

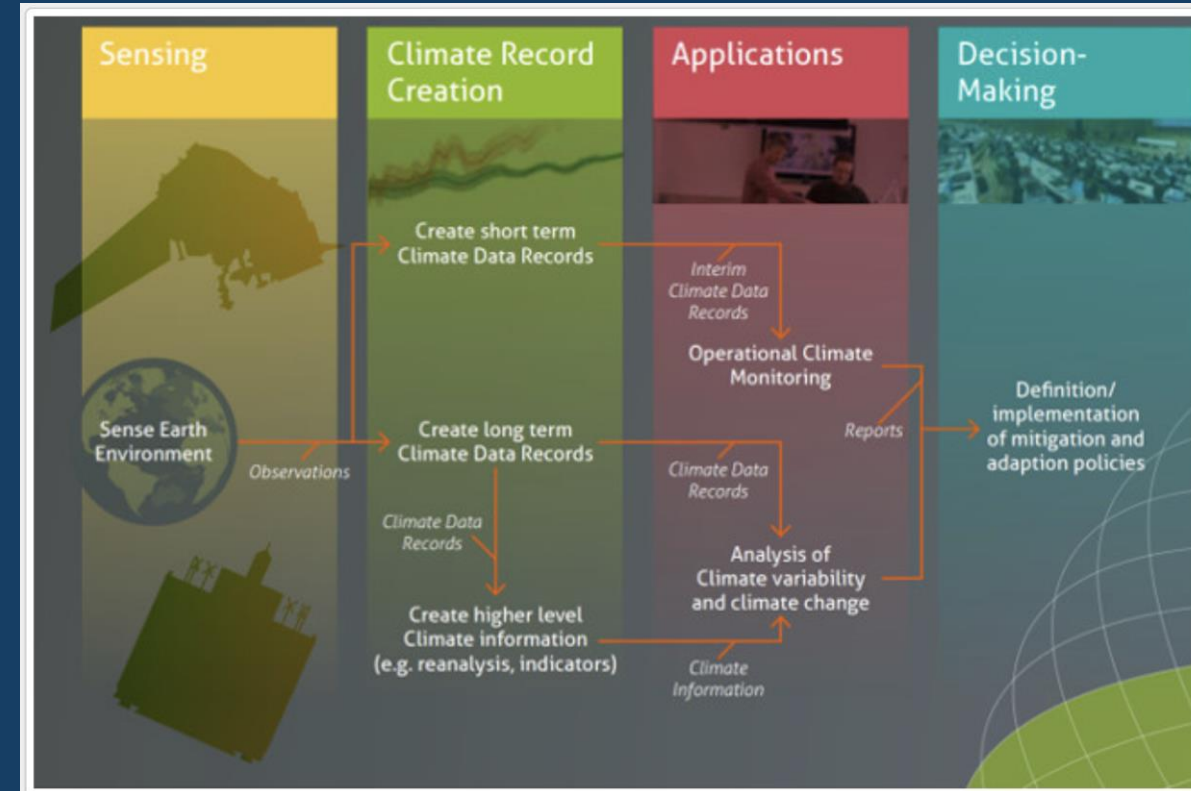
Space Agency Response to GCOS Implementation Plan 2022

