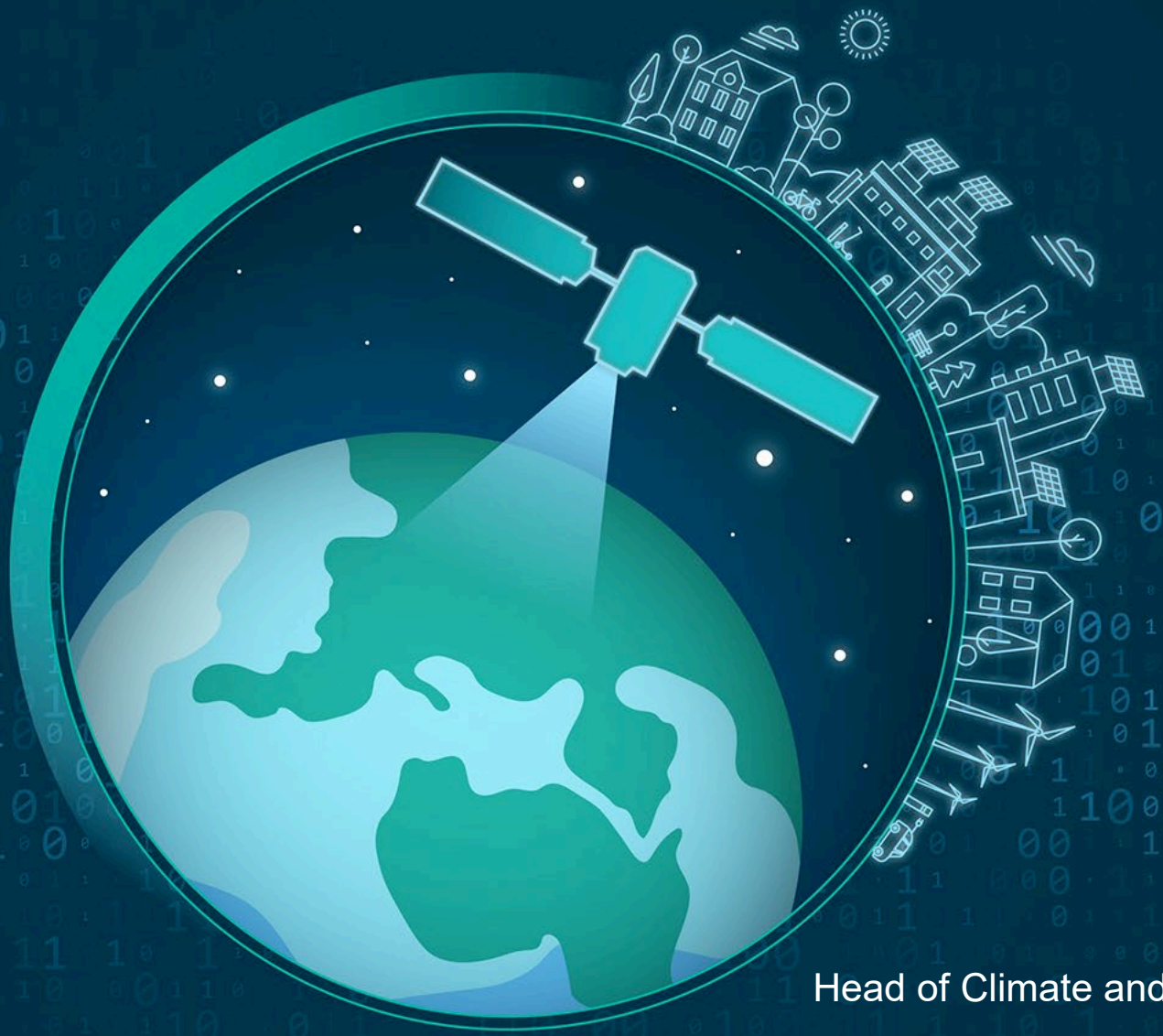
