CEOS Working Group on Climate

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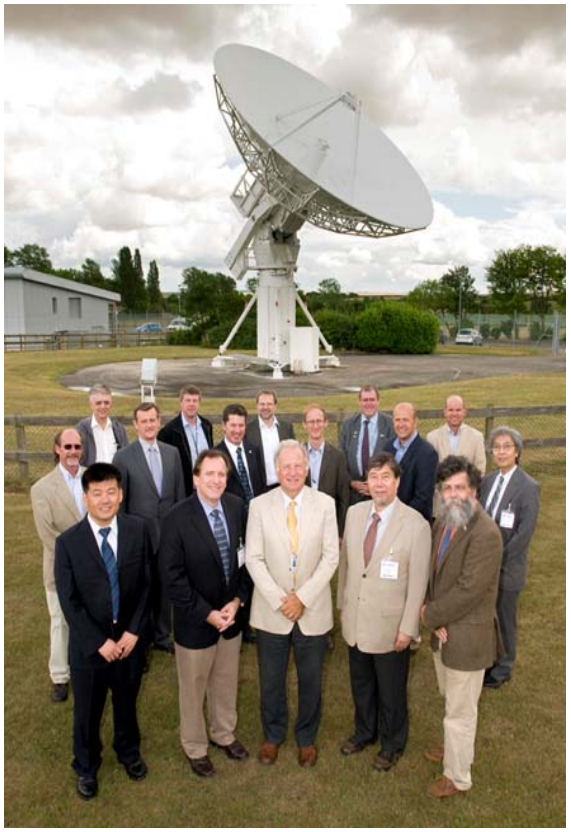
Committee on Earth Observation Satellites

Committee on Earth Observing Satellites
Working Group on Climate (WGClimate)



WGClimate was endorsed as a full CEOS WG (joining WGISS, WGCV and WGEdu) and will coordinate and encourage collaborative activities between the world's major space agencies in the area of climate monitoring

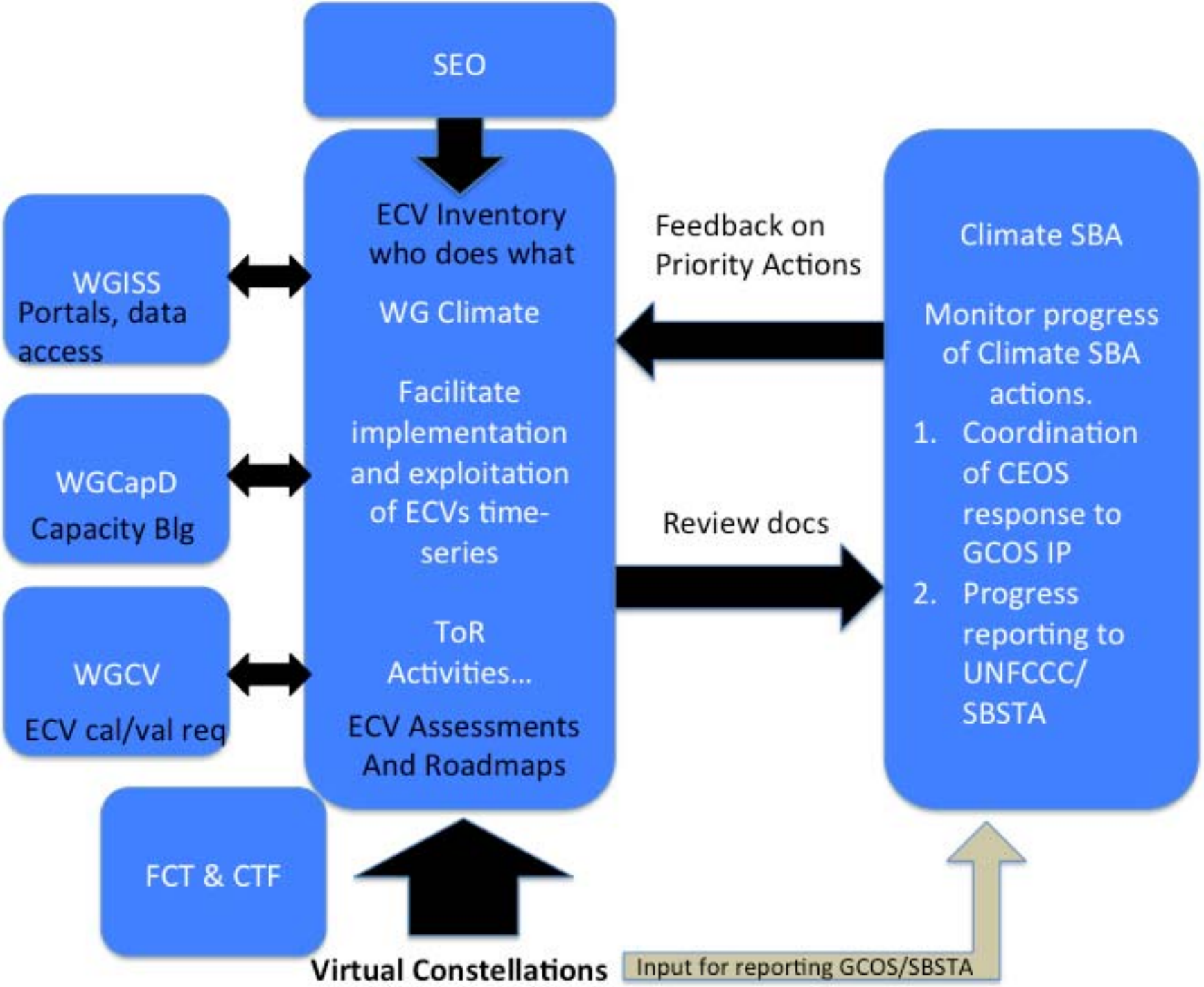
The Mission of the Working Group Climate (WGClimate) is to facilitate the implementation and exploitation of Essential Climate Variable (ECV) time-series through coordination of the existing and substantial activities undertaking be CEOS member agencies. This includes the numerous iterative steps involved in the creation of ECVs and ensuring ECV life cycle information is gathered, organized, and preserved for future generations.

