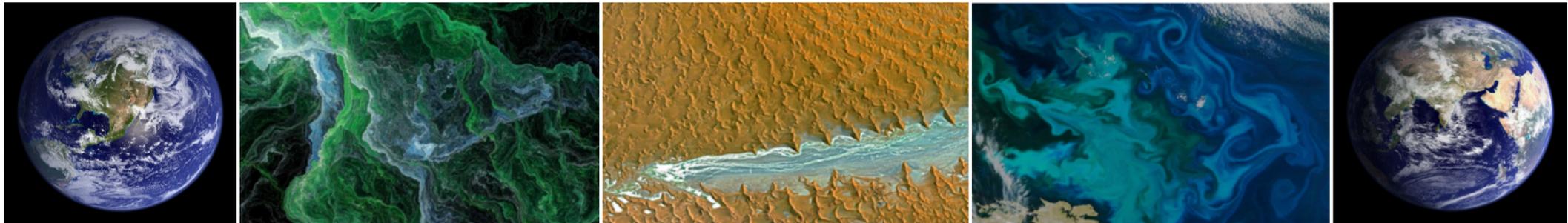


ESA Colocation Meeting – 10 September 2020

# Earth Observations



in support of the UNFCCC Paris Agreement



University of Reading  
Michaela I. Hegglin



## Overview of Project

- Study launched to help ESA identify how Earth Observations can help support the Paris Agreement.
- Output is expected to provide ESA with input for future directions of its climate program.
- Importantly, the study will seek involvement of UNFCCC & national agencies to define stakeholder needs, and of the EO community as well as a wider network of climate experts to identify how to respond to these needs.
- Today's BOGs will be a first step to gather information and will serve as first input to the study.

## Study objectives

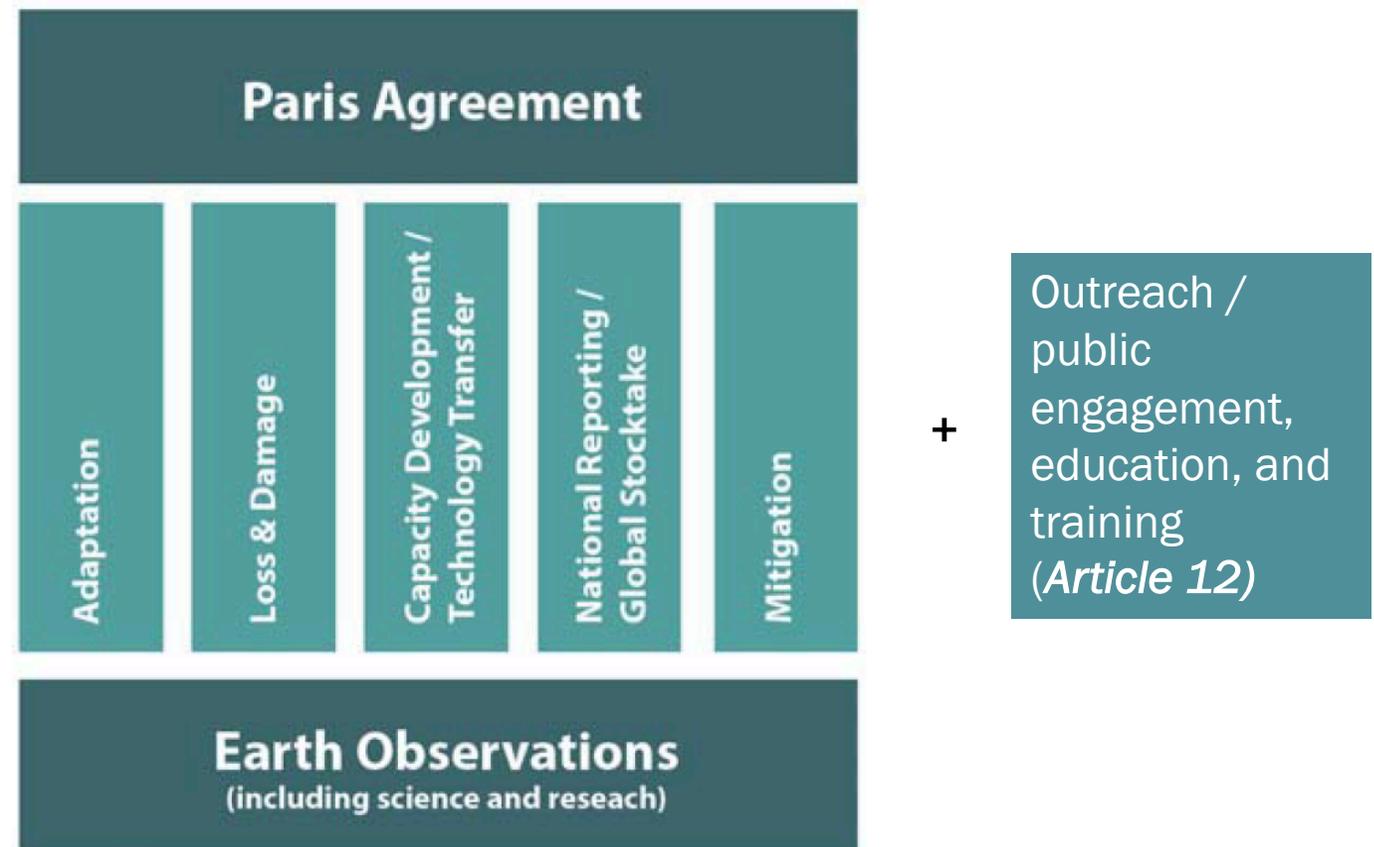
**Objective 1:** To investigate the requirements for the development of satellite EO-based information to fully support the objectives of the UNFCCC Paris agreement - **what are the needs of the Paris Agreement?**