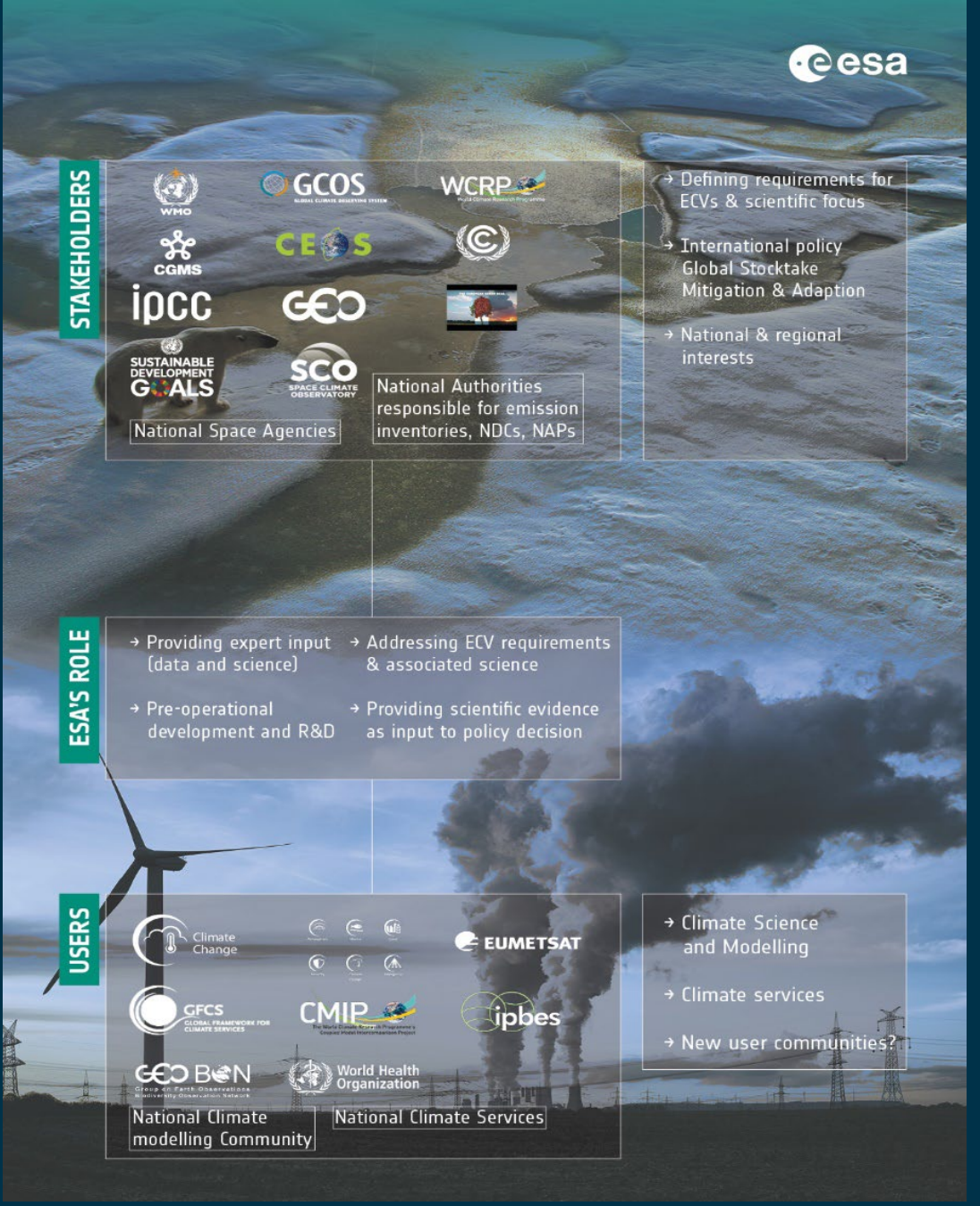


