

Joint CEOS/CGMS WGClimate

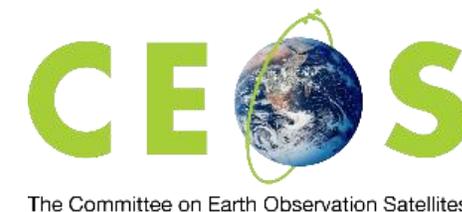
Jörg Schulz, EUMETSAT

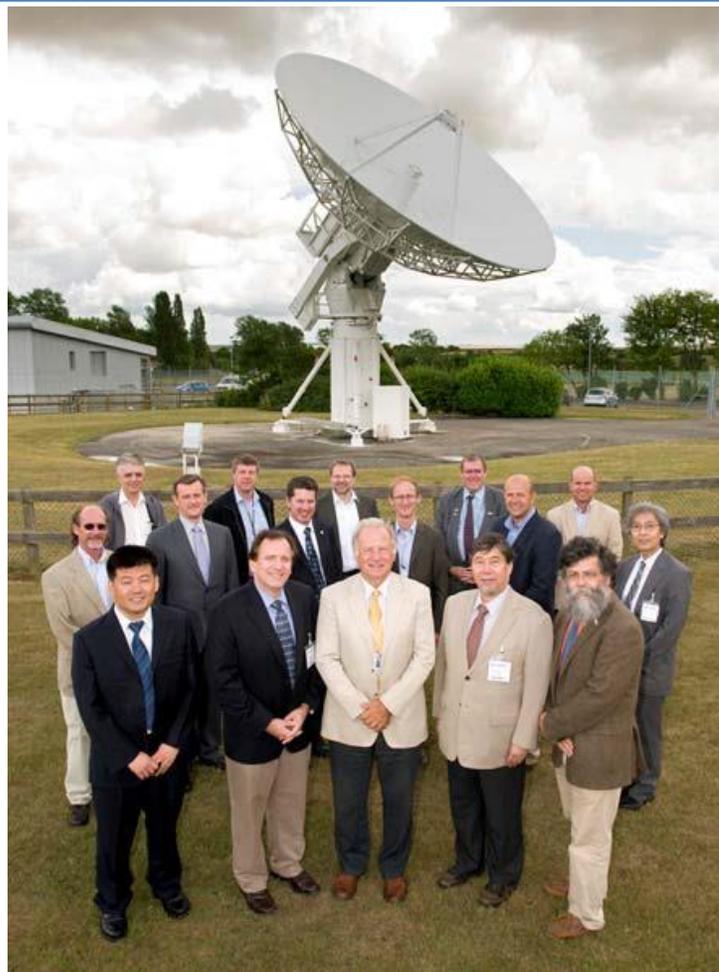
Chair Joint CEOS/CGMS Working Group on Climate

Albrecht von Bargaen, DLR

Vice Chair Joint CEOS/CGMS Working Group on Climate

with more slides from David Crisp (NASA)





- CEOS Working Group on Climate endorsed at CEOS Plenary in 2010;
- The joint development of the high-level architecture for climate monitoring from space led to the formation of the Joint CEOS/CGMS WGClimate endorsed by CEOS and CGMS Plenaries in 2013;
- Major Task is: Coordinate and encourage collaborative activities between the world's major space agencies in the area of climate monitoring.

JWGClimate

Chair: Jörg Schulz (EUMETSAT)

Vice Chair: Albrecht von Bargaen (DLR)

Until November 2020

- Chair: Jörg Schulz (EUMETSAT)
- Vice Chair: Albrecht von Bargaen (DLR)