Chair of CEOS WGClimate
Mark Dowell (EC/JRC)
Vice Chair John Bates (NOAA/NCDC)

Terms of Reference

The CEOS Climate Working Group will:

1. **Review and assess, on behalf of CEOS, the generation of Fundamental Climate Data Records (FCDRs) and derived Essential Climate Variable (ECV) climate products supported by Member space agencies, complementary with existing entities and roles;**
2. **Contribute to the review of compliance of satellite missions and products with the GCOS Climate Monitoring Principles and with the "Guideline for the Generation of Datasets and Products meeting GCOS Requirements" (GCOS-143);**
3. **Identify multi-agency implementation teams for each product and review their actions, and ensure that a coherent implementation plan exists for each and every product taking full account of other pertinent international initiatives such as SCOPE-CM and science programmes;**
4. **Make recommendations to the above teams and receive recommendations from them, for transmission to CEOS Agency Principals;**
5. **Ensure coherence of climate product generation supported by space agencies, including with other relevant international initiatives, in particular SCOPE-CM, and);**
6. **Undertake any other relevant activities as instructed by CEOS Chair.**


SEO
ECV Inventory
who does what
WG Climate
Facilitate
implementation
and exploitation
of ECVs time-
series
ToR
Activities…
ECV Assessments
And Roadmaps
WGISS
Portals, data
access
WGCapD
Capacity Blg
WGCV
ECV cal/val req
FCT & CTF
Feedback on
Priority Actions
Review docs
Climate SBA
Monitor progress
of Climate SBA
actions.
1. Coordination
of CEOS
response to
GCOS IP
2. Progress
reporting to
UNFCCC/
SBSTA
Virtual Constellations
Input for reporting GCOS/SBSTA

Revised WGClimate ToR

In addition, it will:

Ensure a plan is put in place for the development of a CEOS response, which has broad consultation across the community, and provides the basis for future planning and priority setting by space agencies in response to climate information needs, including:

- **The update of the CEOS Response to GCOS requirements, and**
- **The update of reports to SBSTA/UNFCCC on CEOS climate actions, as requested;**

…

In carrying out the tasks above, it will:

…

Track the progress of the detailed Actions Plans developed by CEOS in the *CEOS Response to the GCOS IP* for all of the ECVs involving space-based observations.

Revised WGClimate ToR

We also took the initiative in revising the ToR to add specific reference to the long-term Climate Monitoring Architecture activity (which had not started after the inception of the WG).

