EO for UNFCCC Paris

Breakout 3d: Use of EO in building resilience and adapting to climate change

e.g. monitoring/understanding heatwaves, wildfires, and droughts; desertification; flooding; sea-level rise; sea state extreme/surge events, etc.

Facilitation: Darren Ghent, Reporting: Stefan Simis

40 minutes

Questions:

1. Identify case studies based on **existing** work that illustrate how EO can already support the Paris agreement.

2. Are there R&D case studies that may in the next 5-10 years lead to new types of actionable information supporting Paris Agreement goals?

3. How can the CCI community contribute to the first Global Stocktake in 2023? (i.e., ideas for projects in CCI+ Phase 2)

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1. Identify case studies based on **existing** work that illustrate how EO can already support the Paris agreement.

- **Soil moisture vs biodiversity** (example from plenary)
- (Terrestrial) adaptation to **climate extremes**
  - High-res EO for **urban planning**, greening cities in relation to heatwaves, climate extremes (Darren G.)
  - early **drought, flood, fire alerts** and index-based **insurance** (Germany, link, Carsten B, using 132 indicators.. *e.g. green roofs*)
  - Floods and vulnerability to water-borne diseases. (Shuhba S)
- GEO(GLAM) technical guidance on integration of EO into national adaptation strategies (Sara V) link
  - stabilising market response
  - crop monitoring, real-time response in food insecure regions
- Forecast-based **financing** and **food security**, NRT-EO supporting irrigation schemes, plant disease advisories and climate risk scoring for improved (agricultural) **loan assessment** (Mendy vd V)
- **Water use** (e.g. irrigation efficiency) (Wouter D)
- Stresses on **coastal zones**, e.g. thermal stresses on coral reefs (Chris M)
- **Biomass** (Richard L) – **land cover and mangrove** mapping (national and global scales)
- Copernicus (C3S, CAMS, CEMS) products on forest fire monitoring, trends, emissions. **Reanalysis products** to deal with complexity link
- Marine **Primary Productivity**, fisheries variability vs phytoplankton phenology (Shubha S)

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2. Are there R&D case studies that may in the next 5-10 years lead to new types of actionable information supporting Paris Agreement goals?

- **River** flows (Carlo B)
- **Land cover / change** maps to provide options for mitigation & adaptation (Richard L, example Wales link)
- ESA **Urban TEP** activities remain to be exploited for climate studies (Carsten B)

- Estimating **groundwater variations** from C3S data streams (H2020 G3P, Wouter D)
- **Agriculture** – assess vulnerability and resilience to climate change - crop stresses, yields and losses can use multiple ECVs in a case study: Land cover, biomass, LST, soil moisture, fire (Darren G) + lake responses (Stefan S) + tropospheric ozone (Angela) + aerosols

- **Multiple stressors** to coral reefs and **coastal ecosystems** in general (Chris M)
- EO in support of sustainable, **ecosystem-based fisheries management**. Freshwater, coastal and ocean (Shubha S)

- Lake level change combining pressure information from abstraction - direct and upstream (Link SDG6.1, Gary F.)
- Sea Ice / Sea Level, ice sheets change of primary importance to coastal area adaptation -> R&D needed.

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3. How can the CCI community contribute to the first Global Stocktake in 2023?

Engaging and informing stakeholders
- Aggregate information and information on the outcomes (rather than single case studies) on adaptation and mitigation.
- Equivalent of weather mapping/forecasting as a longer term vision

R&D needs (i.e., ideas for projects in CCI+ Phase 2):
- Multidisciplinary R&D topics:
  - Coastal ecosystems
  - Biomass with sea level, fire, soil moisture
  - Regional water cycles, whole cycle (incl. river flows, soil moisture, inland and coastal waterbodies)
  - Urban areas (adaptation - greening, heat waves, pollution) - local scales, higher resolution. (Defined action in GCOS-222)
- Higher-level goals:
  - Integrative assessments
  - Change mapping

Expanding (EO) capabilities
- **Metrics** for Global Stocktake (particularly adaptation) still poorly defined; need to identify gaps (Joanna P)
- **Higher spatial resolution**, investigating urban areas and anthropogenic pressures, adaptation measures in urban areas, agriculture, again include coastal areas
- **Filling gaps** in essential ocean variables: to reach required density/accuracy for detection of change (currents, surface heat fluxes, oxygen, inorganic carbon, subsurface salinity, phytoplankton biomass and diversity)