Wenying Su

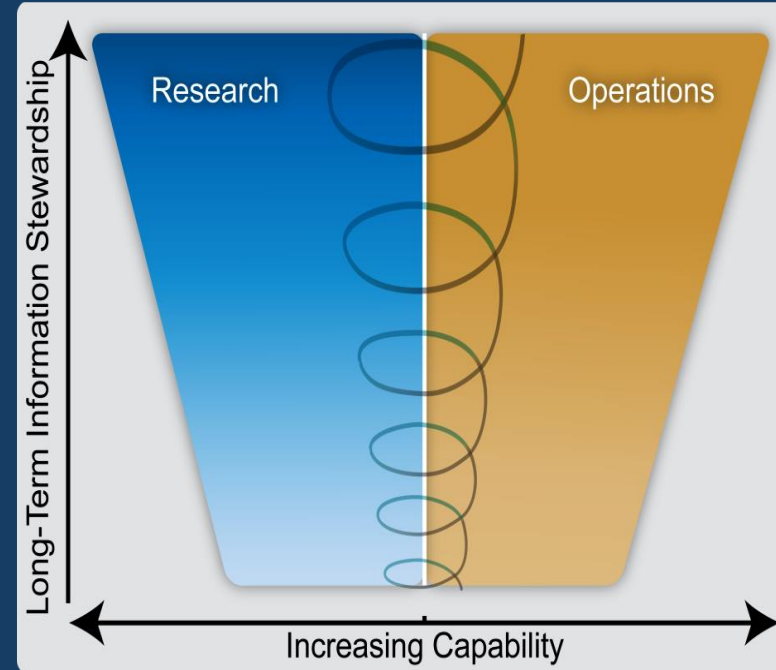
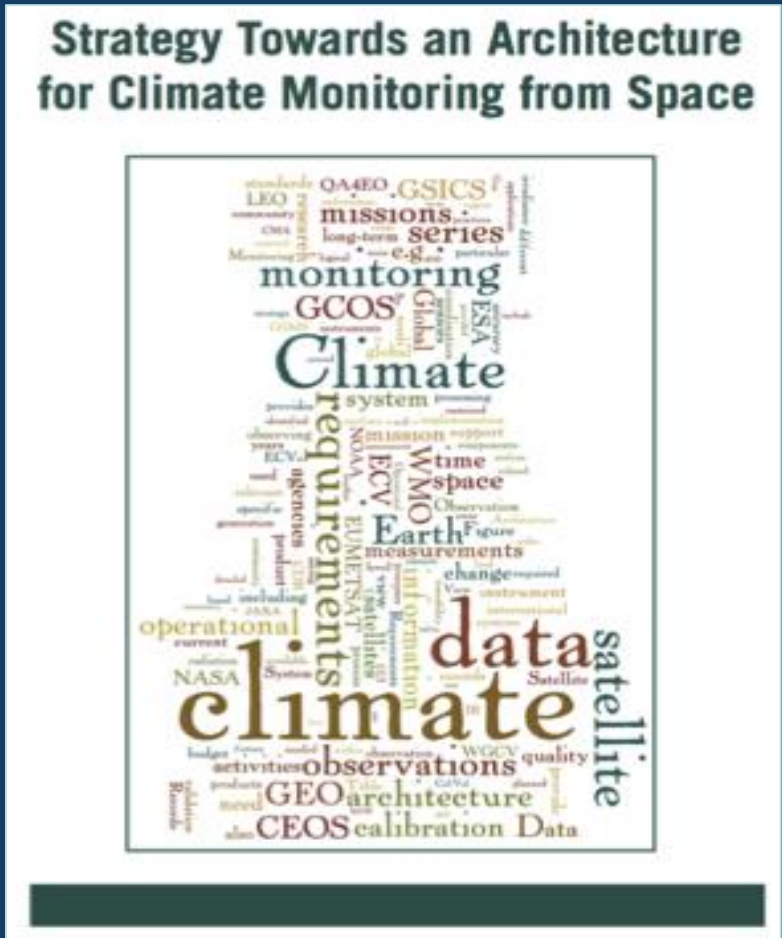
Vice-Chair of Joint CEOS-CGMS Working Group on Climate

On behalf of the WGClimate

- The over-arching goal of the joint CEOS/CGMS Working Group on Climate is to improve the systematic availability of Climate Data Records through the coordinated implementation, and further development of the architecture for climate monitoring from space:
 - Providing a comprehensive and accessible view of existing and planned climate data records;
 - Delivering further climate data records, including multi-mission, through best use of available data to fulfil GCOS requirements;
 - Optimizing the planning of future satellite missions and constellations to expand existing and planned climate data records.
 - Coordinating GHG observations across CEOS-CGMS agencies, working closely with WMO Global Greenhouse Gas Watch and UNEP International Methane Emission Observatory.



A holistic view of the interdependency of research and operations needed for sustained and routine climate monitoring.