November 2020 – November 2022

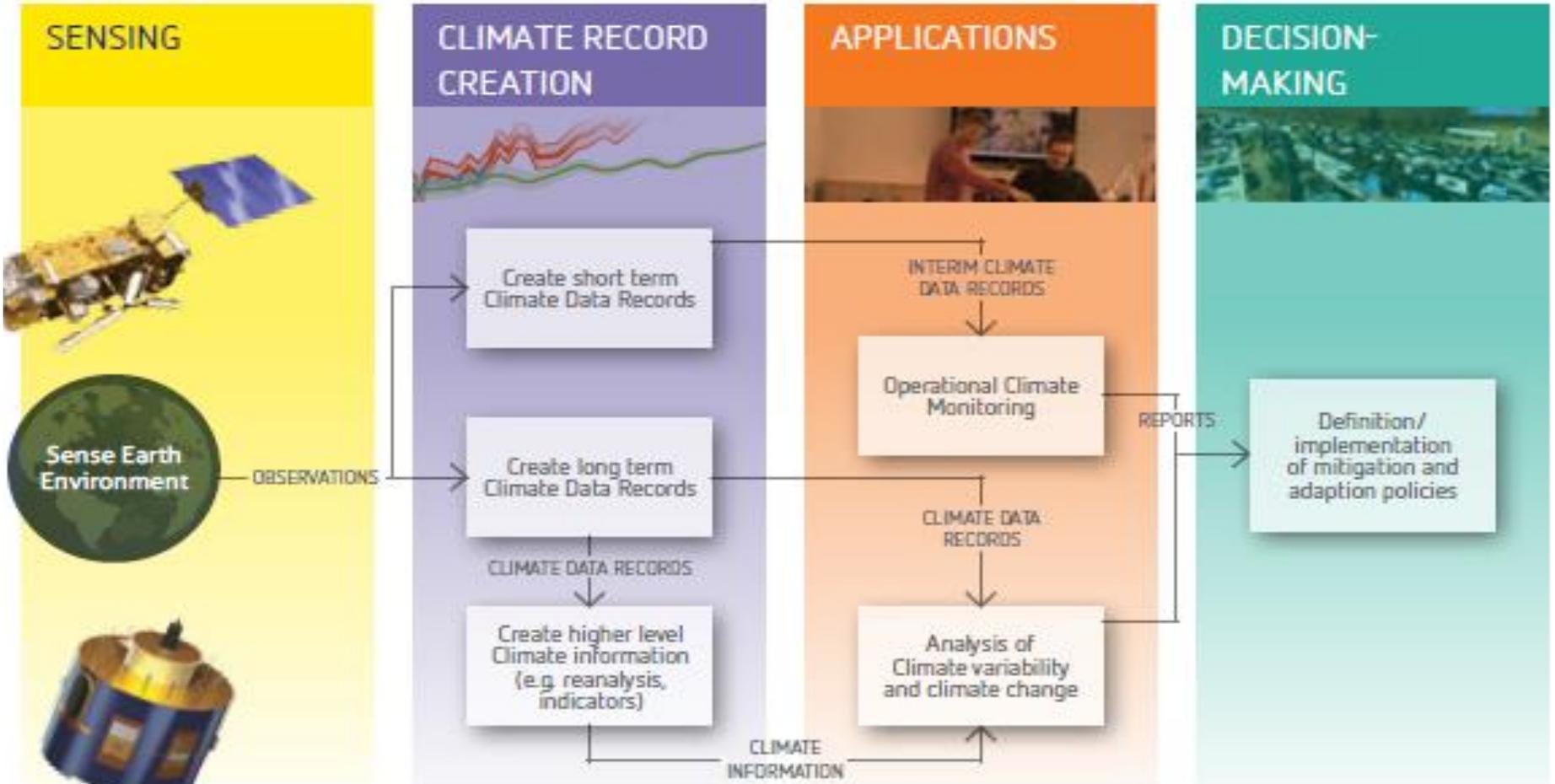
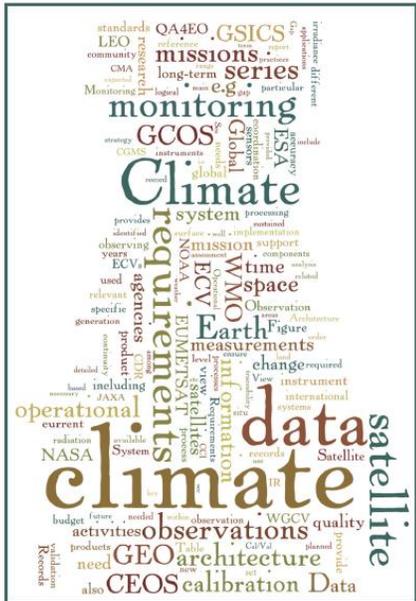
- Chair: Albrecht von Bargaen
- Vice Chair: asking for proposals by Agencies

In the alternating chair position the next term is for CGMS. Nevertheless we will issue a call for nomination to CEOS and CGMS after CEOS Plenary.



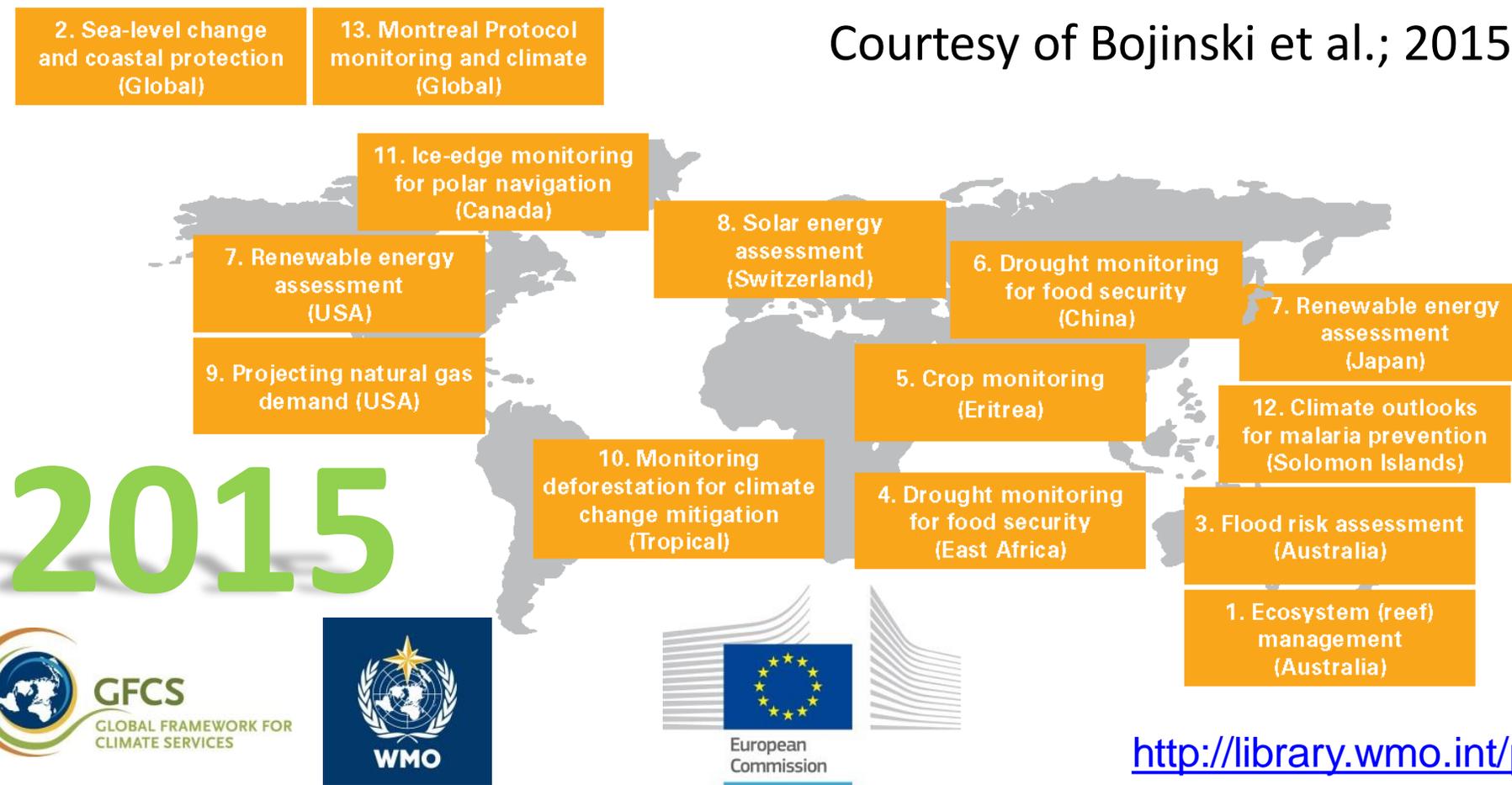
The Architecture for Climate Monitoring from Space

