



# Status and Plans of the Joint CEOS-CGMS Working Group on Climate

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Presented to CGMS-51

Agenda item: CGMS-51-JWGCLIM-WP-02

## Executive summary of the WP

Executive Summary: The CEOS-CGMS Joint Working Group on Climate met in Tokyo for its 18<sup>th</sup> meeting (WGClimate-18) in February, 2023. The Group focused on developing its 2023 Work Plan, including prioritizing initiatives. Top priorities include:

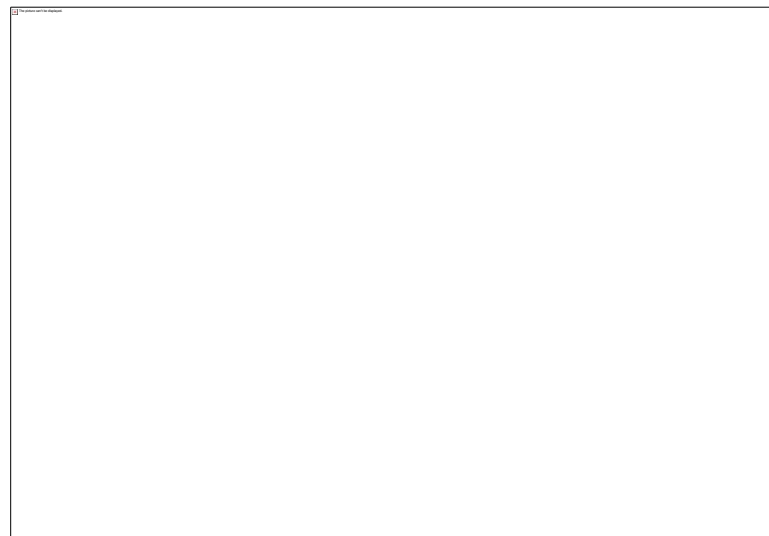
- 1) New approach to Space Agency Response to the 2022 GCOS Implementation Plan (IP)
- 2) Developing the Space Agency Statement for SBSTA delivered at COP-28
- 3) Updating Essential Climate Variable (ECV) Inventory (v5; +45 CDRs)
- 4) Overhauling the Inventory structure and processes for simplification
- 5) Completing a merged Gap Analysis Report (v3/4.1) for the Inventory

Considerations for CGMS:

- 1) Preferred approach to review/approve staggered results on GCOS IP Response
- 2) Path for systematizing GHG capabilities needed for Global Stocktakes 2+
- 3) Guidance on engaging NewSpace entities, especially for GHGs
- 4) Appropriate role complementing new WMO Global Greenhouse Gas Watch
- 5) Guidance on new process for SBSTA Statement development and approval
- 6) WGClimate limited by small number of active parties – seeking additional players

# Outcomes from WGClimate-18

- WGClimate-18 hosted by JAXA in Feb/Mar 2023
- Focus: 2023 Work Plan
  - Prioritizing tasks, opportunities
  - Staffing plan, partnerships
- Top 2023 Priorities
  - Develop Space Agency Response to GCOS Implementation Plan (2022)
  - Complete Gap Analysis Report (v3/4.1)
  - Update and restructure ECV Inventory
  - Develop Statement for SBSTA at COP-28



# New Response Approach to GCOS IP (2022)

- Tight coordination with GCOS leadership
- Goal: Staying current and more responsive to user needs
  - Each GCOS Action assigned to a dedicated team
  - Team composition: WGClimate + GCOS experts
  - Each team determines best start & end dates
    - Different finish times; Some may remain “working” for 5 years
  - Teams currently deciding schedules (2023 or 2024 starts)
- **Seek:** CGMS preference on approval process given fluid end-points



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# ECV Inventory Update & Restructuring