M. Dowell, P. Lecomte, R. Husband, J. Schulz, T. Mohr, Y. Tahara, R. Eckman, E. Lindstrom, C. Wooldridge, S. Hilding, J. Bates, B. Ryan, J. Lafeuille, and S. Bojinski, 2013: Strategy Towards an Architecture for Climate Monitoring from Space. Pp. 39. This report is available from: www.ceos.org; www.wmo.int/sat; <http://www.cgms-info.org/>

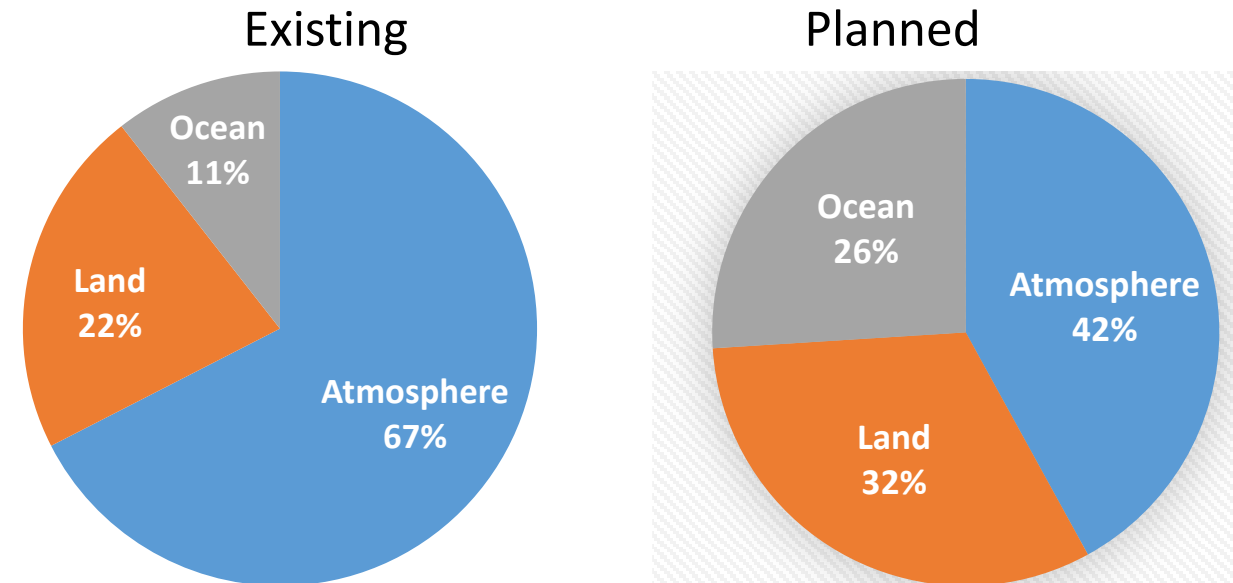
Record Information		Stewardship		Generation Process		Record Characteristics		Documentation		Accessibility		Applications	
Visual display													
ECV and ECV Product		ECV		Groundwater									
		ECV Product		Groundwater volume change									
Physical quantity		Groundwater volume change											
SI units		Units?		1									
		SI units		cm (Equivalent Water Height)									
Satellite/Instrument combination		Satellite		ECV Version		Instrument		Start Date		End Date		Data Level	
		GRACE (2 sats)		4.00		SCA		2002-04-04		2017-06-29		4	
		GRACE (2 sats)		4.00		SuperSTAR		2002-04-04		2017-06-29		4	
		GRACE-FO (2 sats)		4.00		SCA		2018-05-23		*		4	
		GRACE-FO (2 sats)		4.00		SuperSTAR		2018-05-23		*		4	
Satellite/Instrument combination Comments (Optional)		GRACE/GRACE-FO K-Band Ranging System data also used (2002-present); Data gap from June 2017 to May 2018.											
Inter-calibration Satellite/Instrument combination		Satellite		Instrument		Start Date		End Date		Data Level			
Inter-calibration Satellite/Instrument combination Comments (Optional)													
Ground-based network calibration		Ground-based network		Tide gauges									
		Link to source											
		North boundary		90									

