

Current Status of Systematic Observations from Space

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Earth Observation Programmes

Satellite Observation contributing
to GHG inventory, NDCs, and GST
6 December 2023

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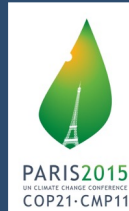


European Space Agency



United Nations
Climate Change

Paris Agreement



Transparency Framework

Global Stocktake

Mitigation

Adaptation

Means of
Implementation:
Finance, Technology,
Capacity Building

Cross-cutting:
Response measures,
Loss & Damage,
Equity

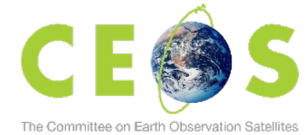
Systematic Observations



Systematic Observations Community



WORLD
METEOROLOGICAL
ORGANIZATION



GCOS
GLOBAL CLIMATE OBSERVING SYSTEM



EUMETSAT



GROUP ON
EARTH OBSERVATIONS



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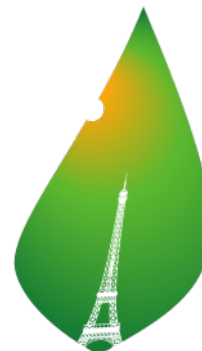
Climate Change: UNFCCC & The Paris Agreement



United Nations Framework
Convention on Climate Change

Tasked with preventing
'dangerous' human
interference with the
climate system

- Lead the international effort to combat climate change
- Body responsible for driving global climate action
- Make decisions on climate change mitigation and adaptation



Legally-binding treaty to limit global
warming to well-below 2C, and
preferably 1.5C

PARIS2015

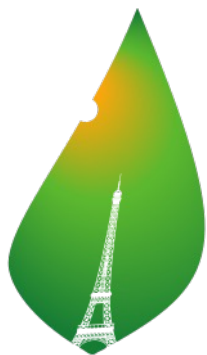
"...to reach global peaking of greenhouse gas emissions as soon as possible... and to undertake rapid reductions thereafter in accordance with best available science...to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century."

→ National GHG inventories to track progress under the PA for climate

Climate Change: UNFCCC & The Paris Agreement



United Nations Framework
Convention on Climate Change



PARIS2015

All Parties have:

- to report their GHG inventory every 2nd year
- to submit they anthropogenic emission reduction goals every 5-yr

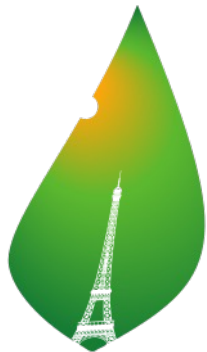
They have also agreed to a Global Stocktake every 5 years to assess the collective progress towards achieving the purpose of the Agreement and to inform of further individual actions to be taken by Parties.

IPCC encourages Parties to verify reported emissions against independent measurements, to promote transparency and align emissions reporting with real-world conditions.

The First Global Stocktake



United Nations Framework
Convention on Climate Change



PARIS2015

The Global Stocktake (GST) is a process for countries and stakeholders to see where they're **collectively making progress** towards meeting the goals of the Paris Agreement – and where they're not.

The 1st Global stocktake was structured in three parts:

1. **Information collection and preparation** (2020-2021)
2. **Technical assessment** (2022 – 2023)
3. **Consideration of outputs at COP28** (2023)

Synthesis Report: <https://www4.unfccc.int/sites/SubmissionsStaging/Documents/202203012343---SO-in-GST-2022-final.pdf>

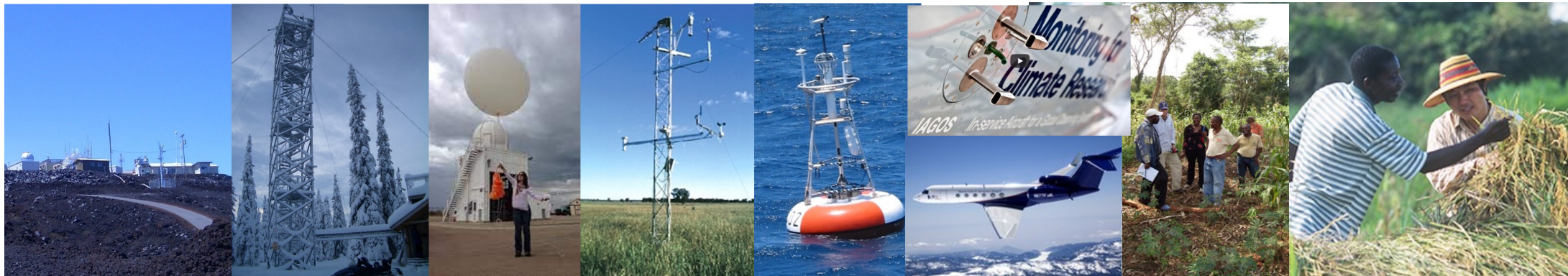
The outcome of the GST will inform the preparation of subsequent NDCs, in order to allow for **increased ambition and climate action**

Global Systematic Observations include space-based and ground-based observations



Space-based measurements from a growing fleet of satellites provides high spatial and temporal resolution and greater and more frequent coverage of the globe.