Susanne Mecklenburg
European Space Agency
Head of Climate and Long-Term Action Division

CLIMATE SPACE

The International Climate Network

→ THE EUROPEAN SPACE AGENCY



The International Climate Network

Policy drivers for Earth & Climate Action

- GCOS & WCRP requirements
- UNFCCC Paris Agreement
- 2030 Agenda for Sustainable Development
- Sendai Framework for Disaster Risk Reduction 2015–2030
- EU's Green Deal
- IPCC Assessments
- New users: tipping points, biodiversity & ecosystems, health

Focus on

Collaboration & Complementarity & Synergy

ESA's unique role for Climate and Earth Action

- A **provider** of trusted data, science, information, methodologies and technology to enable action by climate and environmental decision-makers.
- An **enabler** of Earth Action through focused research and development efforts, leveraging digital technology.
- A **catalyst** for New Space and commercial solutions within this realm.
- A **translator and capacity builder**, educating users within and beyond the space domain.

MANDATED at HIGHEST POLITICAL LEVEL

ESA/C-M/CCCII/Res.1 (Draft)

COUNCIL RESOLUTION on

Accelerating the Use of Space in Europe
("The Matosinhos Manifesto")

(adopted on 19 November 2021 in Matosinhos, Portugal)

The Council, meeting at ministerial level,

CONVINCED that in times of unprecedented challenges facing Europe and the world at large, it is the moment to contribute with bold, shared ambitions to solutions enabled by space, a sector that is ever more indispensable for our common future,

HAVING REGARD to the ESA Director General's 'Agenda 2025' (ESA/C(2021)51) as a vision for Europe to maintain and expand its excellence in space, for the benefit of everyone on Earth and in Europe in particular,

HAVING REGARD to the Report of the High-Level Advisory Group on Accelerating the Use of Space in Europe (ESA/C(2021)147) and in particular the recommendation contained therein to embark on a new 'Accelerator' approach in selected areas of urgency and societal relevance,

HAVING REGARD to the Convention for the establishment of a European Space Agency (hereinafter 'the ESA Convention') which entered into force on 30 October 1980, and RECALLING the purpose of ESA established in Article II thereof,

HAVING REGARD to the Resolutions adopted by Council, meeting at ministerial level in Luzern in 2016 (ESA/C-M/CCLXIV/Res.1 (Final)), in Madrid in 2018 (ESA/C-M/CCLXXVI/Res.1 (Final)) and in Sevilla in 2019 (ESA/C-M/CCLXXXVI/Res.1 (Final)), RECALLING in particular that ESA Member States shall continue to act, notably within the framework of the ESA Convention, across all space domains,

HAVING REGARD to the Framework Agreement between the European Community and the European Space Agency which entered into force on 28 May 2004 (ESA/LEG/279), as well as the successful conclusion and entry into force of the Financial Framework Partnership Agreement between the European Commission, representing the European Union, the European Union Agency for the Space Programme and the European Space Agency (ESA/LEG/518) as the basis of a reinforced reciprocal relationship, RECALLING in particular Article 26 thereof, together with the 'Agenda 2025' priority of strengthening the relations between ESA and the European Union,

Continued Support at Space Summit 2022

ESA/C-M(2023)2
Paris, 31 October 2023
(Original: English)

EUROPEAN SPACE AGENCY

SPACE SUMMIT 2023

ESA Council meeting at ministerial level

The Director General's Proposal on

Lifting Europe's Ambitions for a Green and Sustainable Future, Access to Space and Space Exploration

Summary

This document contains the Director Generals' Proposal "Lifting Europe's Ambitions for a Green and Sustainable Future, Access to Space and Space Exploration".

It constitutes the reference document to the draft Resolution "Draft Resolution on Lifting Europe's Ambitions for a Green and Sustainable Future, Access to Space and Space Exploration" contained in document ESA/C-M(2023)1.

The Director General's Proposal elaborates on ESA's proposals to the Ministers on driving space for our green future, subdivided into space for climate action, green transformation and reducing the impacts of crises on Earth, as well as a sustainable space sector and sustainability in space. The Director General's Proposal furthermore contains new perspectives for ESA driving European space ambitions and modernising the implementation of its programmes subdivided into guaranteeing Europe's access to space and new ambitions and next steps for space exploration.

