Climate Monitoring Architecture and the ECV Inventory

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Genesis of the activity

- January 2011 WMO/GCOS Meeting
- Agreed to develop a strategy for climate monitoring architecture
- Identified adhoc group
  - CEOS
  - CGMS
  - WMO Space Programme
- Identified review group
  - GEO
  - GCOS
  - WCRP
- Develop strategy for developing the architecture

No logo / Badgeless Activity

Initial Report Content

- **Executive Summary and recommendations**
- **Introduction, Objectives & Targets**
- **Climate Monitoring Principles, Requirements & Guidelines**
- **State of the Art**
- **Beyond research to operations**
- **Climate Architecture definition**
- **Mechanisms for Interaction**
- **Roadmap for way forward**

satellite
data
climate
requirements
Climate
monitoring
GCOS
GSICS
missions
series
e.g.
long-term
research
QA4EO
LEO
Monitoring
ESA
Global
coordination
sensors
accuracy
irradiance
different
applications
Gap
reference
standards
community
CMA
expected
logical
main
range
term
report
practices
particular
include
strategy
CGMS
instruments
global
needs
Sea
record
system
processing
sustained
implementation
support
components
analysis
related
time
space
WMO
ECV
NOAA
weather
Operational
assessment
surface
well
Earth
measurements
Observation
Architecture
Figure
order
areas
land
change
required
View
instrument
international
systems
Satellite
information
ensure
processes
Requirements
level
view
satellites
CCI
process
EUMETSAT
ete
see
IR
records
use
traceability
situ
quality
provide
planned
WGCV
observations
architecture
calibration
Data
Cal/Val
set
Table
new
GEO
CEOS
observation
within
key
needed
activities
future
budget
products
need
also
validation
Records
operational
NASA
current
radiation
based
necessary
detailed
continuity
JAXA
including
product
CDR
among
agencies
provides
identified
observing
years
ECVs
used
relevant
specific
generation
Monitoring
expected
CMA
community
LEO
standards