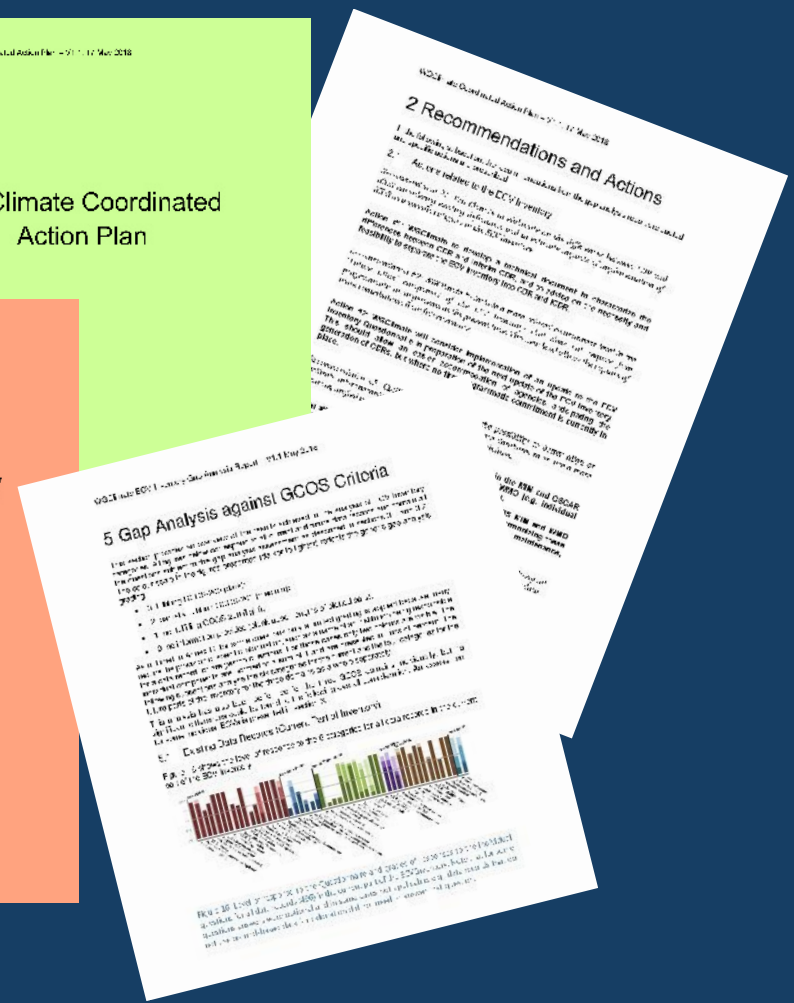
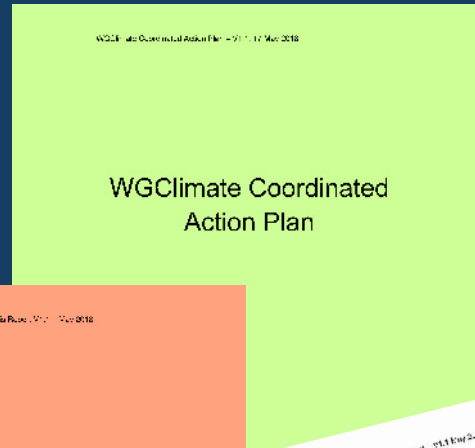
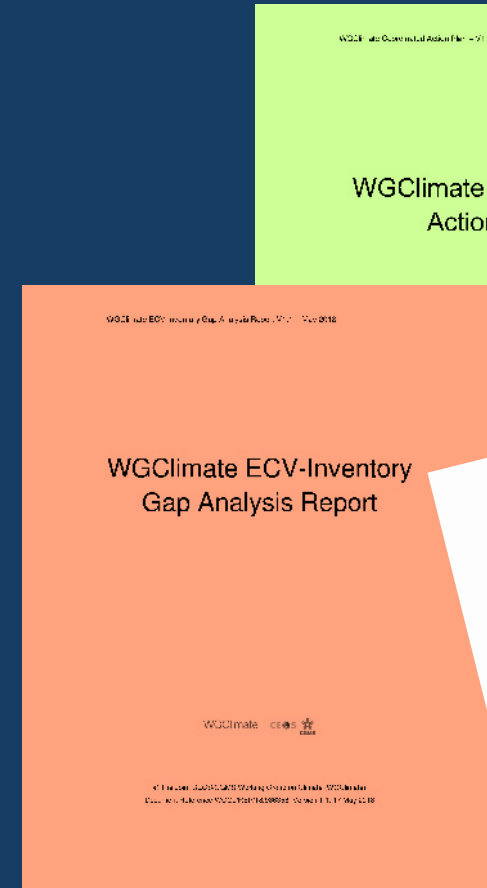
