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.*

Paris Agreement | Structure

Art 2. **Purpose**
Mitigation – Adaptation – Finance flows

Art 3. Progression over time
All Parties to take and communicate efforts towards purpose

Art 5
Sinks

Art 6
Mechanisms

Article 7.7 on adaptation
"Parties should strengthen scientific knowledge on climate change, including research, systematic observation of the climate system and early warning systems, in a manner that informs climate services and supports decision making"

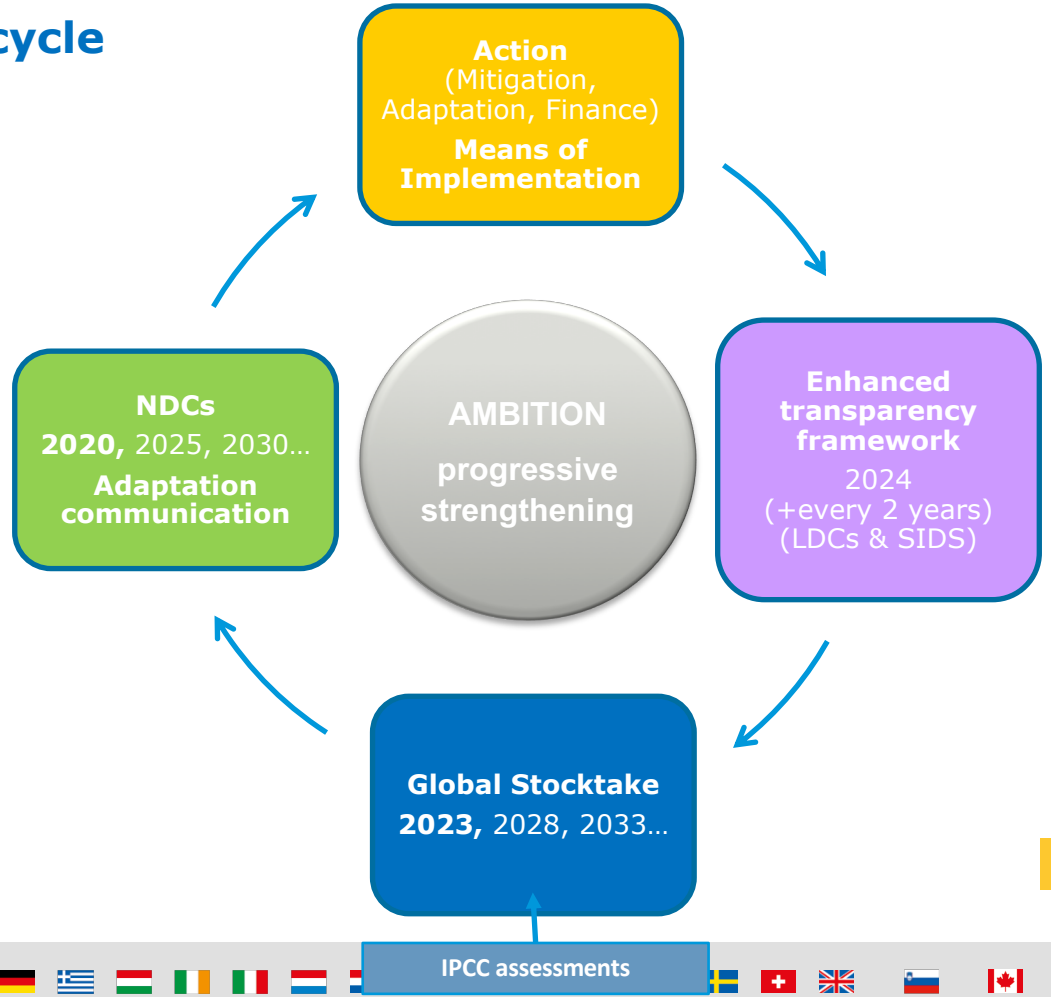
Informs action and support

Art 14
Stocktake every 5 years of collective progress towards purpose and long-term goals

Slide credit: J. Post, UNFCCC

The bottom-up, pledge and review, architecture is more important than where EO is mentioned in the Agreement

The ambition cycle



Indicators for Mitigation Adaptation

Transparency to build trust and confidence:

GHG Inventory

Progress on NDCs

Support provided

Support needed and received

Adaptation

L&D

Slide credit: J. Post, UNFCCC

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)

B. Pinty et al., 2017: **An Operational Anthropogenic CO_2 Emissions Monitoring & Verification Support Capacity** – Baseline Requirements, Model Components and Functional Architecture – Report from the CO_2 Monitoring Task Force - sub-task B