Ground-based and airborne data provide accurate estimates of weather, climate, air quality, greenhouse gases, forest, agriculture, etc. on local scales world-wide

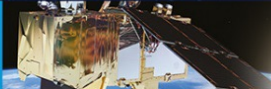


Copernicus Sentinels for operational monitoring



sentinel-1

→ RADAR VISION



sentinel-2

→ COLOUR VISION



sentinel-3

→ A BIGGER PICTURE



sentinel-4

→ EUROPEAN AIR MONITORING



sentinel-5p | sentinel-5

→ GLOBAL AIR MONITORING



sentinel-6

→ SURFING THE SEAS



300 TB

satellite data
distributed per day



full, free & open
data policy

Mission Status: <https://sentinels.copernicus.eu/web/sentinel/missions>



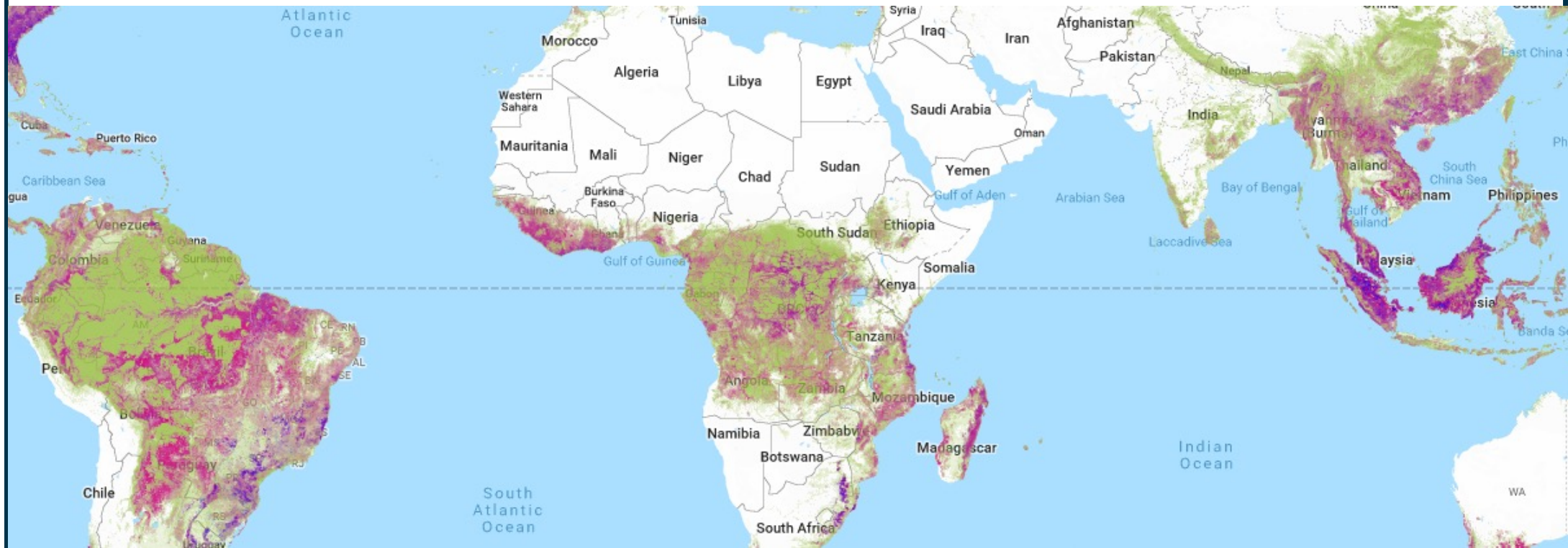
→ THE EUROPEAN SPACE AGENCY

Global Forest Watch



WORLD RESOURCES INSTITUTE

An online platform that provides data and tools for monitoring forests.



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<https://www.globalforestwatch.org/>

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biomass
cci



- Version 4 with global maps from 2010, 2017, 2018, 2019 and 2020 in cooperation with



- Released at GFOI Plenary May 2023
- Consistency: a decade of change



Forest above ground biomass (tonnes/ha) – 2018

0 100 200 300 400



European Space Agency

Earth Observation Handbook 2023



Earth Observation Handbook 2023

Release to coincide with the first Global Stocktake (GST) of the Paris Agreement.

Purpose is to help develop a broad understanding of the importance of satellite EO for all stakeholders in the GST process.

The aim is to provide practical examples and leads for further investigation so that the potential of the data available from the world's EO satellites is fully realised.

<https://www.eohandbook.com/>

Take Home Message



- **Systematic Observations** underpin climate science and services for mitigation and adaptation from local, national to global level
- Large **variety of Earth Observation sensors**: multi- and hyperspectral optical, LIDAR, and SAR
- **Open data** and **knowledge exchange** support the Enhanced Transparency Framework and the GST
- **Cooperation and coordination** is key: On-ground In-situ data, validation and accuracy assessment
- **Long-term** Systematic Observations are means for **implementation**