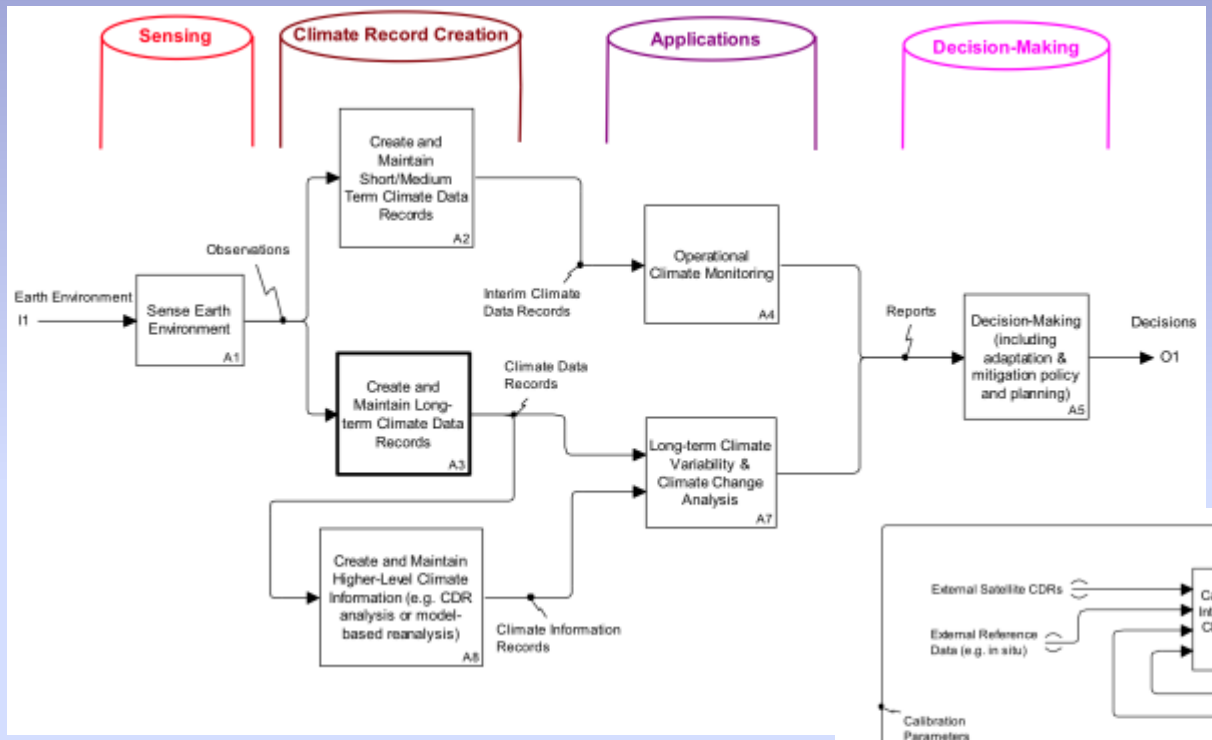
Positioning the report

- approach adopted is intentionally open and inclusive
- designed so that all the relevant entities can identify their potential contributions
- even if this maybe beyond their existing capabilities and programmatic obligations
- in recognition of the need to obtain the maximum degree of consensus at this early stage in the process, the level of definition of the architecture is necessarily high-level and conceptual.

Logical and Physical Architecture

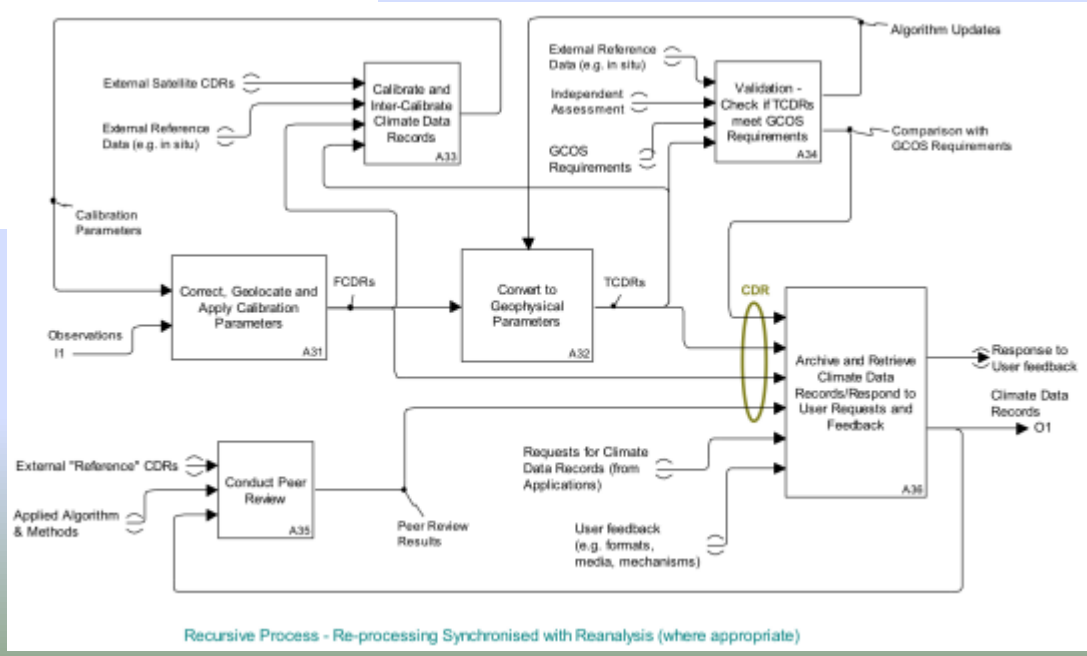
- **logical view**: represents the requirements baseline as a set of interlinked functions and associated dataflows (i.e the target) . Logical view is as stable as the requirements baseline and, once established, should require little maintenance
- **physical view**: describes how the logical view is implemented, i.e. how close we are to achieving the target. Needs to maintained on a regular basis to make sure it appropriately reflects the prevailing status (will take longer to determine)