**Objective 2:** To conduct a survey of the European and international capacity (including both technical expertise and infrastructure) to respond effectively to the EO requirements - **what are the current means of responding to these needs?**

**Objective 3:** To define a Research and Development (R&D) agenda, which is necessary to meet the identified EO requirements and which is intended to serve as input to future ESA climate activities - **what future capabilities will be available (or will be needed) to enhance the usefulness of EO for the Paris Agreement?**

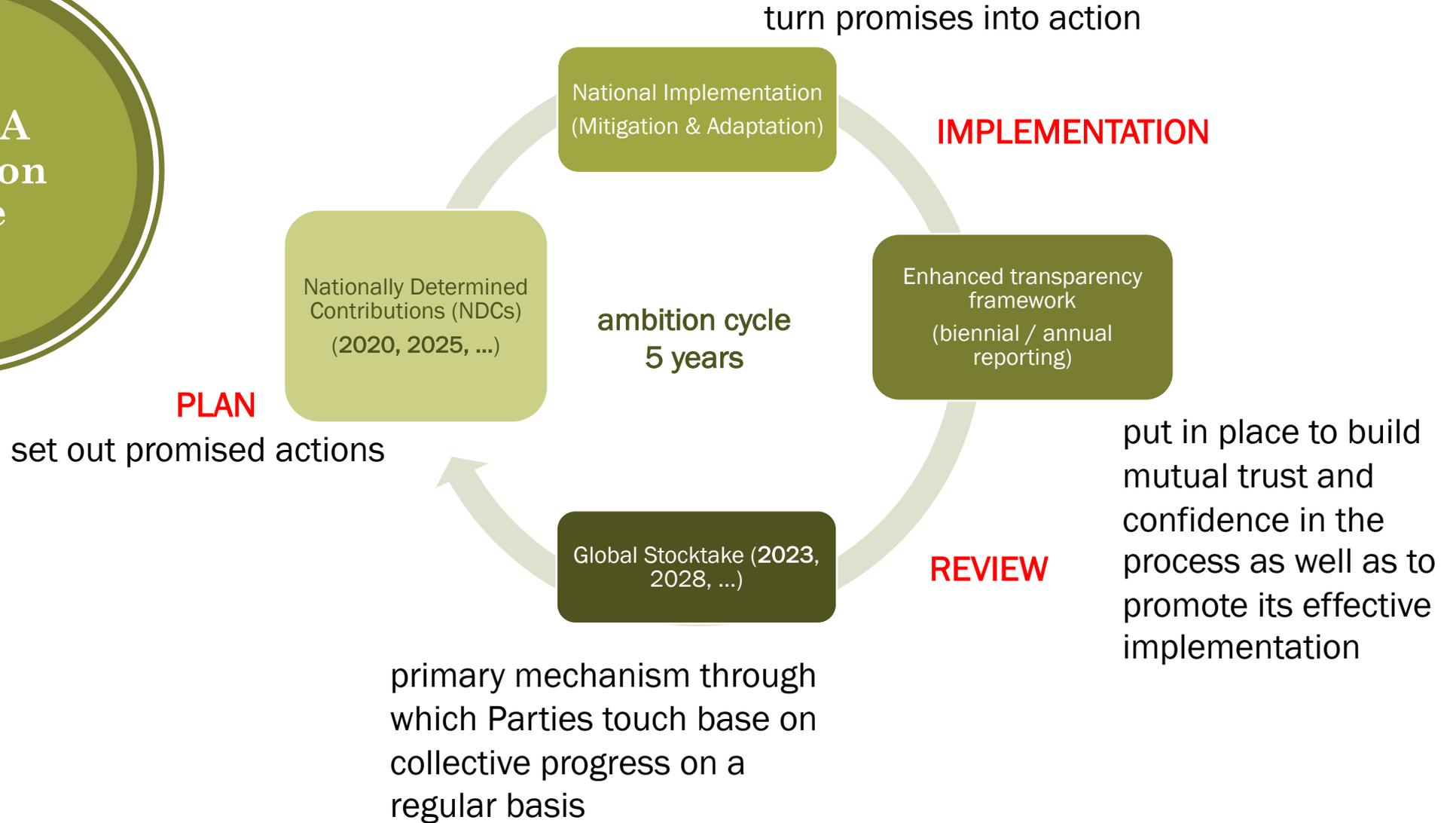
## The Paris Agreement

- The Paris Agreement is based on 5 pillars (thematic areas).
- Earth Observations have the potential to be of use to all of these areas.