Strategy Towards an Architecture for Climate Monitoring from Space

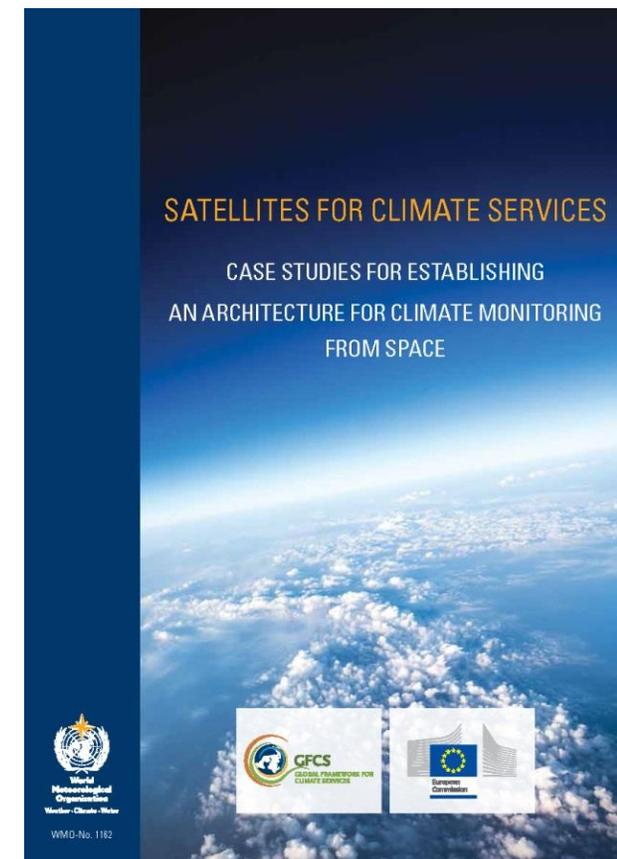


http://ceos.org/document_management/Working_Groups/WGClimate/WGClimate_Strategy-Towards-An-Architecture-For-Climate-Monitoring-From-Space_2013.pdf