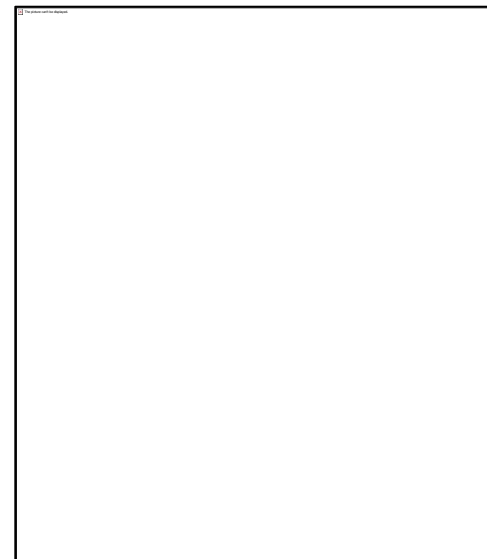
- Version 5: expected December 2023
  - Routine update with ~45 previously-submitted records
- Version 6: expected December 2024
  - Overhauling design and processes to simplify, reduce burden & cost
    - Expanded quickly: ~200 to ~2000 records; diverse user community
    - Paused due to contract recompetition; restarting ~December
  - Working with WMO for improved OSCAR interface for ECV gap analyses

# Statement to SBSTA at COP-28

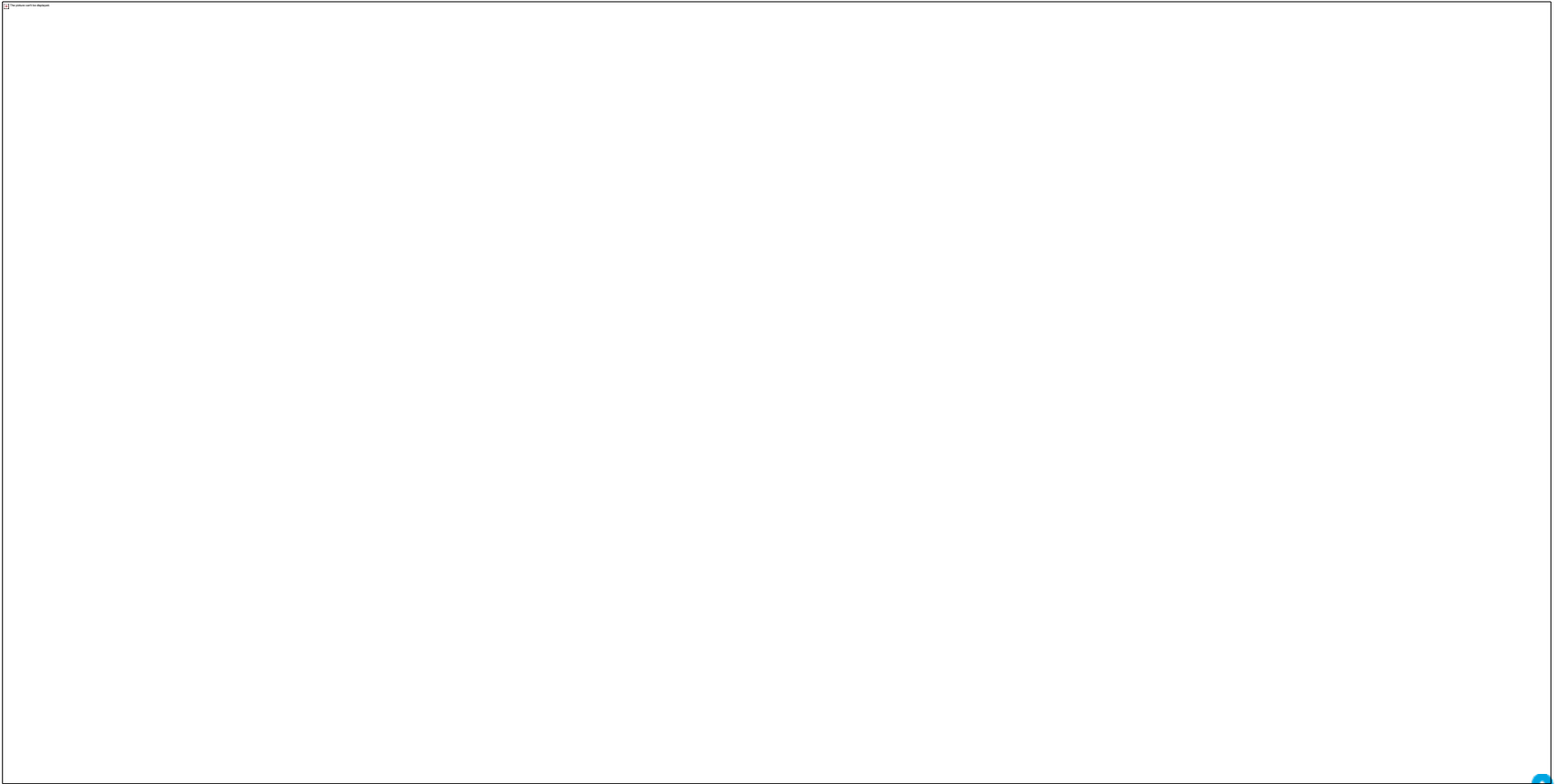
- WGClimate is conduit for CGMS and CEOS to SBSTA/UNFCCC (<2')
- Previous focus: initiatives, accomplishments
- New focus: educating via findings, messaging, advocacy
  - 2023: Inventory Gap Analysis, 1st Global Stocktake; Observation infrastructure needs
- Will coordinate with new SBSTA Secretariat once in place
- **Seek:** CGMS review of Statement vetting process (circa 2018)
  - WGClimate consults with SBSTA and develops 1 page draft (August)
  - Send to GCOS Secretariat (September)
  - Send to CEOS or CEOS SIT Chair (September)
  - Send annotated draft to agency lead of delegation, represents CGMS & CEOS (3-4 weeks out)
  - Delegation finalizes and delivers to SBSTA at COP-28 (Nov/Dec)
    - WGClimate can deliver if requested