"Define and implement a consistent Climate Monitoring Architecture for space-based observations and ensure the complementarity of CEOS efforts with those of partner coordinating bodies (e.g. CGMS)"

Deliverables 2012

1. Logical Architecture Development (complete)
2. Complete first ECV inventory (on-going)
3. WGClimate VC Pilots: assessments, metrics (on-going)
4. CEOS Response to the GCOS IP and COP-18 engagement (complete)

CEOS Response

- Responds to the GCOS Actions
- Reinforces the needs called out by the GCOS Satellite Supplement
  - Provides more detail on the deliverables, coordination, activities and who will lead the effort.
  - Calls out agency activities
  - Calls out international coordination
- Can include additional activities not called out by GCOS but may be considered important by CEOS.

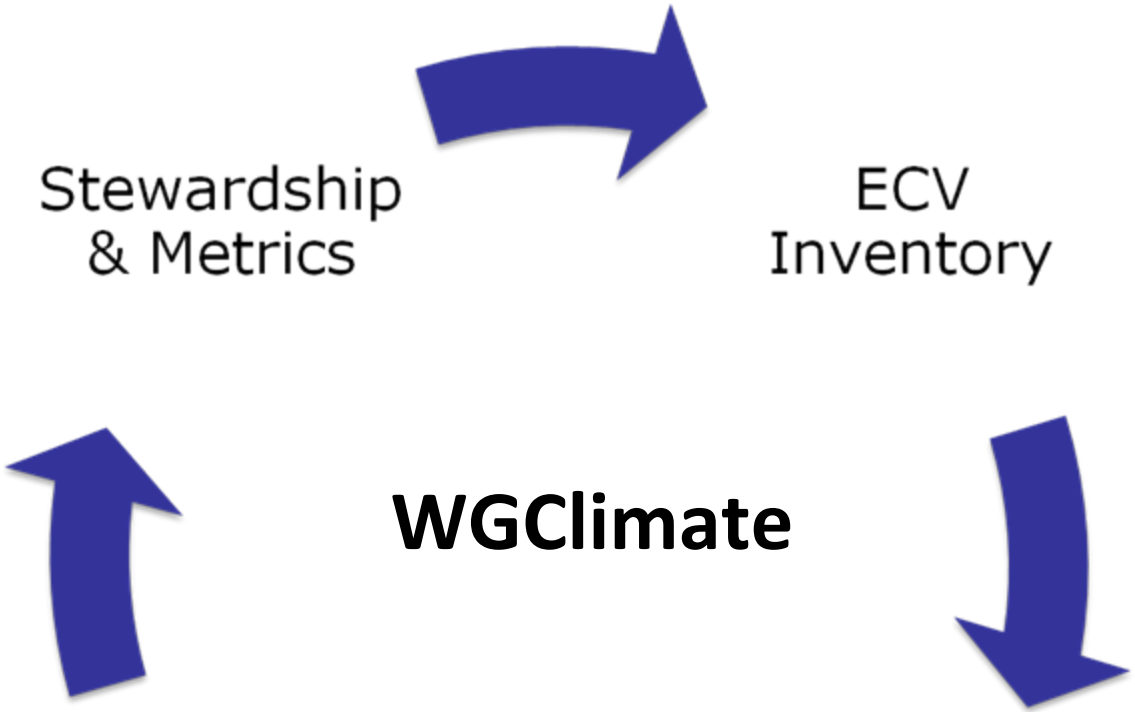
47 Actions addressed

2012 CEOS-GEO Actions
Status Update

Action Number	CL-01-C2_1
Description	CEOS Response to new GCOS Implementation Plan: Once the updated GCOS IP is released, CEOS is expected to update its response to the original IP from 2006. which served as the basis for the 59 CEOS Climate actions. The Climate SBA Coordinator will take responsibility for ensuring a plan is put in place for development of a CEOS Response which has broad consultation across the community and provides the basis for future planning and priority setting by space agencies in response to climate information needs
POC(s)	Mitch Goldberg – Climate SBA/NOAA, Mark Dowell-WGClimate/EC-JRC
2012 Milestones/ Deliverables	Prepare final version of CEOS Response to GCOS-IP(2010) to deliver the UNFCCC/SBSTA by September 2012
Main 2012 Accomplishments	Report finalized and delivered to UNFCCC Secretariat on 21st of September 2012. Report presented at COP-18/SBSTA-37, conclusions of SBSTA-37 acknowledge submission of report and thanked CEOS for their continuing efforts.
Status	*Closed – new activities will be planned for 2014. No explicit Action in 2013*
Comments	**CEOS needs to consider how it addresses future reporting to UNFCCC/SBSTA and it's support for the convention. SBSTA would, in future reporting cycles, appreciated update including all CEOS activities relevant to the Convention, including: support to GCOS, support to REDD, and the work of the CTF on carbon**