Courtesy of Bojinski et al.; 2015



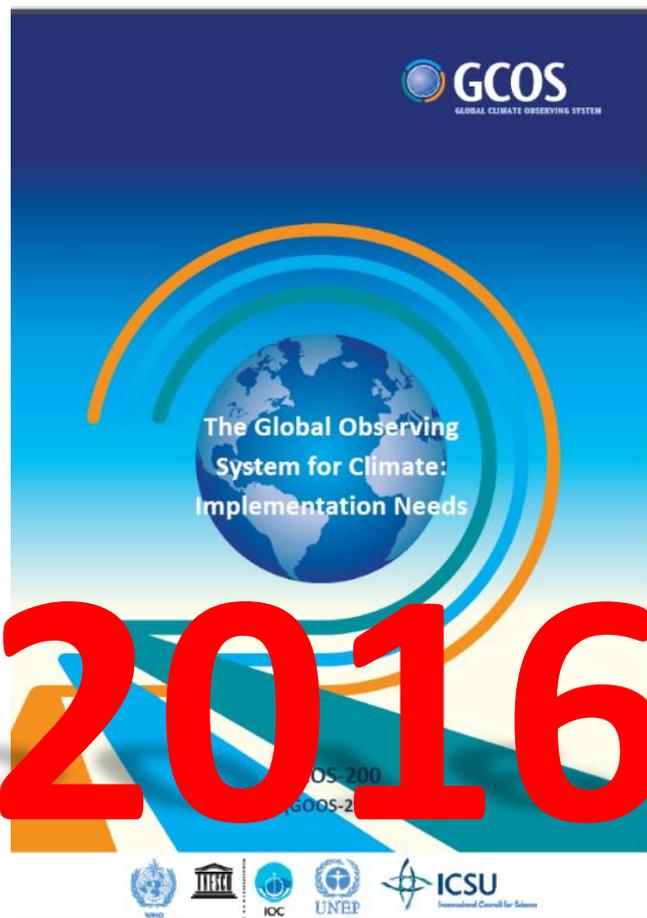
2015



http://library.wmo.int/pmb_ged/wmo_1162_en.pdf



GCOS Implementation Plan & The Comprehensive Answer



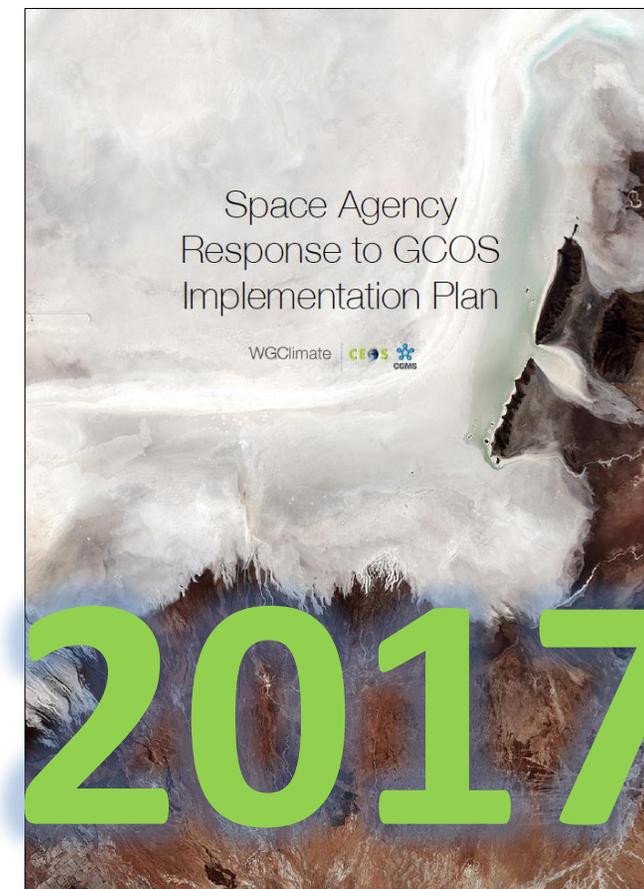
Action G11: Review of availability of climate data records

Action Provide a structured, comprehensive and accessible view as to what CDRs are currently available, and what are planned to exist, together with an assessment of the degree of compliance of such records with the GCOS requirements for the ECV products indicated in Annex A

Action G12: Gap-analysis of climate data records

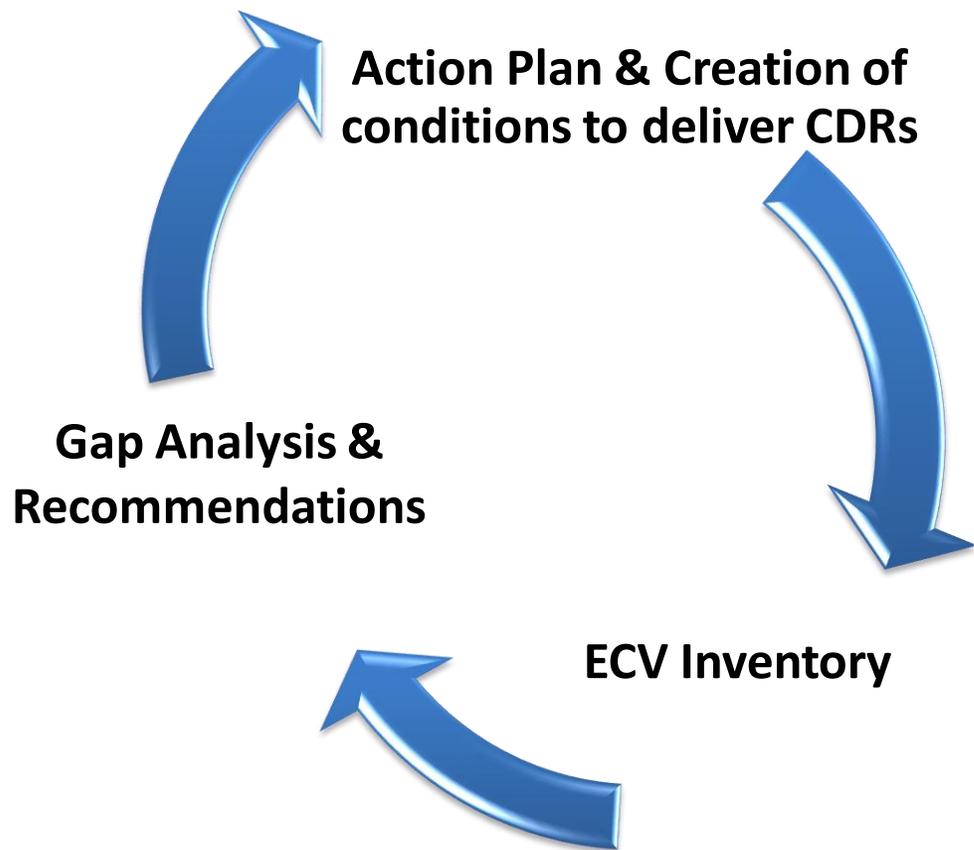
Action Establish a gap analysis process and associated actions, to: (a) address gaps/deficiencies in the current available set of CDRs; and (b) ensure continuity of records, and address gaps through the appropriate planning of future satellite missions for the ECV products indicated in Annex A

- Answer contains status and plans for all actions in GCOS IP relevant for space agencies.
- Allows reporting of progress on GCOS needs to UNFCCC.



