EO Support to UNFCCC Paris Agreement

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CCI Colocation, St Hugh's College, Oxford, 27 March 2019
UNFCCC Paris Agreement (2015)

• Entered into force on 4 Nov 2016
• Will drive climate policy for the next 2 decades at least

The Paris Agreement defines three major aims:

• **Mitigation**: limiting the temperature increase to well below 2.0°C and targeting 1.5°C above pre-industrial levels, by reducing the net emission of anthropogenic GHGs to the atmosphere.

• **Adaptation**: increasing resilience to the adverse effects of climate change.

• **Finance**: making finance flows consistent with a pathway towards low greenhouse gas emissions and climate resilient development.
The bottom-up, pledge and review, architecture is more important than where EO is mentioned in the Agreement.
The ambition cycle

**Action**
(Mitigation, Adaptation, Finance)

**Means of Implementation**

- Enhanced transparency framework
  - 2024 (+every 2 years)
  - (LDCs & SIDS)

**Indicators for Mitigation Adaptation**

- NDCs
  - 2020, 2025, 2030...
- Adaptation communication

**Global Stocktake**
2023, 2028, 2033...

**AMBIATION**
progressive strengthening

Transparency to build trust and confidence:

- GHG Inventory
- Progress on NDCs
- Support provided
- Support needed and received
- Adaptation
- L&D

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GCOS Requirements

• **GCOS Implementation Plan** (GCOS-200, 2016) defines a new ECV: *Anthropogenic greenhouse-gas fluxes*, *i.e.* emissions and removals from all managed-land, fossil-fuel, industrial, waste-treatment and agricultural sources.

• **GCOS: Systematic Observations and the Paris Agreement** (GCOS-222, 2018): Adaptation, GHG emissions & C-cycle, Sinks and REDD+, L&D, Global Stocktake, Capacity Building, Transparency Framework, ...
Example Response to Paris on GHGs (EC)


Considered building an "independent operational GHG emission monitoring and verification support capacity" based on a combination of modelling, space-borne observations, and ground-based monitoring networks.

- Reduce uncertainties in national inventories
- Identify further opportunities for GHG emission reduction
- Track changes in the natural carbon-cycle
Figure 12. Schematic overview of a fossil fuel emission inversion system showing the various required model blocks as well as the potential observations that can be used to constrain the system.
### GCOS Requirements

#### Closing the carbon budget

| Targets | Quantify fluxes of carbon-related greenhouse gases to +/- 10% on annual timescales.  

Quantify changes in carbon stocks to +/- 10% on decadal timescales in the ocean and on land, and to +/- 2.5 % in the atmosphere on annual timescales. |
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<tbody>
<tr>
<td>Who</td>
<td>Operators of GCOS-related systems, including data centres</td>
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<tr>
<td>Time frame</td>
<td>Ongoing</td>
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<tr>
<td>Performance indicator</td>
<td>Regular assessment of uncertainties in estimated fluxes and inventories</td>
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Closing the global water cycle

**Targets**
Close water cycle globally within 5% on annual timescales

**Who**
Operators of GCOS-related systems, including data centres

**Time frame**
Ongoing

**Performance indicator**
Regular assessment of the uncertainties in estimated turbulent flux of latent heat
**GCOS Requirements**

**Closing the global energy balance**

<table>
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<th>Targets</th>
<th>Balance energy budget to within 0.1 Wm(^{-2}) on annual timescales</th>
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<td>Regular assessment of imbalance in estimated global energy budget</td>
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Diagram:
- **Energy**: Radiation Budgets, Temperature, Wind speed & direction
- **Albedo, Latent and Sensible Heat fluxes, Land Surface Temperature**
- **Ocean Surface Heat Flux, Sea Surface & Subsurface Temperature,**

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Energy
Radiation Budgets, Temperature Wind speed & direction
Albedo, Latent and Sensible Heat fluxes, Land Surface Temperature

Carbon
Carbon Dioxide, Methane, Soil Carbon, Above-ground Biomass, Fire, GHG Fluxes

Water
Sea Surface & Subsurface Salinity, Sea Level, Sea Surface Temperature

Soil Moisture, Runoff, Evaporation, Lakes, Groundwater, Cryosphere, Water ice

Biosphere

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