Text relevant to CEOS in SBSTA conclusions

"The SBSTA expressed its appreciation to CEOS for its update on progress made by space agencies providing global observations in their coordinated response to relevant needs of the Convention. It noted the importance of continuing and sustaining satellite observations on a long-term basis, and the role of CEOS in promoting full and open data sharing, in order to support the work under the Convention. It invited CEOS to provide, by SBSTA 41, an updated report on progress made by space agencies providing global observations in their coordinated response to relevant needs of the Convention."

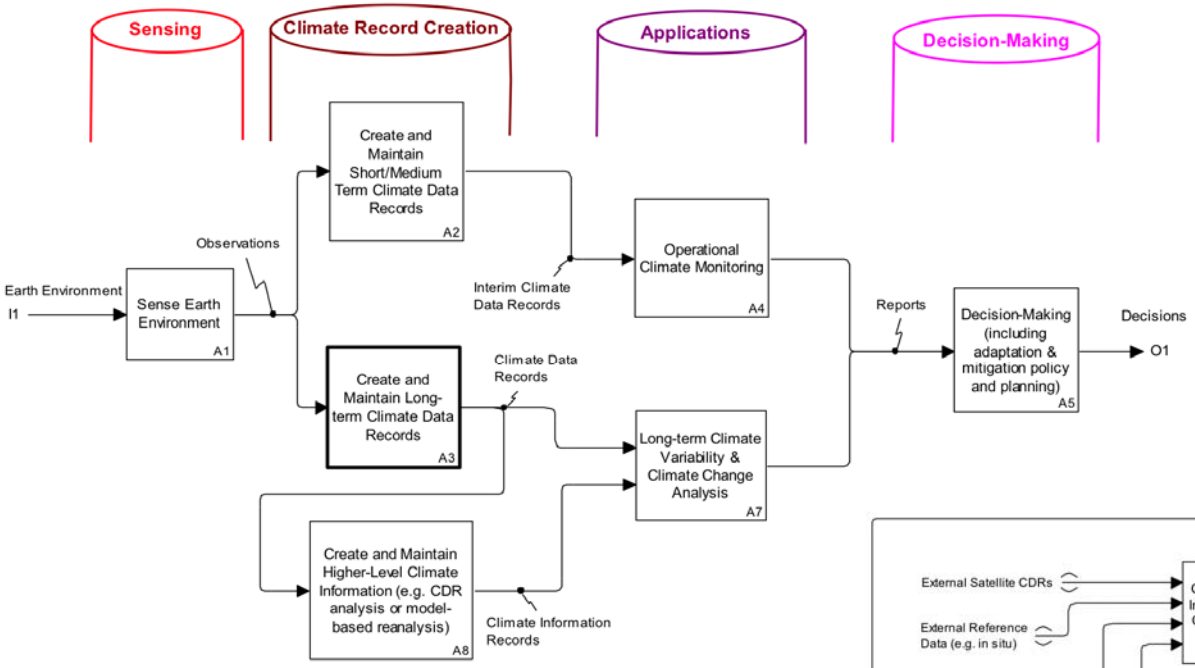

Stewardship & Metrics
ECV Inventory
WGClimate
ECV Assessments
Architecture

Why do we need a Climate Monitoring Architecture?

Three main "needs/usage scenarios" have emerged for a climate monitoring architecture:

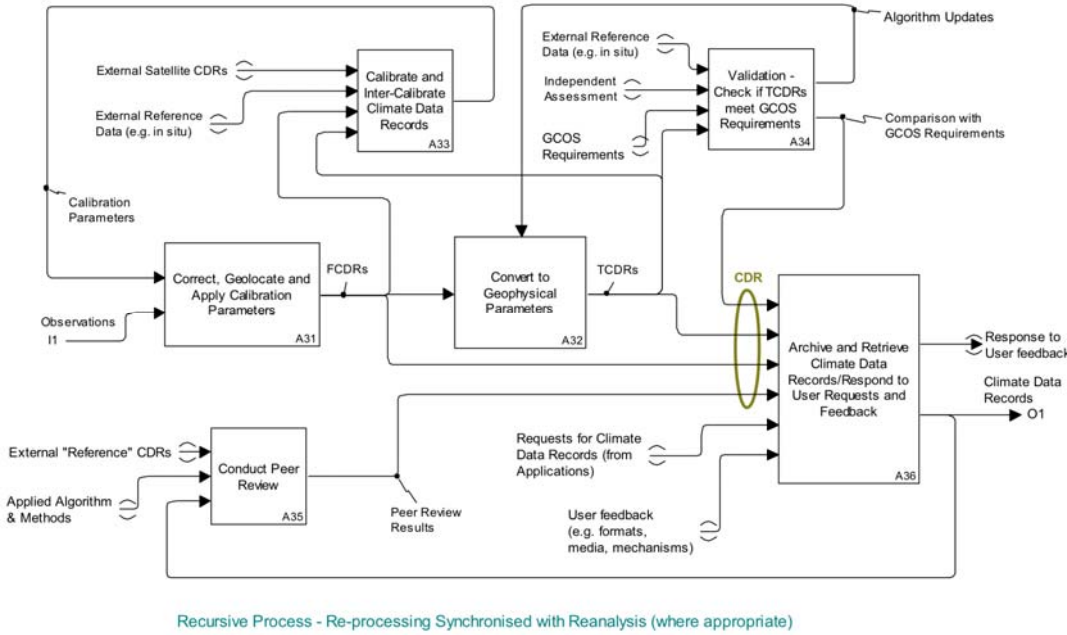
- A Assist in promotion of a common understanding of the implementation implications of meeting the various space-related climate monitoring requirements (e.g. from GCOS)
- B To support an assessment of the degree to which the currently implemented systems meet the requirements (and the generation of an action plan to address identified shortfalls/gaps/duplication)
- C To improve our understanding of the end-to-end information flows and dependencies (i.e. from sensing through to decision-making)

Logical representation



Traceable to GCOS Guidelines and GCOS Climate Monitoring Principles

Traceable from ECV Inventory and physical representation of Climate Monitoring Architecture



Climate Monitoring Architecture Report

- **Report: final version typeset (NOAA).**
- **Publication: decision to publish the report as a unbranded document (printed by ESA)**

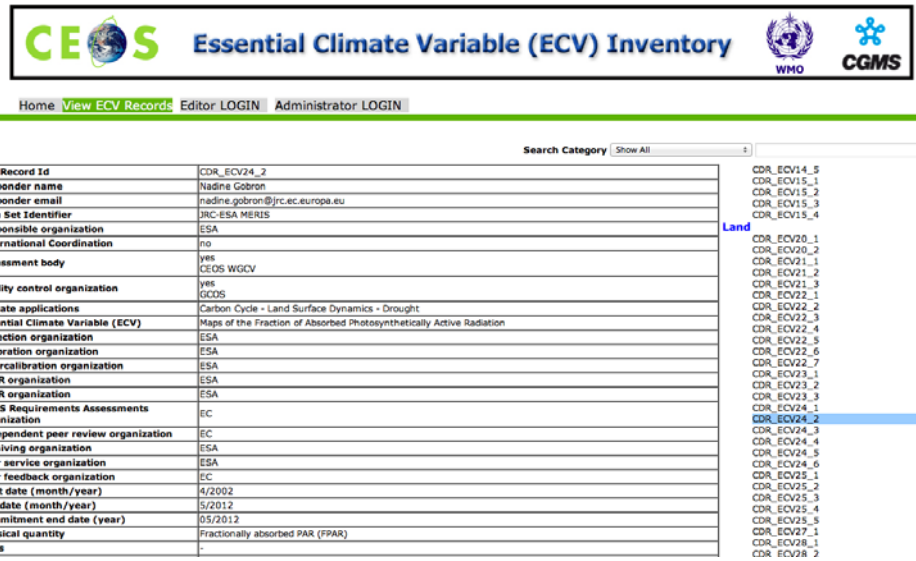
This strategy document is also seen as a foundations for the GFCS Monitoring and Observation Pillar

ECV Inventory Questionnaire

- Joint activity with CGMS and WMO
- Call released with MIM in May, responses were due October 5th
- Questionnaire form – through a web interface.
- Responses were requested at the dataset level
- Addresses both existing / past missions and future / planned mission in two separate questionnaires

Areas:

1. General
2. Dataset Usage
3. Dataset Stewardship
4. Dataset Properties
5. Dataset Access



How will we use the ECV Inventory

1. Describes the current and planned monitoring capability on an ECV basis (allow easier response to e.g. GCOS IP)
2. combined perspective of the logical and physical views should enable the definition of an optimum “macroscale” space system configuration and its components
3. used at the ECV/product level to identify gaps and shortfalls
4. formulation of a coordinated action plan to address such gaps and shortfalls…
5. trigger for the medium-term activities that need to be undertaken to sustain the long-term implementation of the architecture

ECV Inventory Response so far

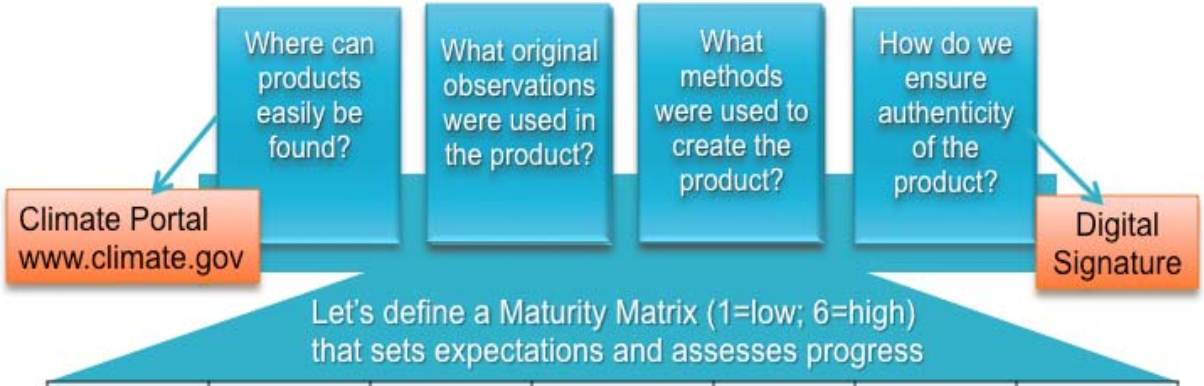
- ECV inventory now contains ~ 220 records
- No records were submitted for the following ECVs: carbon dioxide, methane, and greenhouse gases; sea state; sea surface salinity; lakes; above ground biomass; ice sheets
- Some records are still incomplete and we encourage organizations to continue submitting data so we may begin conducting analyses

- http://www.ecv-inventory.com

Metrics

Maturity Matrix

- **Ultimate ambition – define CEOS "endorsed" Maturity metrics**
- **Starting point - NOAA effort**
- **Task within WGClimate, to review/modify => improve**
- **One size may not fit all**
- **It is as much a tool to monitoring progress as it is to provide a snapshot of current capability**



Collection Methods	Algorithm stability	Metadata & QA	Documentation	Validation	Public Release	Science & Applications
How was the data collected, sensors, surveys, etc.?	Are algorithms under configuration management and how mature?	How full and complete are the metadata and quality assessment?	Is the Operational Algorithm Description full, complete, and peer reviewed?	How complete is the validation?	Are the data, algorithms and software open and available to the Public?	How extensive is the peer reviewed literature and how varied are the applications?

Source J. Bates

End to end analysis of specific ECVs

What need to be done ?

- Additional requirements
- Assessments
- Metrics
- Roadmaps

Pilots

- SST
- OCR
- …

Joint Research Centre

Who could contribute to this?