# WGClimate-18: Other Activities

- CDR Use Cases
  - 15 published online (of 22 received)
  - Continue to accept new submissions
    - Seeking linkages to organizations with similar activities
  - Now emphasizing external visibility and outreach
- Definition taxonomy for long-term records
  - Recent adjustments to scope and definitions
    - Reacting to additional agency interest and feedback
  - Manuscript expected late 2023
- **Seek:** Greater participation: More work than (active) WGClimate members



# Use Cases Geographical Distribution





# Greenhouse Gas Task Team

- Met in February alongside WMO GHG Workshop
  - Focus: tightening Work Plan, metrics
- Key 2023 Activities
  - Lessons Learned from 1<sup>st</sup> Global Stocktake (CO<sub>2</sub> & CH<sub>4</sub> data sets)
  - Coordinate and align with AFOLU (new AFOLU Roadmap in review)
  - Discussions with WMO Global Greenhouse Gas Watch on complementary roles
  - Update GHG Roadmap
  - Coordinate and interface with growing set of GHG missions
    - Preparing community for new products
    - Advocating standards and “virtual continuity” through uncoordinated missions
    - Some in NewSpace – uncharted waters
- **Seek:** CGMS guidance on
  - Engagement with NewSpace
  - Systematizing capacity to support Global Stocktakes 2+ (2027)
  - “Operational” requirements from CGMS for cadre of non-operational missions
    - “Not mature but can’t wait” -Yasjka Meier, ESA, GHG TT Lead

## Key issues of relevance to CGMS:

- The WGClimat and Greenhouse Gas Task Team (GHG TT) made substantial contributions to the first Global Stocktake of the Paris Agreement
- Most contributions stemmed from *ad hoc* research satellites and systems.
- For 2<sup>nd</sup> Stocktake and beyond, need to move toward systematizing and operationalizing the space and ground architectures
- Expanded field measurement network urgently needed (towers, aircraft, flasks)
  - Evaluation of satellite data (not validation because measuring different things)
  - Stocktakes, modeling, monitoring, markets require data from *both* space and field
  - Private and non-profit sector doesn't work in this space
- **Key decisions points are upon us now – seeking heightened engagement**
- More generally, seeking heightened agency participation in climate space