It is intended to release this Director General's Proposal to the pubic, subject to acceptance by Council to be sought at the occasion of the adoption of the draft Resolution on Lifting Europe's Ambitions for a Green and Sustainable Future, Access to Space and Space Exploration, planned on 6 November 2023.

Required action

Delegations are invited to take note of the Director General's Proposal as reference document for the Draft Resolution.

Space Summit 2023

esa

- Green & sustainable future
- Autonomous/guaranteed access to space
- Human exploration beyond LEO

Space bends the Curve

The Space for a Green Future Accelerator is a **co-governed & independent non-profit partnership of Green Transition actors united under a common banner**, engaging governments, businesses, multilateral institutions, civil society groups, end users and citizens to develop practical space-based solutions supporting Carbon Neutrality and greening of society by 2050. We partner with stakeholders and users, aggregate the priorities of Green Transition sectors and seed solutions that address the real needs. We accelerate the use of space by **mobilizing resources and scaling solutions** to full sectorial and global levels.

Accelerator Concept of Action

S4GF Accelerator

Partners set common goals and provide building blocks
Policy & regulatory instruments / Innovation & financing programmes / Infrastructures, systems, data & services

PATHFINDER

Identify new use cases

- Partners identify areas of mutual interest based on policy priorities and user needs for Green Transition and Climate Action
- Partners establish joint roadmaps for the development of new impactful solutions

SEED

Develop and demonstrate new solutions

- Partners contribute to the development of new space solutions up to operational demonstration
- Partners facilitate and encourage cooperation between space and users

SCALE

Increase the impact of proven solutions

- Partners contribute to boost the potential and scope of proven space solutions
- Partners create or support new market opportunities for commercial solutions

Opportunities for space and user sectors
to cooperate and develop new solutions fit for global challenges

Interaction with DG-CLIMA

- EC and ESA joint initiative on Space for Climate Action signed in autumn 2023
- Workshops focussing on thematic areas
    - Global emission reporting and Solar Radiation Modification
    - Decarbonization, cities and transport
    - Adaptation mission
    - LULUCF, carbon removal and forestry
- Tangible collaborations being discussed
- Secondee - Christian Retscher - starting in May

The CMIP International Project Office

- Coupled Model Intercomparison Project (CMIP) has expanded to a point where coordination of its elements requires dedicated secretariat support.
- Focal point for leading national and international entities in climate modelling
  - Emphasises role of EO datasets for model evaluation
  - Brings EO and modelling communities closer
- Main contributor to climate prediction and projection in IPCC
- ESA's Climate Office hosts the CMIP-IPO since March 2022
- IPO team consists of:
  - Director (Eleanor O'Rourke)
  - Programme Manager (Briony Turner)
  - Science & Communications Officer (Beth Dingley)
  - Technical Officer/Software Engineer (Daniel Ellis)
  - Team support (Alice Kolesnikov)

HE SPACE it's all about people esa CMIP

Staff from HE Space Operations under contract to ESA

The *GOLD STANDARD* of state of climate assessments

IPCC SYNTHESIS REPORT

Release date: 20 March 2023

Re-emphasise the call for action in terms of taking measures for adaptation and mitigation and identifies opportunities for both.