Internal

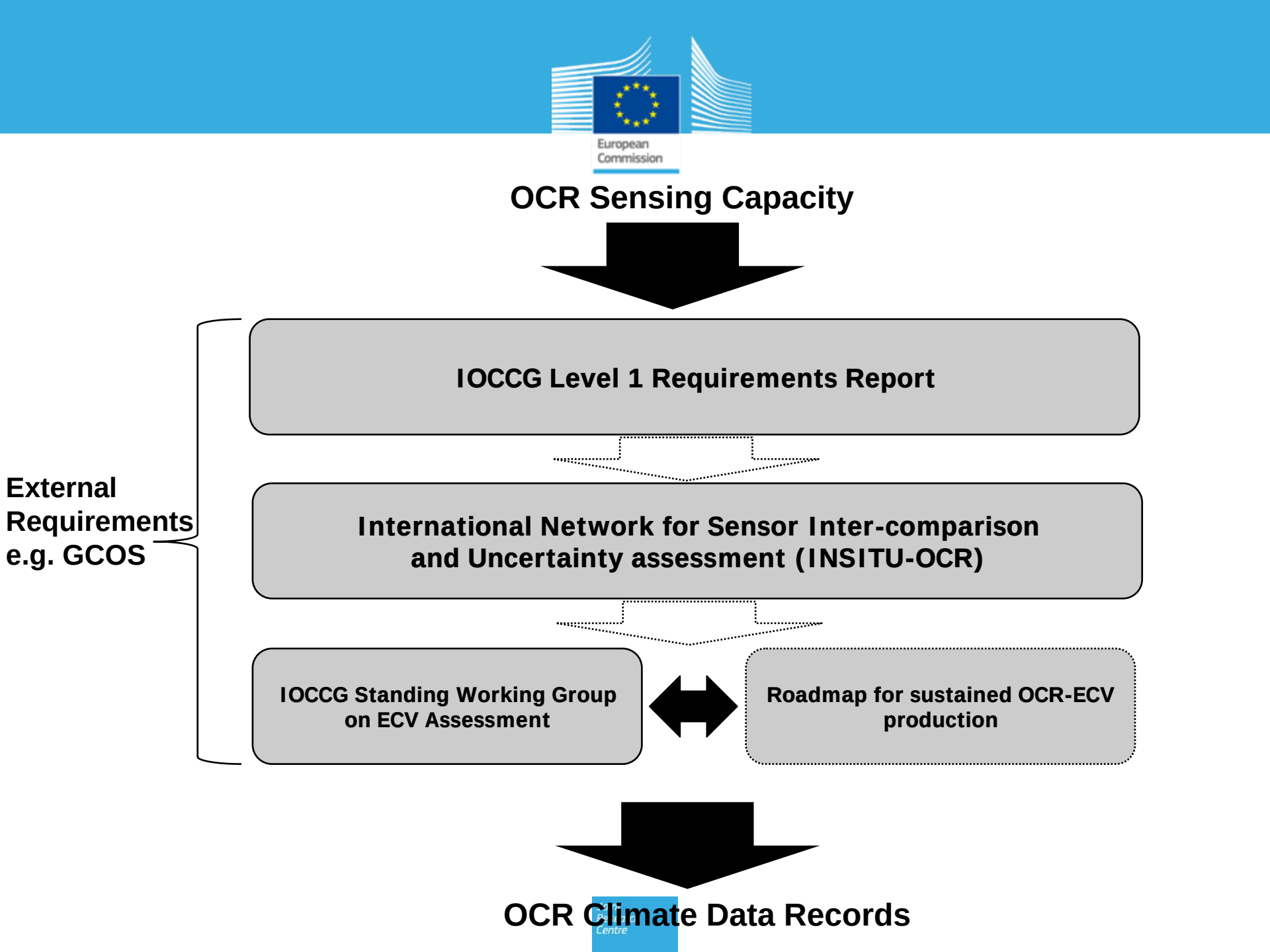
1. Virtual Constellations
2. Working Groups (particularly WGCV)

External

1. **WCRP-WDAC**
2. **GEWEX & SPARC**
3. **Scientific Groups associated with VCs (e.g. IOCCG)**

WGClimate and the VCs

- **Some VCs already committing to new ECV relevant activities e.g. IOCCG/OCR-VC Standing "WG" on ECV Assessments, SST-VC/GHRSST CDR-TAG**
- **Generalisation is sometimes impractical (and may not be useful).**
- **Converging on the following areas (at least for the near-future):**
  - **ECV Assessments**
  - **Metrics**
- **ECV Inventory will also provide information for forward looking roadmaps**


OCR Sensing Capacity
IOCCG Level 1 Requirements Report
External Requirements e.g. GCOS
International Network for Sensor Inter-comparison and Uncertainty assessment (INSITU-OCR)
IOCCG Standing Working Group on ECV Assessment
Roadmap for sustained OCR-ECV production
OCR Climate Data Records

CEOS Self-study

Initiative championed by NASA as SIT Chair

Dedicated session with CEOS agency principles at SIT-28 (NASA Langley, March 2013)

We can't prejudge the outcome, but…

- Virtual Constellation will undoubtedly emerge as important implementation mechanism
- The positive relationship between the VCs and scientific organizations (such as IOCCG, GHRSST) will be further encouraged
- The support of the VCs in advancing the development of CDRs will underlined