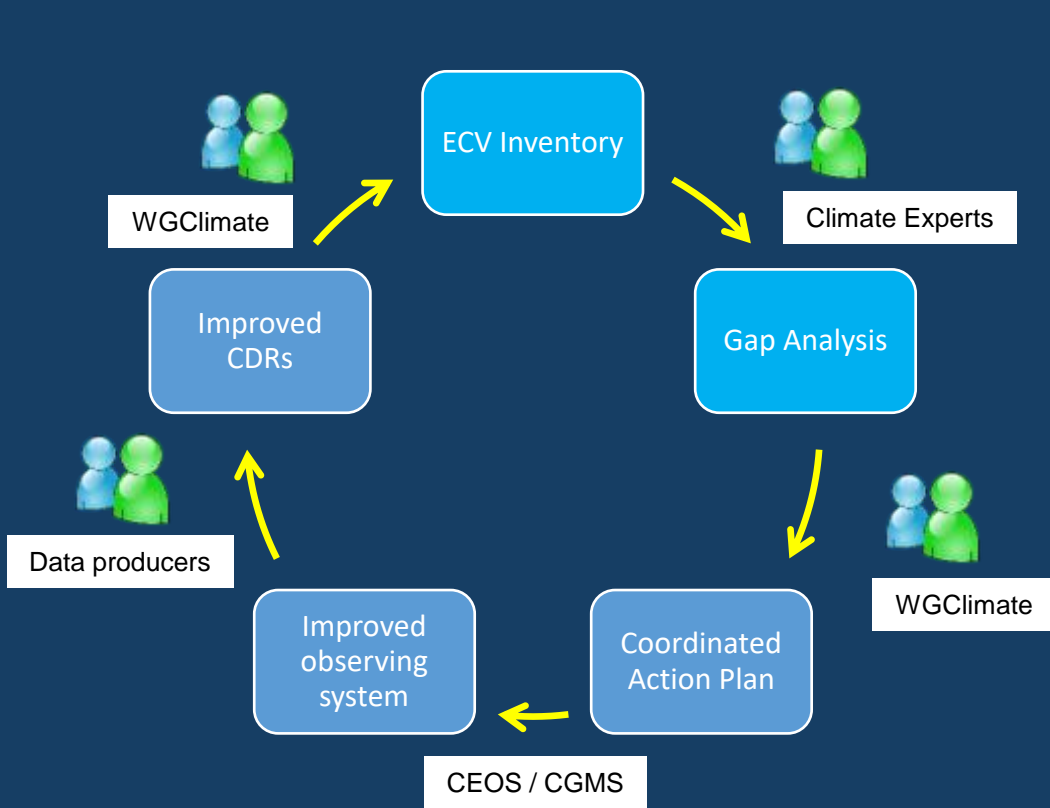
<https://climatemonitoring.info/ecvinventory/>