The report warns that

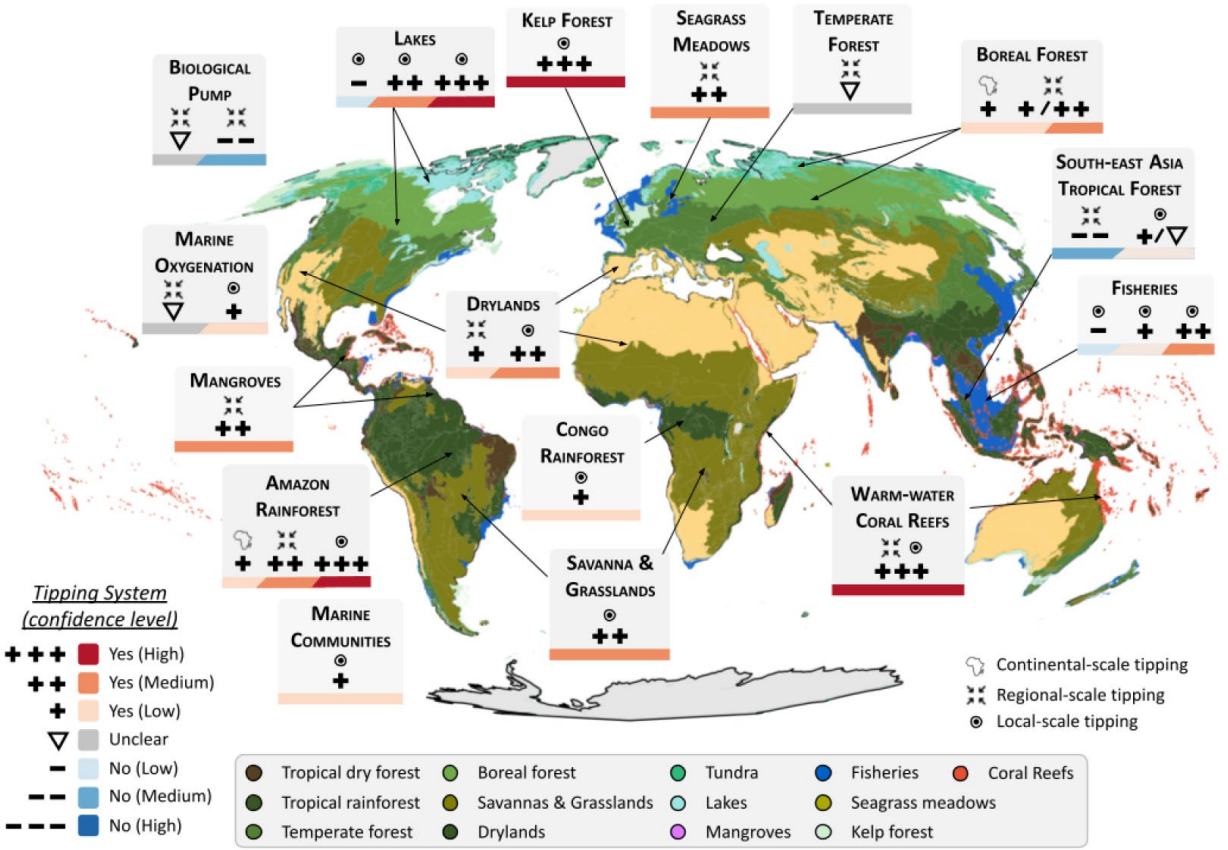
- *"Currently insufficient action to limit warming to even 2deg C"*
- *"Global GHG emissions must half by 2030, to stay below 1.5"*
- *"For any given future warming level, many climate-related risks are higher than assessed in AR5 and projected long-term impacts are up to multiple times higher than currently observed (high confidence)"*
- *"Some future changes are unavoidable and/or irreversible but can be limited by deep, rapid and sustained global greenhouse gas emissions reduction."*

