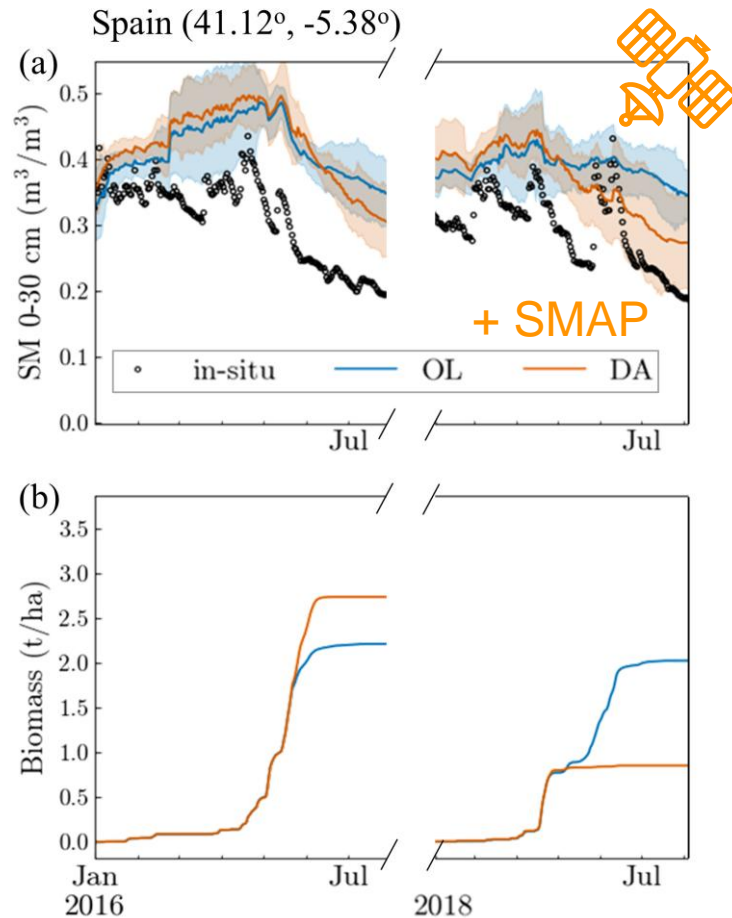
**Sentinel-1 C-band (5 cm) is not transparent to snow:**

- Tower/sled experiments
- Default and ML retrievals
- DA improves hydrology

# Soil moisture, irrigation, crops

# CROPWAVES

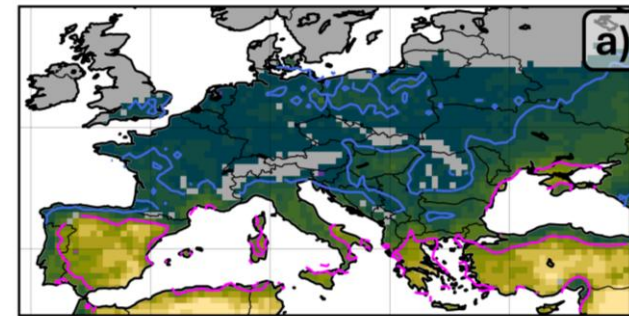
Past



Future

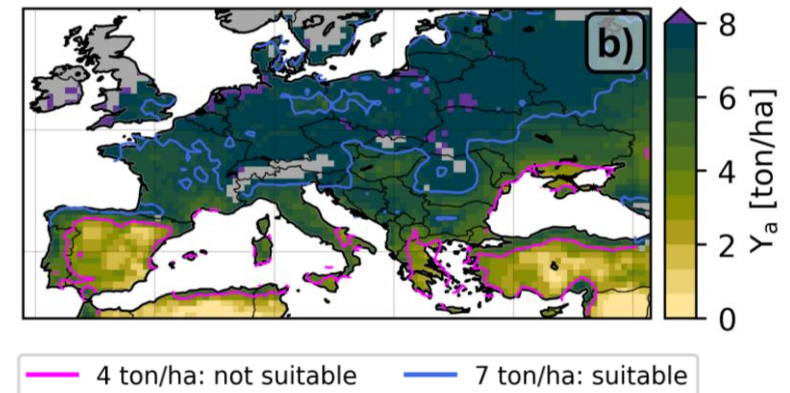
Baseline (1985-2014)