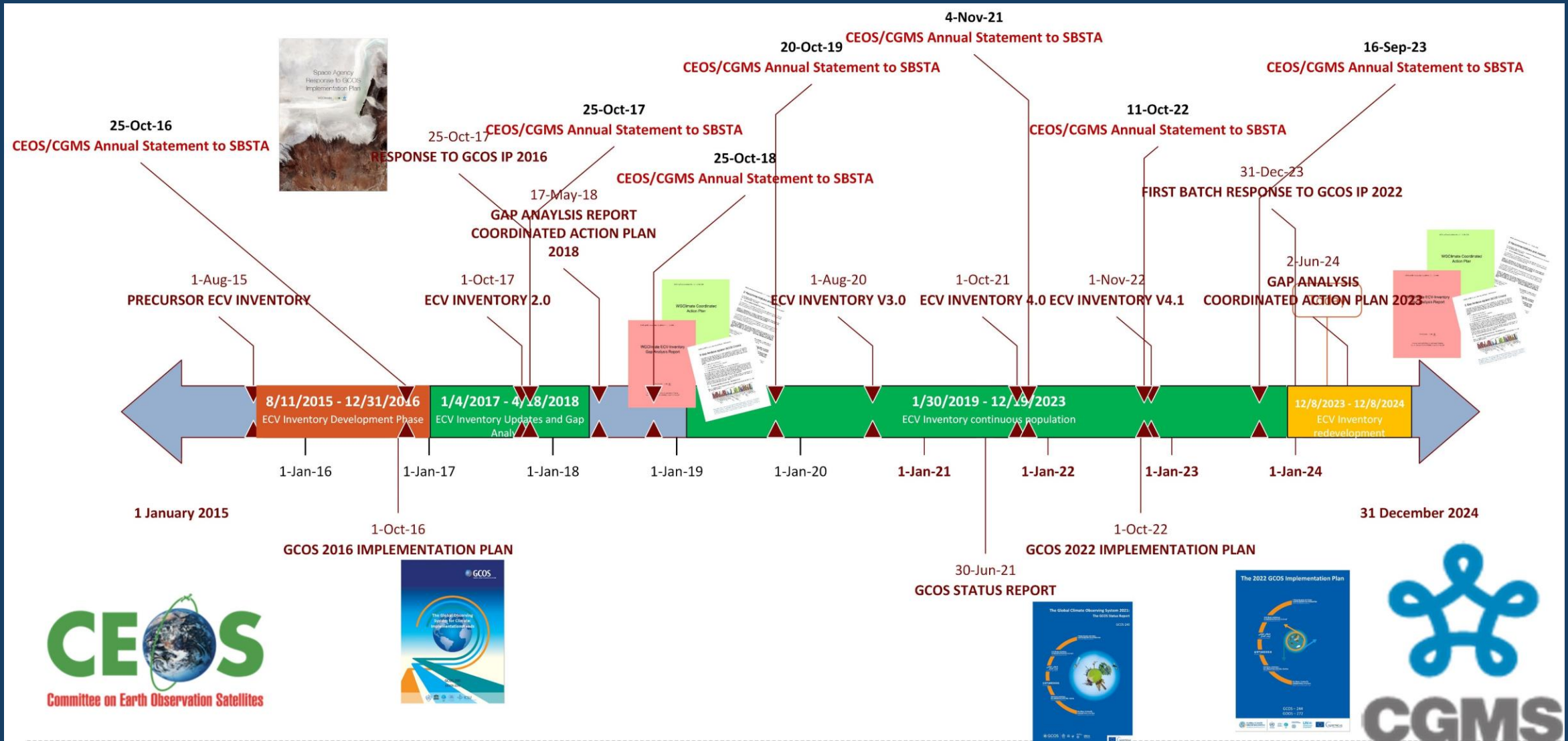
- V2.0: October 2017
- V3.0: August 2020
- V4.0: October 2021
- V4.1: November 2022
- V5.0: October 2024
 - ~80 previously-submitted records
- V6.0: August 2025
 - New structure and process
- EUMETSAT continuing sustainment with new 5-year contract, started May 2024
Renaming: Satellite Agency Climate Data Records Inventory