ECV Inventory - Resource for Coordinated Response to GCOS

<http://climatemonitoring.info/ecvinventory>



Existing data records | Planned data records | Details (existing)

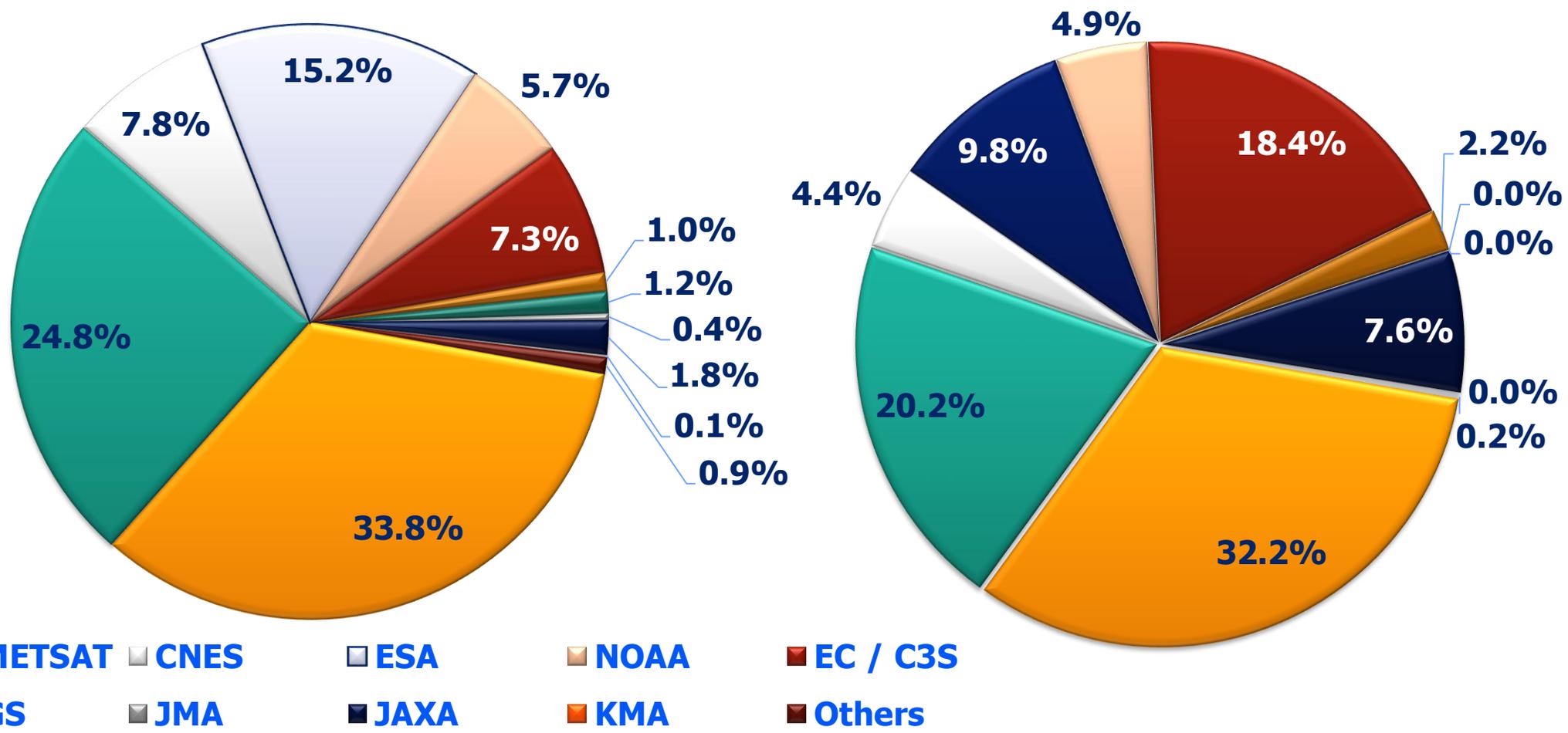
Detailed information for existing data record

Refresh

Record Information		Stewardship	Generation Process	Record Characteristics	Documentation	Accessibility	Applications
Responder name		Rainer Hollmann					
Responder E-mail		rainer.hollmann@dwd.de					
Co-editor E-mail (optional)							
Observer E-mail (optional)							
Data Record identification	Data record identifier	http://dx.doi.org/10.5676 ... M_SAF_CM/CLARA_AVHRR/V001					
	Data record name and version (optional)	CLARA-A1					
	TCDR family	CLARA					
	Official citation reference (optional)	Karlsson et al. 2012: CM SAF cClouds, Albedo and Radiation dataset from AVHRR data - Edition 1 - Monthly Means / Daily Means / Pentad Means / Monthly Histograms. Satellite Application Facility on Climate Monitoring. DOI:10.5676/EUM_SAF_CM/CLARA_AVHRR/V001. http://dx.doi.org/10.5676 ... M_SAF_CM/CLARA_AVHRR/V001 publication reference: Karlsson et al. 2013: http://doi.org/10.5194/acpd-13-935-2013					
Responsible Organisation		EUMETSAT (CM SAF)					
Collection Organisation		NOAA (USA)					
Calibration Organisation		NOAA (USA) EUMETSAT (CM SAF)					
FCDR Organisation		EUMETSAT (CM SAF)					
Inter-calibration Organisation		EUMETSAT (CM SAF)					
TCDR Organisation		EUMETSAT (CM SAF)					
GCOS Requirements Organisation		EUMETSAT					

