EO for Monitoring, Reporting, and Verification of Carbon Removals

Copenhagen, 8-11 October 2024

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DAY 3: Second Forum on EO for Carbon Markets Breakout Groups

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Breakout Group 1 - Enhancing Earth Observation Monitoring Capabilities

Chairs: Nathalie Morin (Geoville) and Michelle Hermes (EARSC)

This session will delve into advanced monitoring techniques and various data sources to track and verify carbon activities. We will explore different methodologies and tools that can contribute to enhanced accuracy and efficiency of monitoring. The session will include presentations and Q&A sessions with stakeholders, followed by an interactive discussion format to gather best practices and address remaining challenges from breakout group participants.

Breakout Group 1 - Enhancing Earth Observation Monitoring Capabilities

Detailed Agenda

1. Introduction by Michelle Hermes, EARSC

~~2. New EU-ETS2 focusing on the requirements from policy side for emission monitoring by François Schmitt, DG CLIMA~~

3. Towards an Operational EO-integrated LULUCF and Carbon Removal MRV Service at Pan-European level by Nathalie Morin, GeoVille (Austria)

4. MARVIC project - MRV system for carbon removals in European agriculture by Eric Ceschia, Irstea (France)

5. ESA SCORE project - EO-based carbon rating system by Federica D'Acunto, Up to Earth (Germany)

6. EO for carbon rating by Johannes Hansen, Sylvera (UK)

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Questions addressed:

1. How can EO-based data and methodologies can be leveraged to comply with the TACCC principles of Transparency, Accuracy, Completeness, Consistency and Comparability in support to monitoring and verification of carbon removals?

2. What are the main challenges to address for the operationalization and standardization of an EO-based MRV system of carbon removals in Europe?

3. What are the user requirements for an EO-based carbon removal MRV system?

4. How can we bridge the gap between the different stakeholders (policymakers, researchers, service providers, financial institutions, carbon rating agencies, farmers,…) across the entire carbon market value chain?

~~***5. Who will set the standards taken as a baseline for the subsidies of the new ETS based on LULUCF ?***~~

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1. ***How can EO-based data and methodologies can be leveraged to comply with the TACCC principles of Transparency, Accuracy, Completeness, Consistency and Comparability in support to monitoring and verification of carbon removals?***

- Focus of discussion more on **TRANSPARENCY** and **ACCURACY** of EO data and derived information products
- **Lack of transparency of AI Deep Learning methods** compared to Machine Learning which enables more control over model parameters or other traditional statistical approaches
- **Good input expert data** is required for training of the models => *"rubbish in is rubbish out"*
- Key message of the **lack of in-situ national forest inventory (NFI) data** made publicly accessible in most EU Member States guarant of scientific robustness of the Above-Ground-Biomass (AGB) models and carbon removal estimates
- Need for more information on the **accuracy of both mapping products and training data** to avoid cumulative bias
- What is the **cost effectiveness** of remote sensing AI algorithms, computing time?
- Use of multiple scale data: satellite, airborne, terrestrial laser scanning, field sample plots for different purposes.
- Best practice examples of EO-Enhanced NFI combining the different data sources.

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2. What are the main challenges to address for the operationalization and standardization of an EO-based MRV system of carbon removals in Europe?

- **Lack of in-situ NFI data**
- Need for **Activity Data at a local scale** (farm or plot level) for carbon farming
- **What needs to be standardized?**
- Need for more **accuracy** and **uncertainty** assessment, **validation**
- **Different scales and aims of the compliance market (national inventory compilers) and voluntary private carbon market**
- Need to harmonize the MRV approach and decision-tree in answer to the end users
  => hence the **importance of user engagement**
- **Who are actually the end-users** of an EO-based carbon removal MRV system??
  - **EC DG CLIMA, etc.**: independent proxy tool for verification of MS GHG LULUCF NIR at pan-European level
  - **Countries**: EO-enhancement of the inventory method at national scale by integrating geospatially explicit data and Copernicus data products in compliance with the new revision of the LULUCF regulation (2023)
  - **Farmers, carbon certification agencies** for carbon rating at local scale?
- Can the **methodological approaches** be **shared for the compliance and voluntary carbon markets**?
- How to deal with constant change in technologies and ecosystems by setting some standards

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3. 5. What are the user requirements for an EO-based carbon removal MRV system?

- Before setting-up an MRV framework, we need to define:
  - **Who is the user ?**
  - **What is required?**
- Highlight which of these technical specifications are according the **requirements from the Carbon Removal Certification Framework (CRCF)**
- The EO community tends to focus on **Monitoring**
- Introduce the **Verification** component in our pipeline in compliance with the CRCF FWC
- Idea of **a country workshop to gather the user requirements and technical specifications** for an EO-based carbon removal MRV system at pan-European level
  - Define a **list of variables** needed by the user and the ones which the EO community can fulfill and identify the gaps
  - Table of parameters: data, spatial and temporal resolution, consistency, quality, KPIs,…
- Key measurements of AGB & SOC stock changes
- **Need for a better overview of the current state-of-the-art on the use of EO in countries** (e.g. CLC, CLCplus, other Copernicus products, satellite data processing, etc.)

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4. How can we bridge the gap between the different stakeholders (policymakers, researchers, service providers, financial institutions, carbon rating agencies, farmers,…) across the entire carbon market value chain?

- **Chaotic** situation
- **Fast-growing** blooming field of **carbon market => many remaining open questions…!**
- Challenge of gathering 3 different communities in a single event: national inventory compilers, remote sensing community and stakeholders from the private carbon market