Note: Increased use of satellite data and new methodology in AR6

Use of EO for Tipping Points

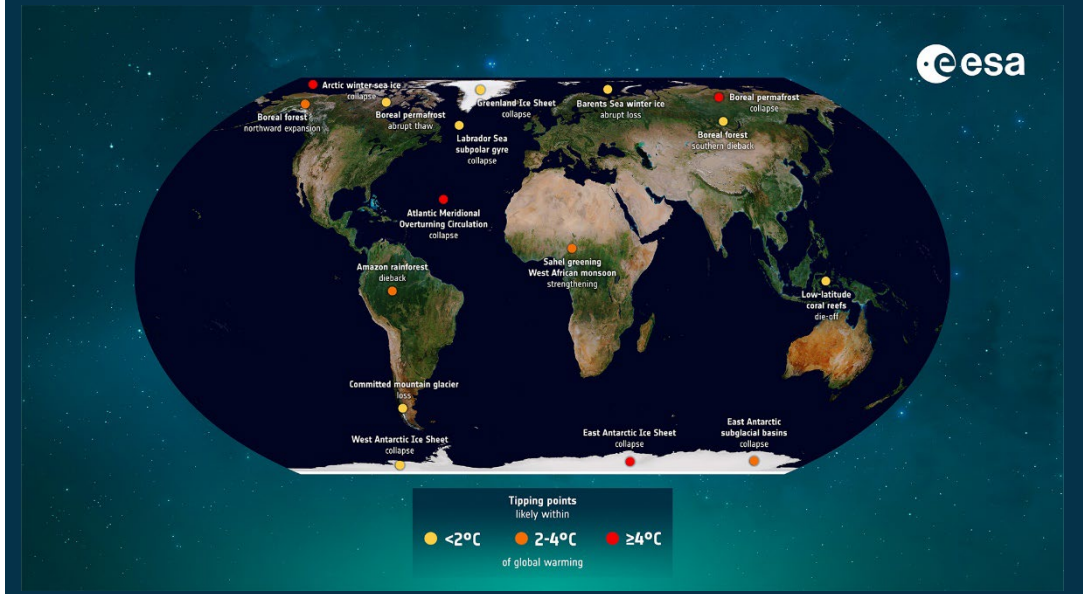
1.3.2 Current state of knowledge on tipping points in the biosphere

In this section we assess available scientific literature relating to tipping points in the Biosphere, as summarised in Figure 1.3.1 and Table 1.3.1. We focus on the following biomes: forests, savannas, drylands, lakes, coastal ecosystems and marine environments.



Open call out – deadline 17 May

Research focus but impact assessment planned



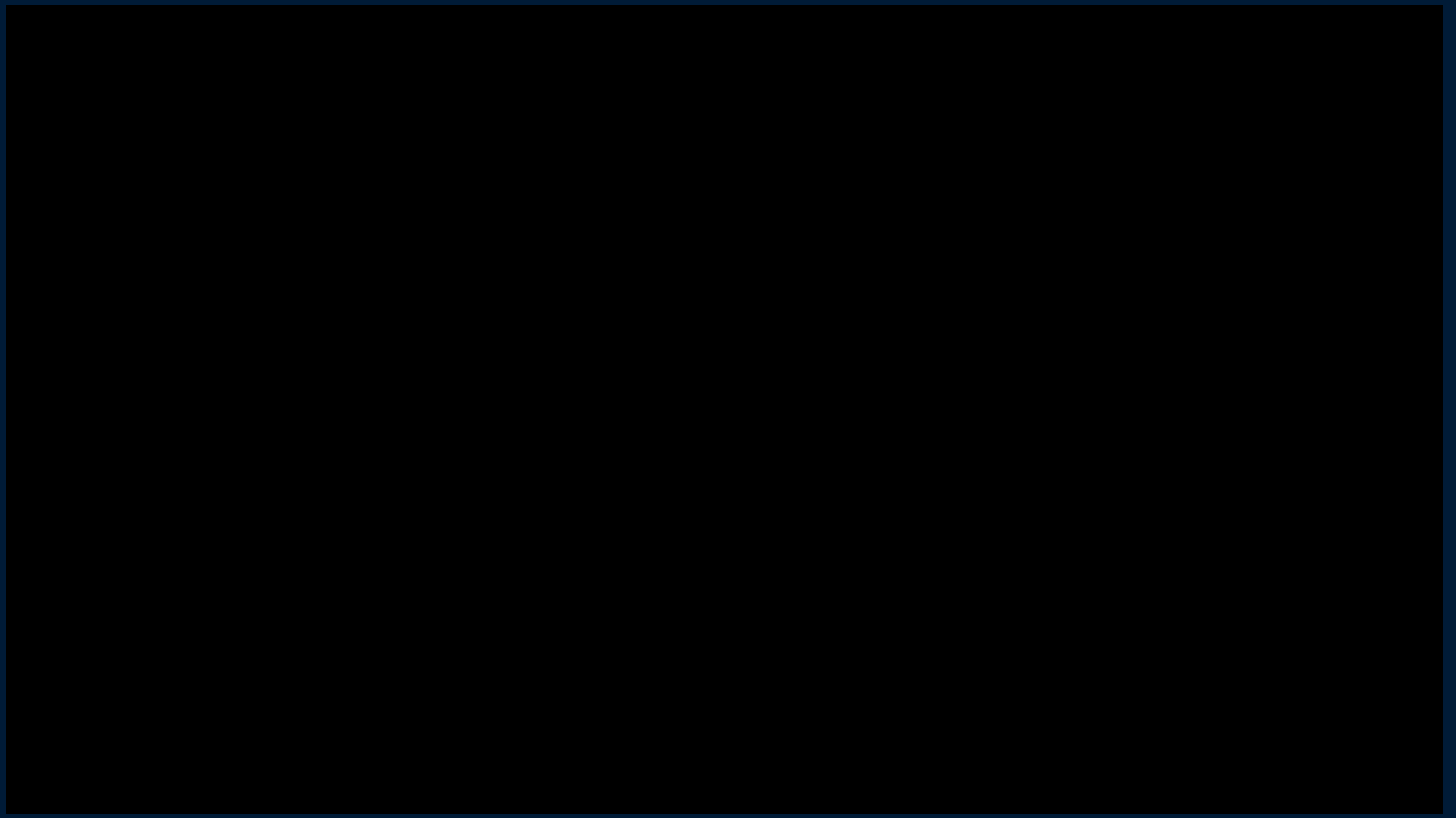
From Global Tipping Points | Home (global-tipping-points.org)