CDR Inventory Contributions Inventory #3 (Provisional)

Existing: 817
Planned: 481
Total: 1298



There is lack of high spatial resolution (100m or better) data records included in the portfolio of future CDRs.

Recommendation #19: The CEOS Land Surface Imaging-Virtual Constellation (LSI-VC) to coordinate on the formulation of future high resolution missions and seamless continuity of sustained Land Surface Temperature CDRs.

VC-LSI	22	LSI-VC to formulate future high resolution missions for Land Surface Temperature climate data records aiming at seamless continuity of CDRs.	Discussion with VC-LSI needed.	31 Dec 2019	OPEN	Mission Planning, Science, LSI lead needed, needs deadline extension
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As IR imagers are used for the derivation of LST there is no apparent gap in the availability of such missions, but Table shows that, for most new missions, no plan exists to derive LST climate data records from an individual instrument series or combinations of it.

VC-LSI	23	The LSI-VC to assess the usefulness of available data from multiple sensors for the generation of climate data records. Resulting plans at Agencies to generate climate data records shall be registered with the ECV Inventory.	Discussion with VC-LSI needed.	31 Dec 2019	OPEN	Science, LSI lead needed, needs deadline extension
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For Leaf Area Index (LAI), it was observed that some known data records have not been registered within the ECV Inventory; this omission should be fixed in the next update. The total number of existing and planned data records currently in the ECV inventory is fairly low (two existing and three planned), even though plenty of satellite instruments that have very high relevance for Leaf Area Index are known to exist. Thus, it is recommended that the LAI-VC assess climate user needs for such products that are not currently exploited from existing missions. This should assist future planning for LAI CDRs;

Number of LAI data records has doubled in Inventory #3.

VC-LSI TOPC	24	The LSI-VC and GCOS TOPC to assess the climate user community needs for LAI that are not currently exploited from existing missions to enable planning for further Leaf Area Index data records as appropriate. Resulting plans at Agencies to generate climate data records shall be registered with the ECV Inventory.	Discussion with VC-LSI needed.	31 Dec 2019	OPEN	Mission sufficiency, Science, LSI lead needed needs deadline extension
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CEOS/CGMS provided a white paper describing a constellation architecture for monitoring atmospheric CO₂ and CH₄ concentrations and their natural and anthropogenic fluxes from space¹ to support climate policy

- 166-page document, 88 authors representing 47 organizations
- Executive Summary (2 pages)
 - Overview of objectives and approach for policy makers, CEOS/CGMS Agency leads
- Body of report (75 pages)
 - Science background and requirements, current and near-term mission heritage and system implementation approach, intended for program scientists and project managers
- Technical Appendices (42 pages)
 - “Textbook” summarizing state-of-the-art in measurements and models for scientists, engineers, and inventory community