Logical representation

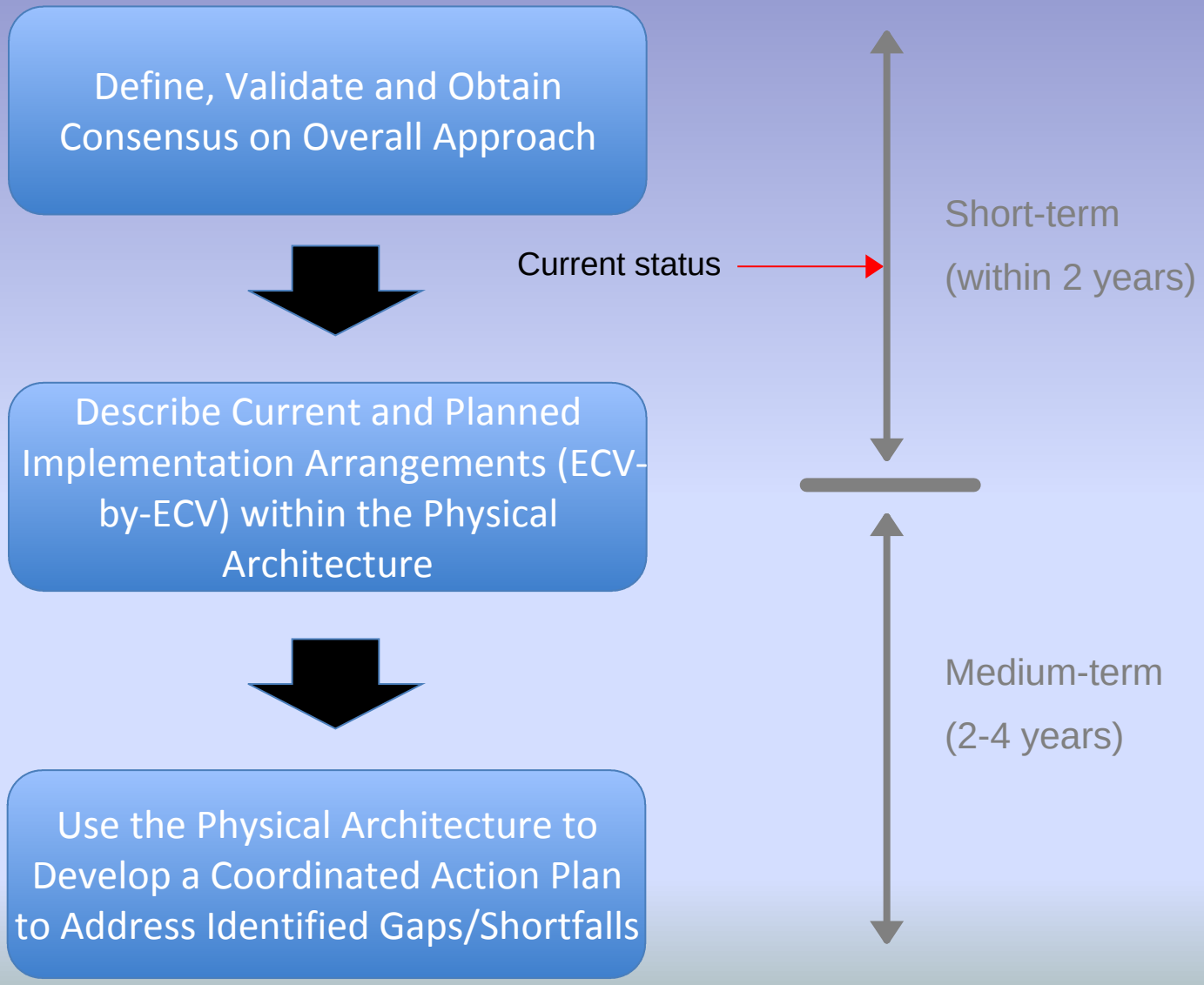


Traceable **to** GCOS Guidelines and GCOS Climate Monitoring Principles

Traceable **from** ECV Inventory and physical representation of Climate Monitoring Architecture



Way Forward


Define, Validate and Obtain Consensus on Overall Approach
Current status
Short-term
(within 2 years)
Describe Current and Planned Implementation Arrangements (ECV-by-ECV) within the Physical Architecture
Medium-term
(2-4 years)
Use the Physical Architecture to Develop a Coordinated Action Plan to Address Identified Gaps/Shortfalls

Physical representation (1)

- Main Objective
  - To systematically expose the ECV-relevant data holdings of space agencies to potential users

