Earth Observations

in support of the UNFCCC Paris Agreement
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.
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

Outreach / public engagement, education, and training (Article 12)
**Continuous Improvement cycle (ambition or ratcheting-up mechanism) under the PA**

- **The PA ambition cycle**
  - **PLAN** set out promised actions
  - **IMPLEMENTATION** turn promises into action
  - **REVIEW** put in place to build mutual trust and confidence in the process as well as to promote its effective implementation

- National Implementation (Mitigation & Adaptation)
- Enhanced transparency framework (biennial/annual reporting)
- Ambition cycle 5 years
- Nationally Determined Contributions (NDCs) (2020, 2025, ...)
- Global Stocktake (2023, 2028, ...)

The primary mechanism through which Parties touch base on collective progress on a regular basis.
PA points of action for EO

- National Implementation (Mitigation & Adaptation)
- Enhanced transparency framework (biennial / annual reporting)
- Global Stocktake (2023, 2028, ...)

ambition cycle 5 years

country-level
- GHG emissions
- Capacity building/technology transfer
- Mitigation / AFOLU
- Loss & Damage
- Adaptation
- Expert Assessments
- Climate research
- IPCC

global level

Nationally Determined Contributions (NDCs) (2020, 2025, ...)

IPCC

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


- 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.
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)

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

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

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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

- **2020**
  - May: Review ongoing work (4 months)
  - Jul: Build a network of experts (4 months)
  - Sep: Establish portfolio of Case Studies (4 months)
  - Oct: Define R&D agenda (4 months)

- **2021**
  - Feb: White paper (28 Feb)

**Events:**
- Expert meeting
- Earth Information Day