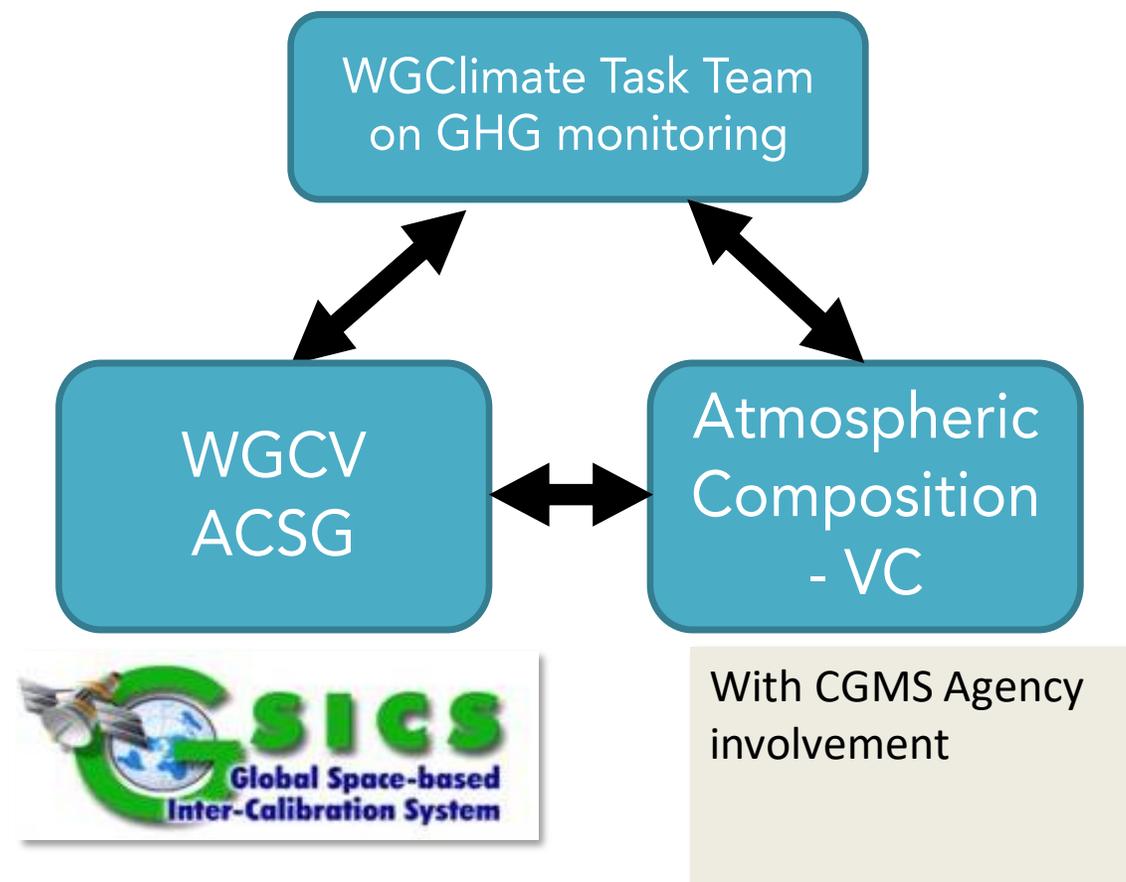


A CONSTELLATION ARCHITECTURE FOR
MONITORING CARBON DIOXIDE AND
METHANE FROM SPACE

Prepared by the CEOS Atmospheric Composition Virtual Constellation Greenhouse Gas Team
Version 1.2 – 11 November 2018
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http://ceos.org/document_management/Virtual_Constellations/ACC/Documents/CEOS_A_C-VC_GHG_White_Paper_Publication_Draft2_20181111.pdf

1. Coordination mechanism proposed and endorsed by CEOS and CGMS Plenaries
2. Contributions from multiple CEOS & CGMS entities (WGClimate GHG Task Team, AC-VC, WGCV/ACSG & GSICS)
3. Addressing Actions on two different time horizons i) Prototype products: 2021 for 2023 Global Stocktake and ii) Pre-operational: 2026 for 2028 Global Stocktake
4. Roadmap meeting in Tokyo (09/06) draft roadmap by CEOS SIT TW in September 2019 present to CEOS 33rd Plenary (October 2019), and send to CGMS, for written endorsement.





- **Space based measurements of land cover and aboveground biomass stocks provide critical constraints on the land carbon cycle and its response to**
 - human activity (deforestation/reforestation, forest degradation, agriculture and other land use change)
 - climate change (drought, floods, heat stress, wildfire, etc.)
- **Land cover and aboveground biomass measurements alone do not provide useful constraints on the uptake or emissions (fluxes) of CO₂, CH₄ or other greenhouse gases on national scales**
- **However, observable changes in land use or biomass are often associated with dramatic changes in land carbon fluxes**
- **Integrating ongoing efforts to monitor land cover, aboveground biomass and greenhouse gases from space could yield**
 - new insights into the processes controlling land-atmosphere fluxes
 - improved models for predicting their response to climate change.



Carbon and GHGs are one of 3 CEOS Chair Priorities for 2020-2021

- ❑ **Supporting the GHG Roadmap process – escalating, elevating, and accelerating progress towards major milestones, including for 2023 Global Stocktake. 2021 prototype flux products.**
- ❑ **Reflecting \$4Bn+ investment (2018-2024) in Above-Ground Biomass missions and seeking to accelerate the policy relevance of these new data (GFOI, GEOGLAM...)**
- ❑ **Encouraging stronger and more systematic engagement by CEOS of convention frameworks – building on IPCC outreach**

Goal: To support CEOS Carbon Science Mission by providing easy discovery of and access to carbon-related data resources in CEOS member agencies

The Objectives: *1) enable carbon community to easily find their interested data in the CEOS agency collections brokered by both CWIC and FedEO; 2) allow searching and accessing data within collections using CWIC and FedEO with keywords, spatial and/or temporal constraints; and 3) provide common discovery and access of all CWIC partner holdings targeting at the CEOS Carbon Community*

Summary of progresses since WGISS'47 in May 2019:

- Refined search support by periods
- Improved search support by acquisition types
- More data format support for user-uploaded map for searching and customized clipping
- Allows searching of Essential Climate Variables (ECV)
- Release of fully developed User's Guide
- Updated release of beta version in middle July 2019

Next steps: Release of version 1 in September and tailor it to serve localized and specialized carbon projects

CEOS WGISS Carbon Community Portal (beta), Version 0.88

Keyword Search...