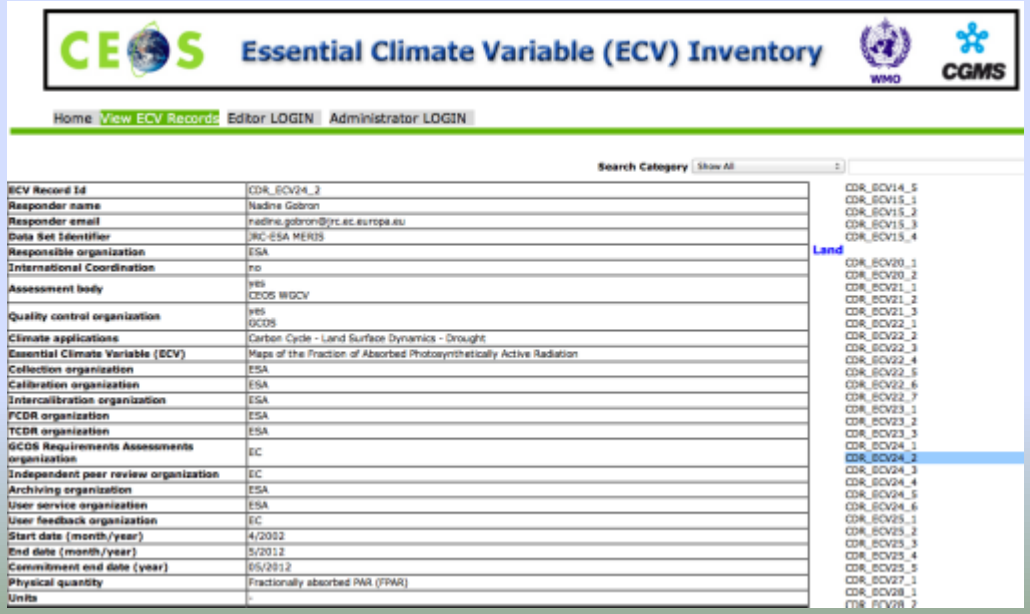
- Methodology
  - Step 1: Invite agencies to populate a questionnaires aimed at characterising the relevant datasets, including:
    - Implementation responsibilities for each of the functions identified in the logical architecture
    - Anticipated usage (relevant ECV, potential applications)
    - Technical properties (accuracy, stability, coverage, frequency, length of record, etc)
    - Admin aspects (access conditions, formats supported, contact points…)

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 (1/2)

- ECV inventory now contains 171 records submitted for 11 responsible organizations
- 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 incomplete and we encourage organizations to continue submitting data so we may begin conducting analyses
- Some organizations have stated this is a partial submission list and require more time

ECV Inventory Summary

Domain	ECV NAME	Number of Records
Atmosphere	Surface Wind	18
	Upper-air temperature	6
	Water vapor	12
	Clouds	31
	Precipitation	6
	Earth radiation budget	23
	Ozone	11
	Aerosols	12
	Upper-air wind	1
Ocean	Sea-ice	6
	Sea level	4
	Sea surface temperature	5
	Ocean Color	4

ECV Inventory Summary

Domain	ECV NAME	Number of Records
Land	Glaciers and ice caps	2
	Snow extent	3
	Albedo	7
	Land cover	3
	FAPAR	6
	LAI	5
	Fire disturbance	1
	Soil moisture	2
	Land surface temperature	3

ECV Inventory Response so far (2/2)

- We are prepared to continue to accept entries from agencies (including to complete those currently entered as placeholders) until the end of this calendar year.
- A concern is that for many Agencies we still don't have specific p.o.c for the ECV Inventory
- We will start our analysis on the datasets available in January.
- We expect to have some preliminary results to show at SIT-28 with a full analysis by the respective CEOS and CGMS 2013 Plenaries

Next meeting

- Planned joint meeting adhoc Climate Monitoring Architecture group, WGClimate-3, SCOPE – CM, WCRP-WDAC
- 18th-22nd February at WMO in Geneva, “Climate from Space” week
- Joint adhoc Climate Monitoring Architecture & CEOS WGClimate for first analysis of material from ECV Inventory

Points for Discussion

1. ECV Inventory – additional time until end of the year
2. Help is available, please confirm p.o.c
3. Additional CGMS Agency involvement for the analysis phase of ECV Inventory is welcome (see Feb. 2013 meeting)
4. Further discussion required on mechanisms of interaction/governance: Architecture activity (CGMS-CEOS-WMO), WGClimate-SCOPE-CM Phase 2, GFCS Engagement

http://www.ecv-inventory.com

Present List of Participants

- EC – Mark Dowell, Chair
- ESA – Pascal Lecomte
- EUMETSAT – Joerg Schulz, Robert Husband
- JMA – Yoshihiko Tahara
- NASA – Richard Eckman, Eric Lindstrom
- NOAA – John Bates, Suzanne Hilding, Chuck Wooldridge, Mitch Goldberg
- INPE – Daniel Alejandro Vila
- WMO – Jerome Lafeuille, Barbara Ryan, Tillmann Mohr, Hye Jin Lee