*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*

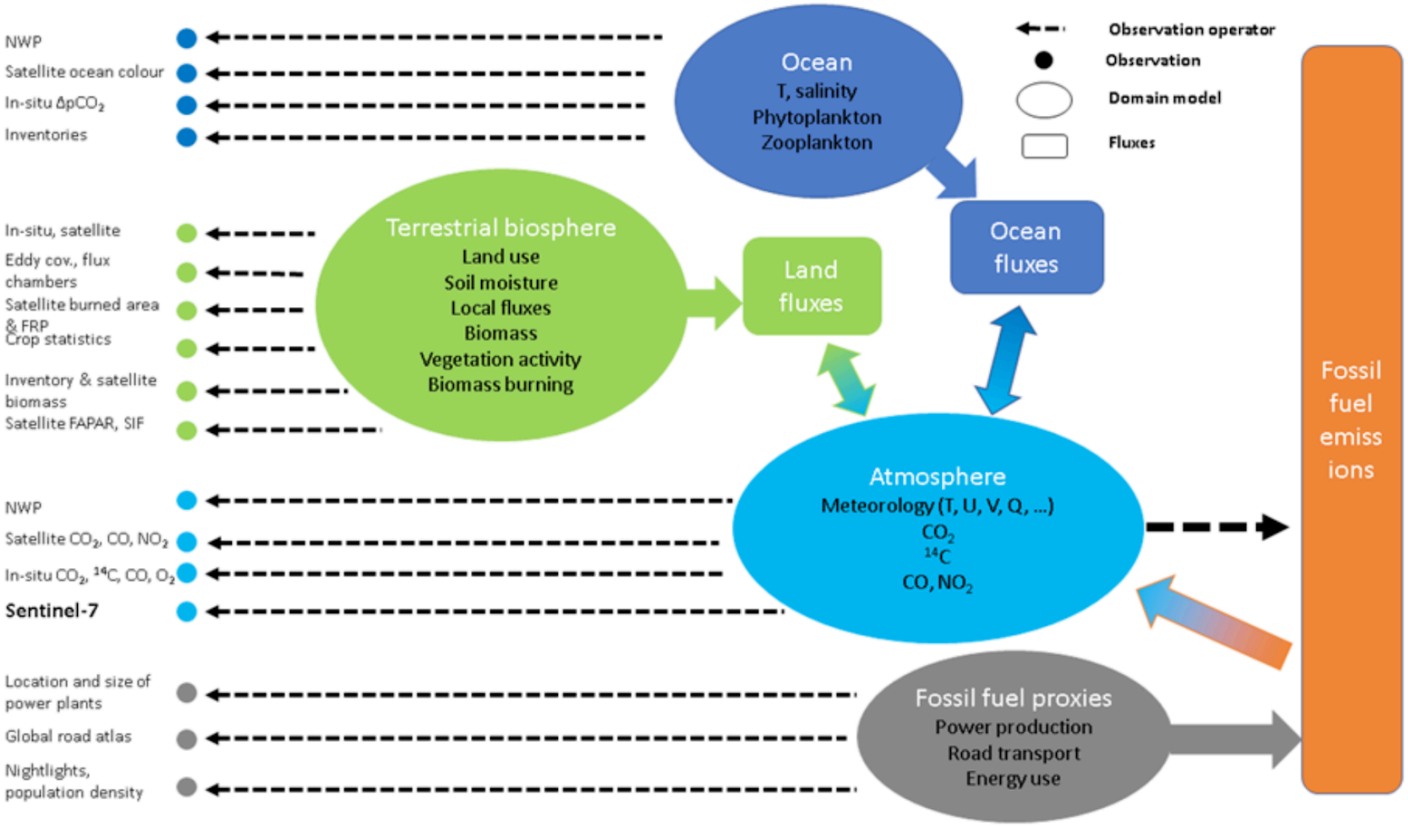
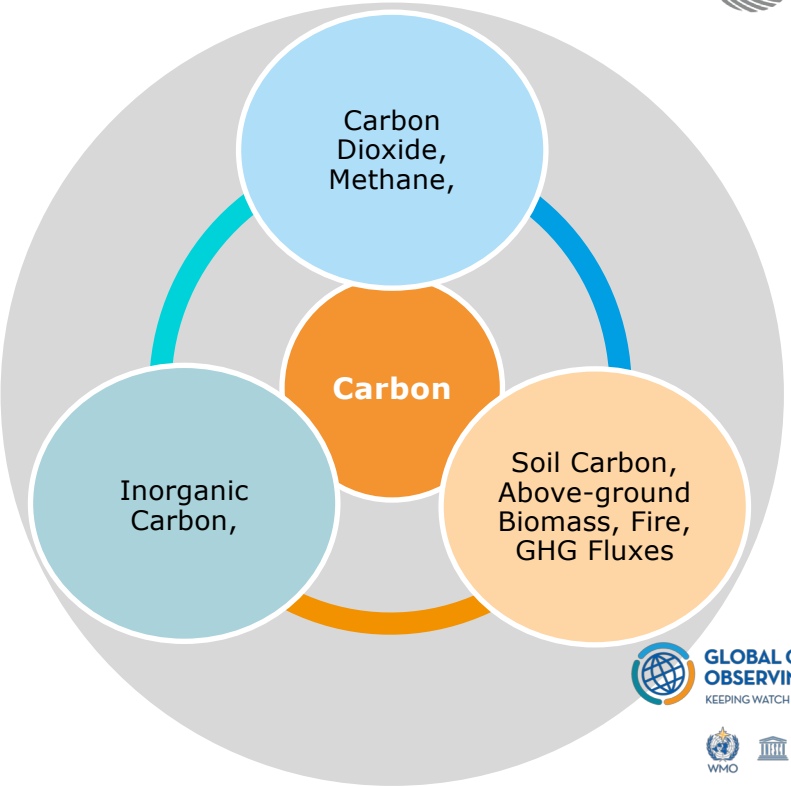