Towards the UNFCCC Paris Agreement

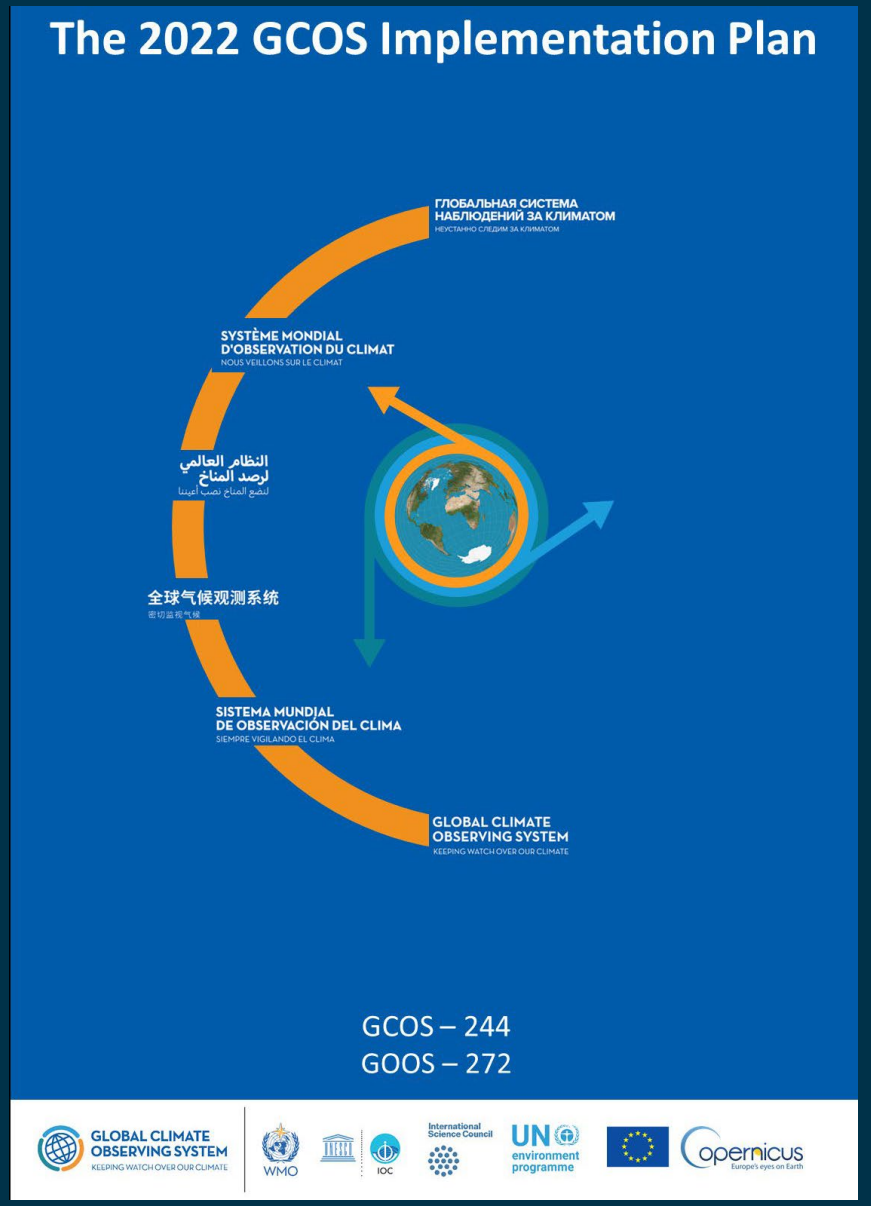
IPCC guidelines for NGHGIs: encourage countries to use independent information to check on emissions and removals