Collection Search Result (3397)

- LBA-ECO ND-08 Soil Respiration, Soil Fractions, Carbon and Nitrogen, Para, Brazil**
 - Identifier: C17913225-ORNL_DAAC
 - Author: CMR
 - Point: -0.86, -52.55
 - Date: 2001-07-01T00:00:00.000Z/2003-03-31T23:59:59.000Z
 - Data (https) Documentation (html) Metadata (https) Documentation (pdf)
 - CWIC Granule Open Search Descriptor Document Product metadata
- LBA-ECO CD-06 Isotopic Composition of Carbon Fractions, Amazon Basin River Water**
 - Identifier: C179003627-ORNL_DAAC
 - Author: CMR
 - Box: -16.475 -74.57W -1.82N -58.8E
 - Date: 1991-08-12T00:00:00.000Z/2003-01-26T23:59:59.000Z
 - Data (https) Documentation (html) Metadata (https) Documentation (pdf)
 - CWIC Granule Open Search Descriptor Document Product metadata
- LBA-ECO ND-11 Litter Decomposition, Carbon, and Nitrogen Dynamics in Agroforestry**
 - Identifier: C179003747-ORNL_DAAC
 - Author: CMR
 - Point: -2.52, -60.03
 - Date: 2002-07-11T00:00:00.000Z/2002-10-15T23:59:59.000Z
 - Data (https) Documentation (html) Metadata (https) Documentation (pdf)
 - CWIC Granule Open Search Descriptor Document Product metadata
- LBA-ECO CD-08 Leaf Carbon, Nitrogen, LAI, and Isotope Data, Manaus, Brazil: 2001**
 - Identifier: C179131425-ORNL_DAAC
 - Author: CMR
 - Box: -2.615 -60.21W -2.5N -60E
 - Date: 2001-08-08T00:00:00.000Z/2001-08-08T23:59:59.000Z
 - Data (https) Documentation (html) Metadata (https) Documentation (pdf)
 - CWIC Granule Open Search Descriptor Document Product metadata
- LBA-ECO ND-07 Carbon and Nitrogen in Cerrado Plants and Soils, Brasilia: 1999-2000**
 - Identifier: C179003195-ORNL_DAAC
 - Author: CMR
 - Point: -15.93, -47.85
 - Date: 1999-12-01T00:00:00.000Z/2000-09-30T23:59:59.000Z
 - Data (https) Documentation (html) Metadata (https) Documentation (ND07_15N_Leaves_Soil.PDF)
 - CWIC Granule Open Search Descriptor Document Product metadata
- LBA-ECO CD-08 Carbon Isotopes in Belowground Carbon Pools, Amazonas and Para,**

Map view showing the Indian Ocean region.

Last predefined datasets date: July 19, 2019 / Last modified date: July 19, 2019
Center for Spatial Information Science and Systems, George Mason University



United Nations
Climate Change

COP-21 Paris Agreement: Adaptation (Article 7(c)):
Strengthening scientific knowledge on climate, including research, **systematic observation of the climate system** and early warning systems, in a manner that informs climate services and supports decision-making.



Reports on Progress
@ SBSTA/COP



WGClimate

The Joint CEOS/CGMS
Working Group on Climate



Needs and Requirements

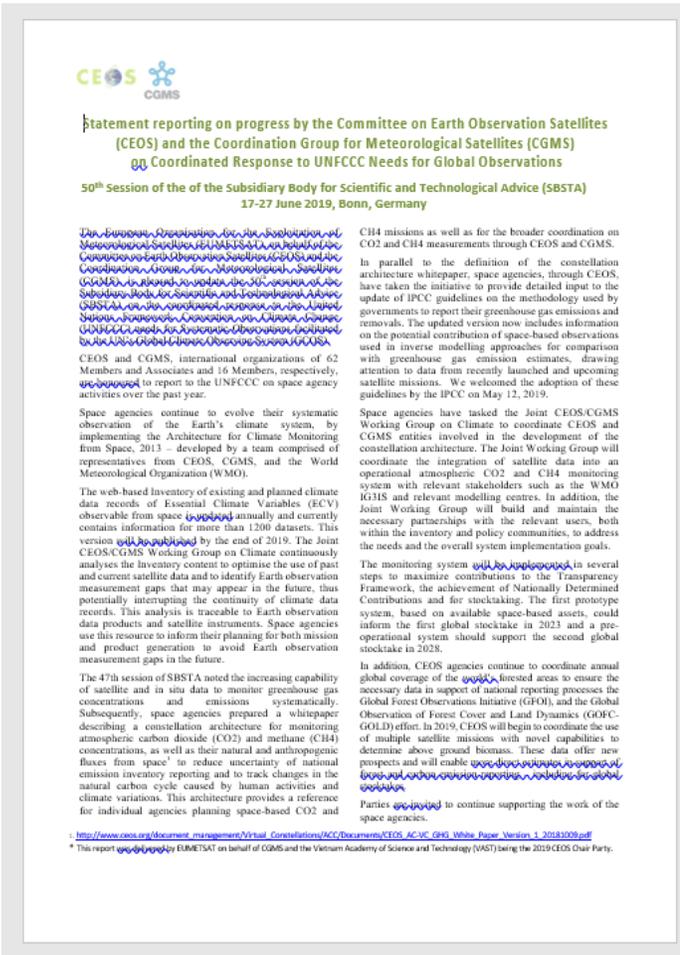


Coordinated Response



GCOS

GLOBAL CLIMATE OBSERVING SYSTEM



- CEOS/CGMS regularly provide statements to SBSTA demonstrating relevant progress concerning climate observations including GHG;
- Progress was echoed in Conclusions of the Systematic Observation chapter, e.g., the ECV Inventory, and the contributions that satellite data can have to reduce uncertainty of national emission inventory reporting and to track changes in the natural carbon cycle caused by human activities and climate variations;
- Other items in the statement were:
 - update of IPCC guidelines on the methodology used by governments to report their greenhouse gas emissions and removals;
 - forest monitoring activities (GFOI and GOFD);
 - use of multiple satellite missions with novel capabilities to determine above ground biomass.