Figure 12. *Schematic overview of a fossil fuel emission inversion system showing the various required model blocks as well as the potential observations that can be used to constrain the system.*

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.
Who	Operators of GCOS-related systems, including data centres
Time frame	Ongoing
Performance indicator	Regular assessment of uncertainties in estimated fluxes and inventories

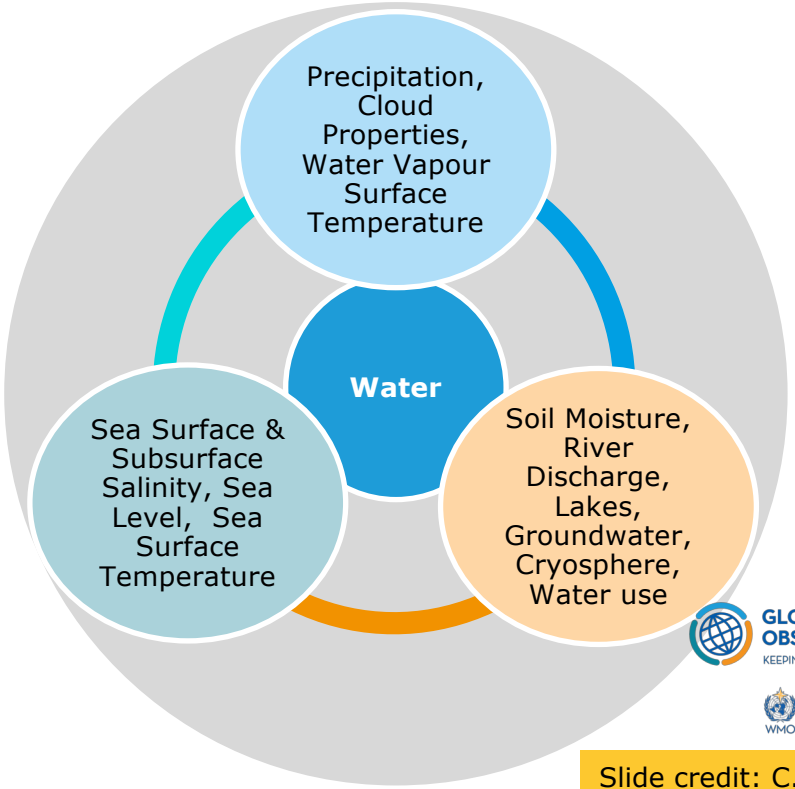


GLOBAL CLIMATE OBSERVING SYSTEM
KEEPING WATCH OVER OUR CLIMATE

Slide credit: C. Richter, GCOS

GCOS Requirements