Such a verification of “bottom-up” national reports against “top-down” atmospheric inversion results is not mandatory, although a few countries have already added inversions as a consistency check of their national reports.

Worked with BEIS in the UK, CITEPA in France, UBA in Germany and CMCC in Italy, INPE in Brazil, IDEAM in Colombia



Bastos, A., Ciais, P., Sitch, S. et al. On the use of Earth Observation to support estimates of national greenhouse gas emissions and sinks for the Global stocktake process: lessons learned from ESA-CCI RECCAP2. Carbon Balance Manage 17, 15 (2022). https://doi.org/10.1186/s13021-022-00214-w



Responding to GCOS and WCRP requirements

- Focus on adaptation and carbon, water and energy cycles
- Requirements collated in joint GCOS-WCRP cycles workshop
- Cross-ECV activities addressed in recent ESA call in support of GCOS updated implementation plan
- Scientific analysis that contributes to directly respond to knowledge gaps related to our Climate System as part of the Earth System (this includes work on budgets, cycles, and processes).

Working with operational services

CCI-C3S cooperation agreement

- Provision of CDRs
- Coordination of R&D activities
- Collaboration on pre-operational developments
- 16 ECVs transferred to C3S

What we can offer

- Address scientific and monitoring gaps
- R&D and pre-operational development across scales, global to regional to local
- Preparation for operational climate services: Copernicus
- Close link to climate modelling community (CMIP, CORDEX etc)
- Developing methodology for climate policies: UNFCCC Paris Agreement, Green Deal
- Climate change impact studies
- Direct link to financial institutions: GDA

CSQ	Short Title	Atmosphere	Land	Ocean	Solid Earth	Cryosphere
CSQ-1	Anthropogenic influences on the carbon cycle	x	x			
CSQ-2	Land biosphere response to CC	x	x			
CSQ-3	Ocean carbon cycle responses to climate	x		x		
CSQ-5	Sea level change in the coastal ocean		x	x		
CSQ-7	Coastal interfaces with land atmosphere and	x	x	x		
CSQ-8	Coastal climate change feedbacks		x	x		
CSQ-20	Ice mass balance			x	x	x
CSQ-21	Sea Ice thermodynamics					x
CSQ-24	Polar change and climate variability	x		x		x
CSQ-25	Cryosphere and Polar ecosystems		x	x		x
CSQ-33	Ice sheets and rheology				x	x
CSQ-35	Erosion and sedimentation		x	x	x	
CSQ-36	Plate boundary deformation dynamics				x	
CSQ-39	Crust and internal dynamics interactions				x	
CSQ-43	Coupling between energy water and carbon	x	x	x		
CSQ-44	Anthropogenic influences on the water cycle	x	x			
CSQ-45	internal energy flux estimates	x	x	x		x
CSQ-46	Earth energy imbalance	x	x	x		x
CSQ-48	Regional planetary heat exchange	x	x	x		
CSQ-51	Lithosphere-atmosphere-ionosphere coupling	x			x	
CSQ-55	State of Land ecosystems		x			
CSQ-56	Land ecosystem critical transitions		x			

Thanks for your attention