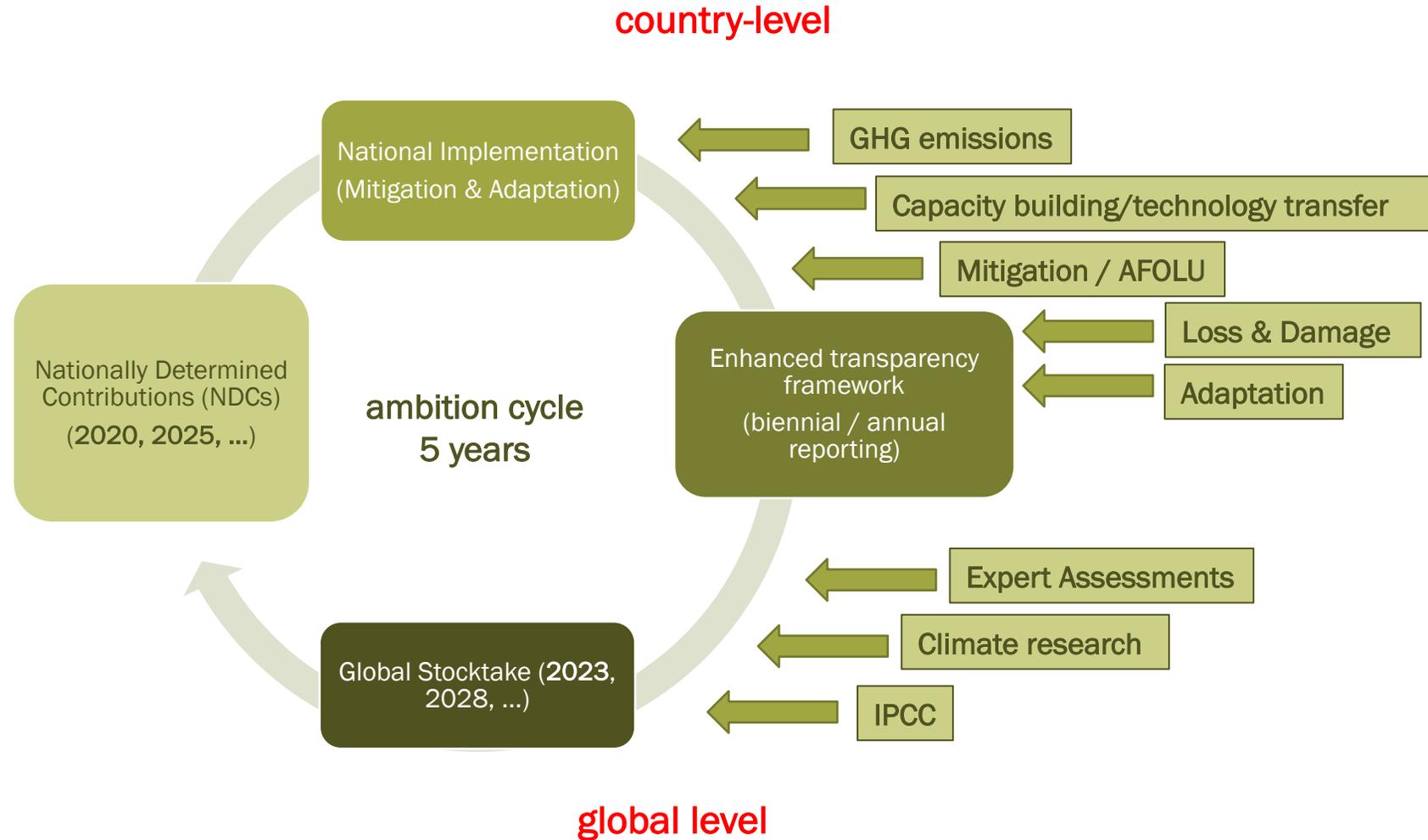


*GEO, Report of the PA Subgroup, 2018*

# Continuous Improvement cycle (ambition or ratcheting-up mechanism) under the PA



# PA points of action for EO



Potential of  
EO  
contribution  
to PA

Paris Agreement highlights in a request to the Parties to “... *strengthen scientific knowledge on climate, including research, **systematic observation of the climate system** and early warning systems, in a manner that informs climate services and supports decision-making*” (Article 7.7c).

However, it falls short to tell us how this needs to happen in practice!



Potential of  
EO  
contribution  
to PA

Paris Agreement highlights in a request to the Parties to “... *strengthen scientific knowledge on climate, including research, systematic observation of the climate system and early warning systems, in a manner that informs climate services and supports decision-making*” (Article 7.7c).

However, it falls short to tell us how this needs to happen in practice!