Version	Total CDRs	Existing	Planned
V2.0	913	496	417
V3.0	1137	766	371
V4.1	1251	870	381

ECV Products Per Domain





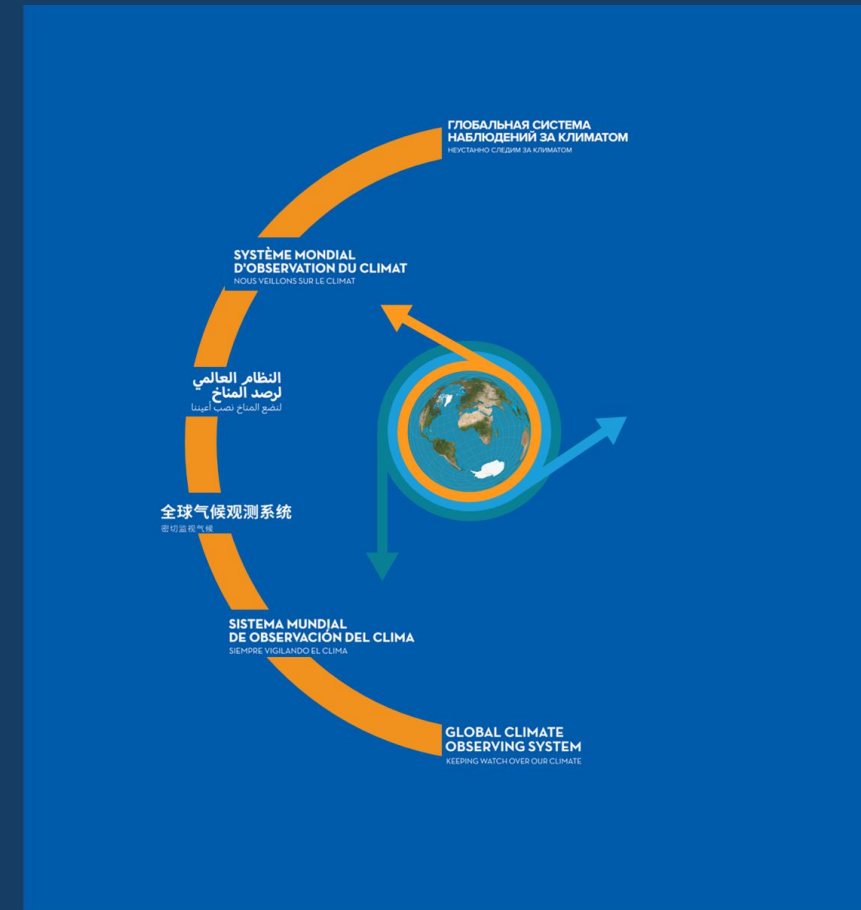


Produced every 5-6 years, GCOS Implementation Plans:

- Are submitted to UNFCCC and the GCOS sponsors.
- Provide recommendations for a sustained and fit for purpose Global Climate Observing System.
- Cover climate monitoring needs over the entire Earth system from the atmosphere to the oceans, from the cryosphere to the biosphere.
- Encompass the water, energy and carbon cycles.
- GCOS provides a stable framework for space agency priority setting.

This 2022 GCOS Implementation Plan has a different form to earlier plans, it has:

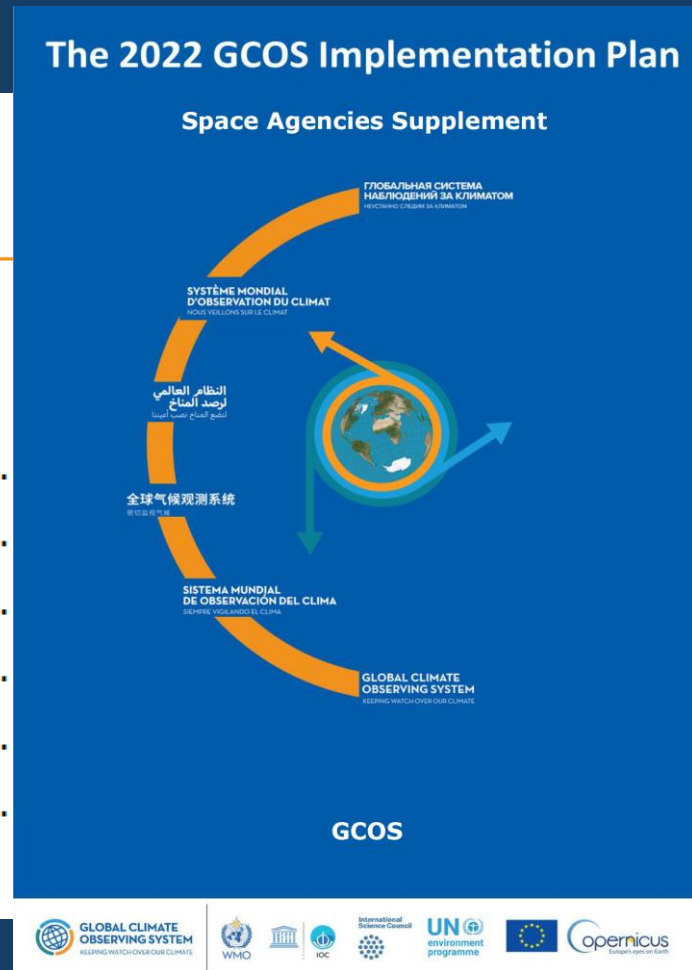
- Fewer, more focused, and integrated actions.
- Clearer means of assessment.
- Clearer identification of the stakeholders who need to respond to the actions.
- The updated ECVs requirements are presented in a separate document - *The 2022 GCOS ECVs Requirements (GCOS 245)*.