Thank You

From top of SkyTree

## Backup Slide: Recent Advocacy @ COP-27, AMS

AMS's 38th Conference on Climate Variability and Change: Poster #66

### A Definitions Taxonomy for Satellite Climate Data Records and Time Series Data Sets

Jeffrey L. Privette (NOAA), Wenyang Su (NASA), Jörg Schulz (EUMETSAT), Christopher J. Merchant (University of Reading)

**Introduction**

- Sustained and consistent space-based observations began in the 1970s with satellites from NOAA, EUMETSAT, NASA, USGS and the U.S. Department of Defense.
- Climate Data Records – consistent time series data merged from successive satellites – are used to characterize, monitor and model the environment, conduct scientific analyses, and with industry, social or economic data to reveal relationships and develop predictive models.
- Various groups have proposed definitions for these data, including the U.S. National Academies of Science, the Global Climate Observing System (GCOS), the Committee for Earth Observation Satellites (CEOS), the Coordination Group for Meteorological Satellites (CGMS), as well as some research teams (e.g., Milne et al., 2019).
- Existing terminology is inconsistent, incomplete, ad hoc or has become inadequate as remote sensing and climate science have evolved.
- The Joint CEOS-CGMS Working Group on Climate (WGClimate) is developing new definitions within a self-consistent taxonomy. The draft definitions will be reviewed by other international organizations before publication.
- Community adoption of the final taxonomy will facilitate more effective communication among CDR developers, producers and users.

**Problem: Inconsistent and Incomplete Naming of Satellite Time Series Data Sets**

	Raw Data	Lowest-Latency Time Series	Single-Mission/Reprocessed Time Series	Complete Period of Record Time Series
<b>Description</b>	Retrieved Data	Calibrated Observations	Retrieved Observational Variables	General Category
<b>Typical Characteristics</b>	Unprocessed	Unprocessed	Processed	Processed
<b>Categorical Terms</b>	Raw	Operational Products	Calibrated Products	Reprocessed Products
<b>NOAA</b>	Level 0	Level 1	Level 2	Level 3
<b>NASA</b>	Level 0	Level 1	Level 2	Level 3
<b>ECMWF</b>	Level 0	Level 1	Level 2	Level 3
<b>GCOS</b>	Level 0	Level 1	Level 2	Level 3
<b>EUMETSAT</b>	Level 0	Level 1	Level 2	Level 3
<b>Proposed new defined terms</b>	Level 0	Level 1	Level 2	Level 3

**Proposed: A Coherent Taxonomy of Satellite Time Series Data Set Definitions**

- A **Forward-processed Data Record (FDR)** is a time series of data, located in time and space, processed and released for the first time from a given input data set and production system. Subtypes are **Fundamental (FDR)** and **Thematic (TDR)**.
- A **Mission-reprocessed Data Record (MDR)** is a consistently-processed time series of data, located in time and space, produced using observations from instrument(s) on one observing platform that improves upon a previously-released version of the record. Subtypes are **Fundamental (MDR)** and **Thematic (TMDR)**.
- A **Climate Data Record (CDR)** is a consistently-processed time series of uncertainty-quantified data, located in time and space, of sufficient length and quality to be useful for climate time-scale uses.
- A **Fundamental CDR (FCDR)** is a consistently-processed time series of uncertainty-quantified sensor observations calibrated to physical units, located in time and space, of sufficient length and quality to be useful for climate time-scale uses.
- A **Thematic CDR (TCDR)** is a consistently-processed time series of uncertainty-quantified values of a geophysical variable or related indicator, located in time and space, of sufficient length and quality to be useful for climate time-scale uses.
- An **Interim CDR (ICDR)** is a consistently-processed time series of uncertainty-quantified data, located in time and space, processed with a system approximating an operational CDR system but operating at lower latency.