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



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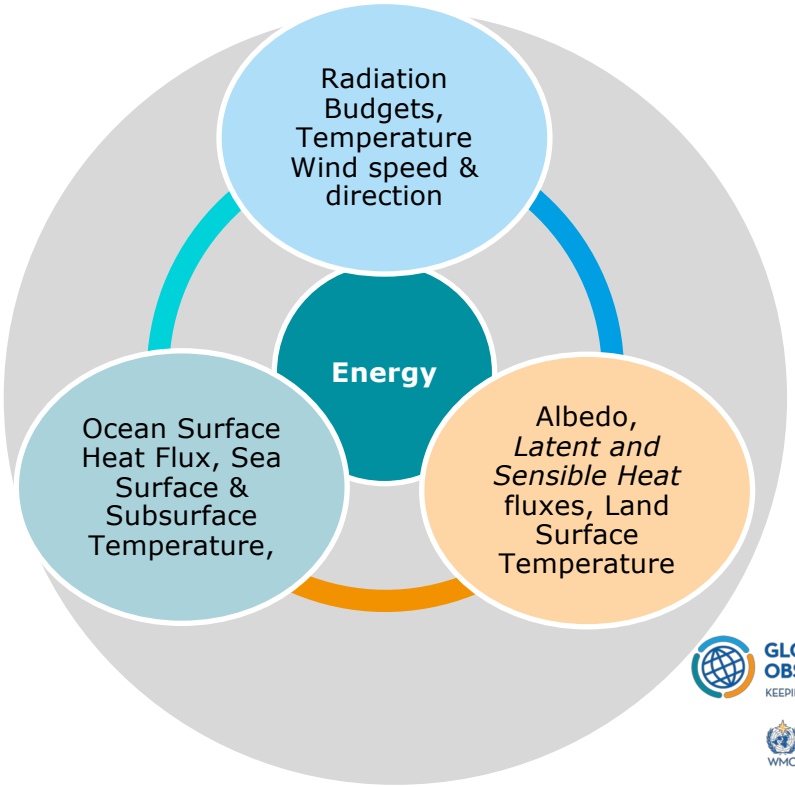
GCOS Requirements

Closing the global energy balance	
Targets	Balance energy budget to within 0.1 Wm^{-2} on annual timescales
Who	Operators of GCOS-related systems, including data centres
Time frame	Ongoing
Performance indicator	Regular assessment of imbalance in estimated global energy budget



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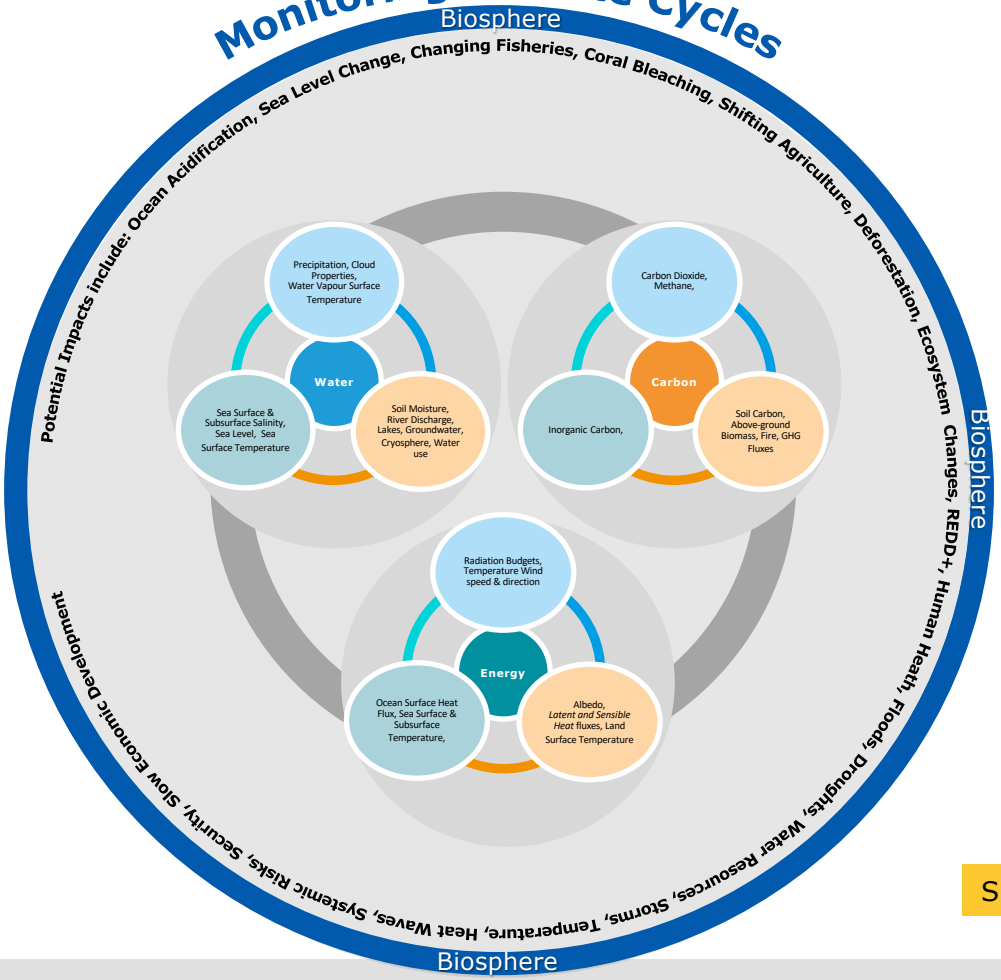
Monitoring Climate Cycles



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