MEAN: 5.49 STDEV: 2.09



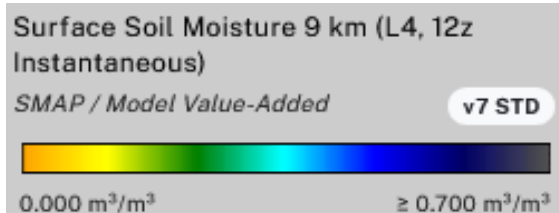
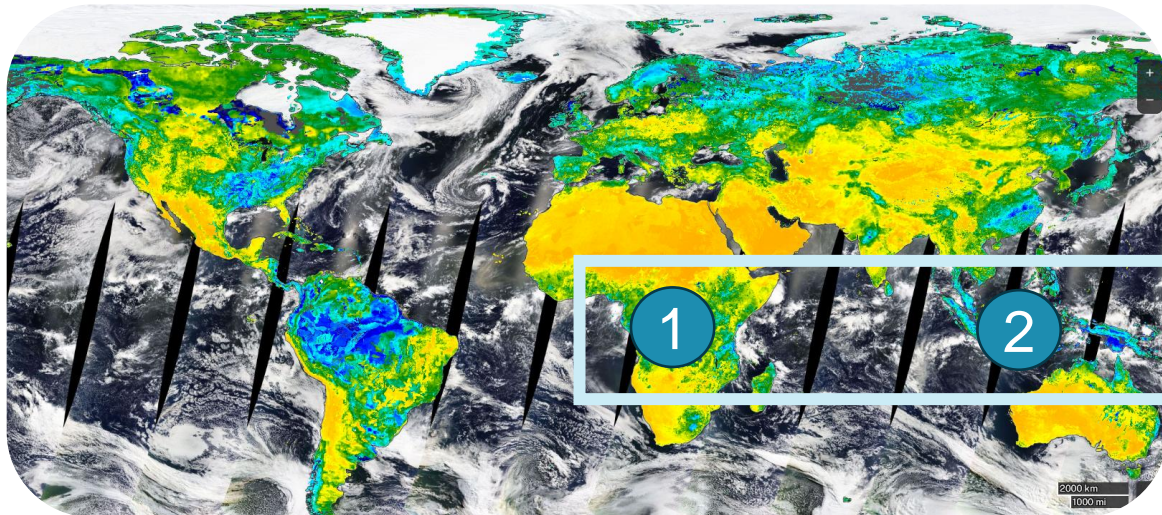
SSP3-7.0 (2030-2059)

MEAN: 5.85 STDEV: 2.03



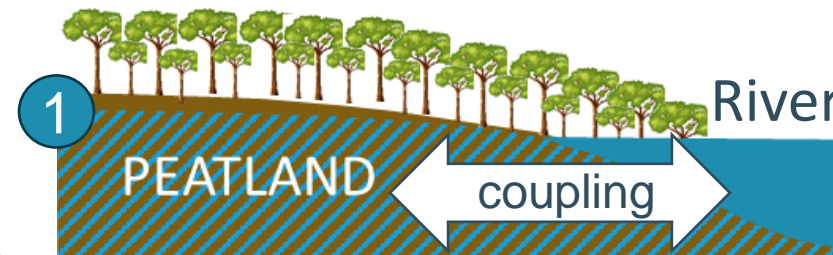
# Tropical peatlands

SMAP L4\_SM 8 May 2025 (NRT)

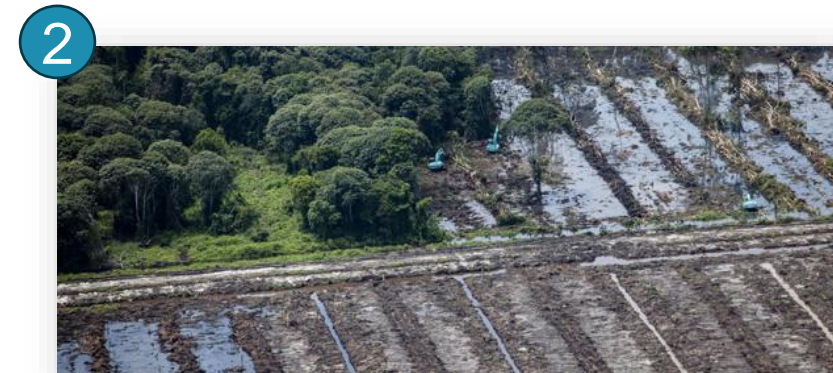


water -  
carbon

SWOT, CYGNSS, GRACE



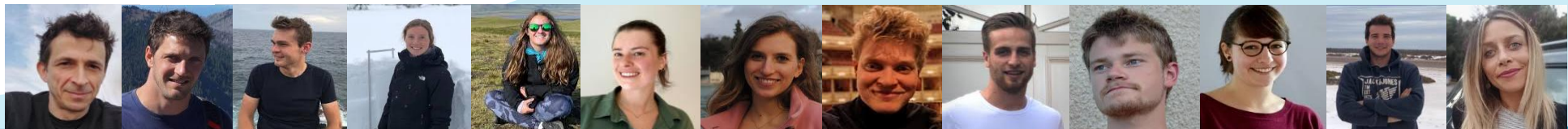
Climate  
and river  
impacts



Human  
impacts

# Education and jobs

- Course Earth Observation
  - ~ 100 students / year
  - First exposure to EO
- Bsc, Msc thesis students
- PhD students
- Postdoctoral researchers
- Visiting researchers
- Universities worldwide
- VITO, KMI,...
- NASA, ESA, ECMWF,...



# Commissions of trust



## ESA ACEO

- Earth Explorer 12: CryoRad, ECO, Hydroterra+, Keystone
- EO science strategy



fwo



# Conclusions

## Changes and challenges



Catalyst: efficient & innovative science, quality control, collaboration



Keep brains, fundamental insight



Liaison ESA, policy makers, etc.



Belgium on the global map



Launch young EO experts in both the public and private sector