2022 GCOS Implementation Plan - Space Agencies Supplement

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1. Introduction
2. Theme A: Ensuring Sustainability
3. Theme B: Filling Data Gaps.....
4. Theme C: improving data quality, availability and utility, including reprocessing.....
5. Theme D: Managing Data
6. Theme F: Other Emerging Needs



A: ENSURING SUSTAINABILITY	A2. Address gaps in satellite observations likely to occur in the near future
	A3. Prepare follow-on plans for critical satellite missions
B: FILLING DATA GAPS	B1. Development of reference networks (in situ and satellite Fiducial Reference Measurement (FRM) programs)
	B3. New Earth observing satellite missions to fill gaps in the observing systems
	B5. Implementing global hydrological networks
	B6. Expand and build a fully integrated global ocean observing system
	B9. Improve estimates of latent and sensible heat fluxes and wind stress
C: IMPROVING DATA QUALITY, AVAILABILITY AND UTILITY, INCLUDING REPROCESSING	C1. Develop monitoring standards, guidance and best practices for each ECV
	C2. General improvements to satellite data processing methods
	C4. New and improved reanalysis products
	C5. ECV-specific satellite data processing method improvements
	D4. Create a facility to access co-located in situ cal/val observations and satellite data for quality assurance of satellite products
D: MANAGING DATA	
F: OTHER EMERGING NEEDS	F1. Responding to user needs for higher resolution, real time data
	F2. Improved ECV satellite observations in polar regions
	F3. Improve monitoring of coastal and Exclusive Economic Zones
	F5. Develop an Integrated Operational Global GHG Monitoring System

- A total of 16 actions, each may include multiple activities (total of 48).
- Space agencies play minor role in 3 actions (B6/C1/C4).
- Space agencies collaborate with other on 2 actions (B5/F2).

- Working closely with GCOS secretariat: develop the response template, clarify actions
- Tiered approach to split the work into 2023/2024
- WGClimate members collaborate on responses via google doc

Action XX:	
Activity XX.Y	
Means of assessing progress	
GCOS IP rapporteur(s)	
Priority for WGClimate	Level of priority for WGClimate
Feasibility	<p>Is this activity feasible, will it be successful? If not, what are the reasons that would make this activity not feasible (technical, budget..). Is it only partially implementable? If this is the case, reformulate feasible part of activity If it is totally feasible, by when can the action be accomplished?</p>
Collaboration with GCOS	Would this activity benefit or require a tight collaboration with GCOS? If yes, how (see above)
Connections with other IP actions	Are there any connections to other GCOS IP actions and activities? If yes, would it be better to address these activities together? If yes, reformulate
Implementers	Which is/are the space agencies that would better address this action. Identify a responsible person within these space agencies.
Timeline and milestone for this activity	
Date	Milestone

- Delivered 21 activities in 2023.
- Sent the draft response to GCOS secretariat for panel review in 2023.
- Addressed all but one (B3.5 permafrost extent) GCOS panel feedback.
- There are 28 remaining activities, many of them are cross cutting.
- Started collaboration with LSI-VC (C5, F1), Working group on Cal/Val, and COAST (F3) to formulate responses.
- Discussed with GCOS panel members to address some of the activities as well.
- On track to deliver the remaining activities in 2024.
- Final report expects to be available Q2 of 2025.