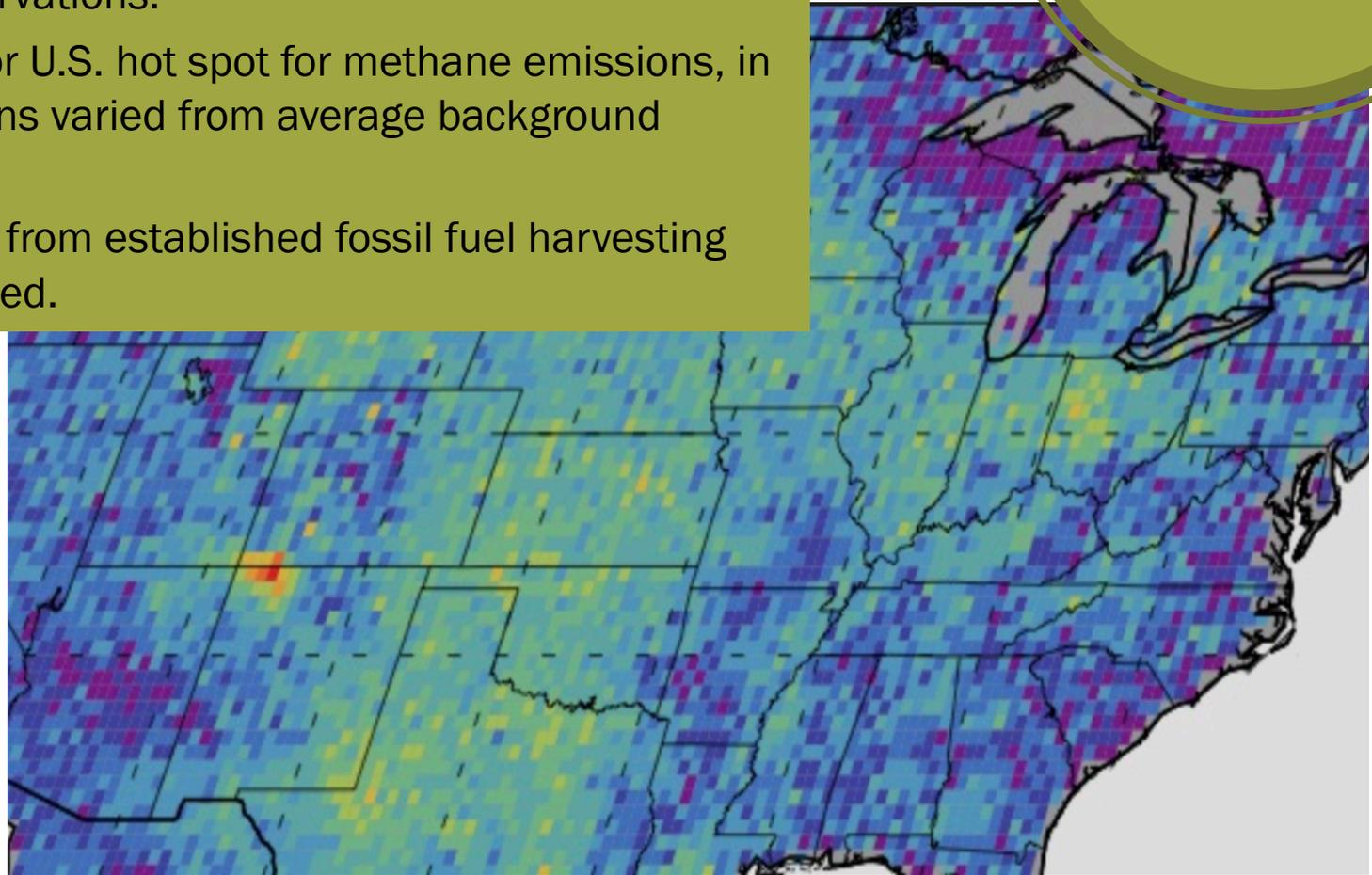


**Mitigation – Quantify GHG emissions and AFOLU (NDC reporting and verification)  
(also capacity building and knowledge transfer)**

*Kort, et al., 2014. Four corners: The largest US methane anomaly viewed from space. Geophysical Research Letters, 41(19), pp.6898-6903.*

- Derived from ESA's SCIAMACHY observations.
- The Four Corners area (red) is a major U.S. hot spot for methane emissions, in this map showing how much emissions varied from average background concentrations from 2003-2009.
- Results are indicative that emissions from established fossil fuel harvesting techniques are greater than inventoried.

Potential of  
EO  
contribution  
to PA



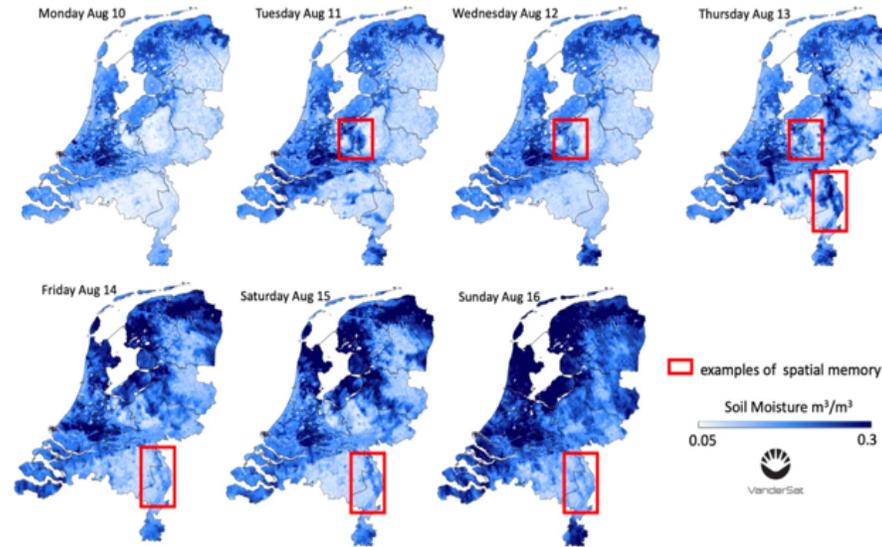
**Adaptation** – assess vulnerability and resilience to climate change (which drives adaptation needs)

- Using indicators of changes in base climate that affect
  - economic sectors such as forestry, fisheries, and snow tourism
  - energy sector (hydro, wind, solar production)
  - biodiversity (weakening resilience to climate extremes)
- Identifying changes in resources such as water availability and soil fertility
- Quantifying sea-level rise (coastal flooding and erosion)

Potential of  
EO  
contribution  
to PA

**Loss and Damage** – assess climate change impacts (links to insurance costs)

- Extreme events – heavy precipitation & flooding, heat waves, droughts, and forest fires



copyright @ flickr

ESA CCI soil moisture, <https://vandersat.com/data/>

How can  
you get  
involved  
and  
contribute?

- Engage in today's BOG and help answering the three questions for your research area!
- Contribute / collaborate on case studies to be showcased at the Earth Day in November and COP26
- Be part of extended discussions on the topic in a dedicated ESA CCI science-leader workshop in October
- Participate in writing a white paper on how EO can support the Paris Agreement
- *Stay tuned!*

### Timeline ESA EO for PA study

