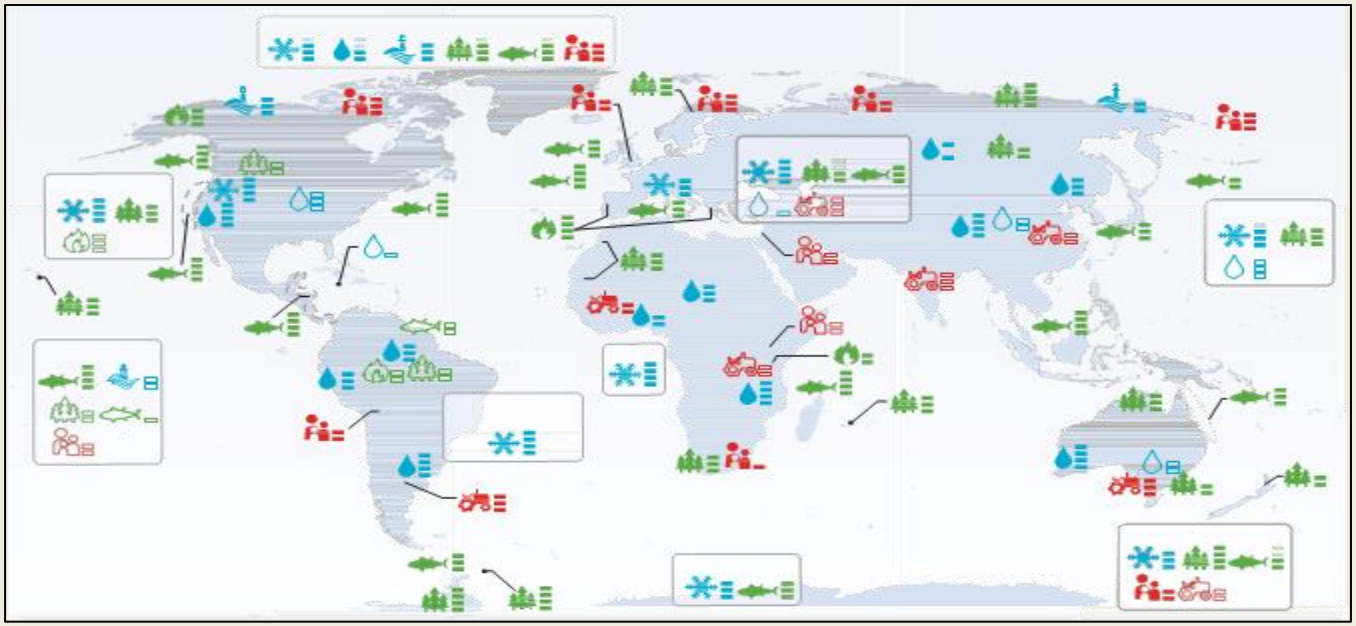
Assessing Observation Needs in Data Quality, Data Access, and Stewardship for Preparedness and Adaptation

John Bates

Chair Joint CEOS-CGMS Working Group on Climate



GCOS/IPCC/UNFCCC Enhancing Observations Workshop

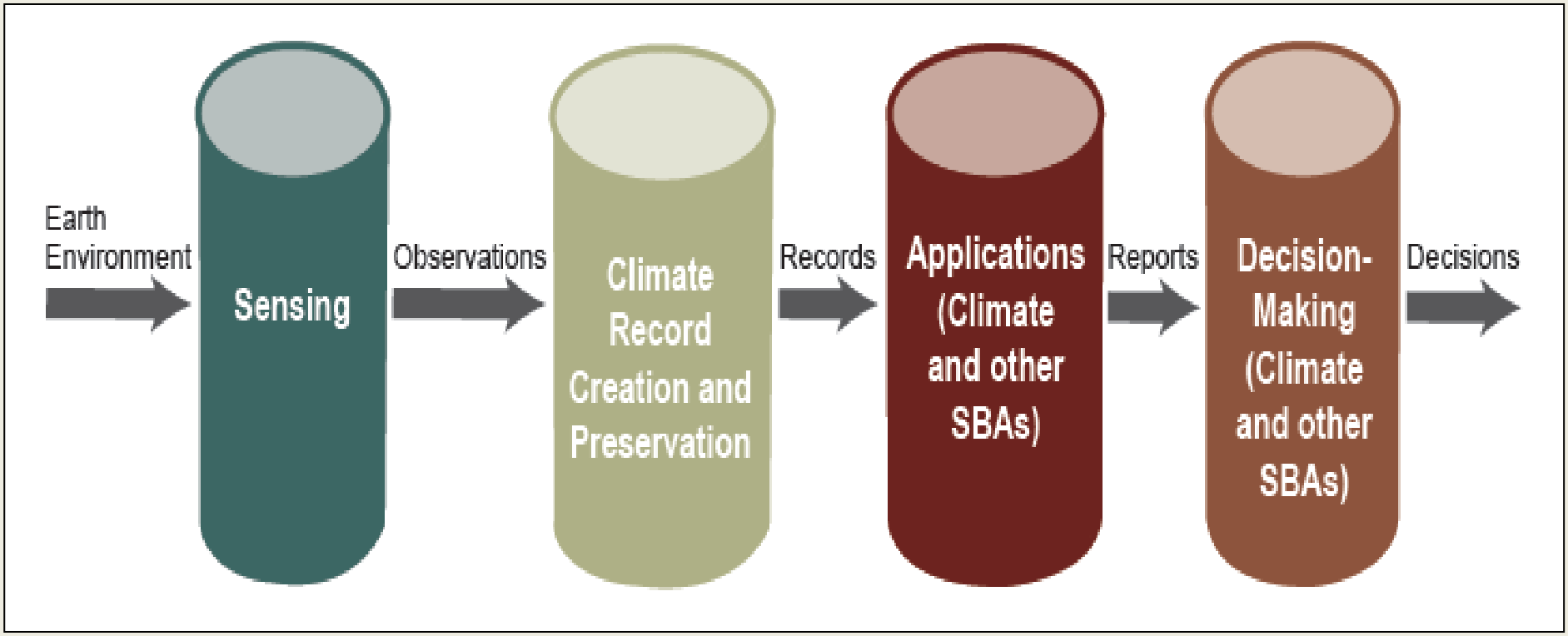
CEOS Committee on Earth Observation Satellites

CGMS

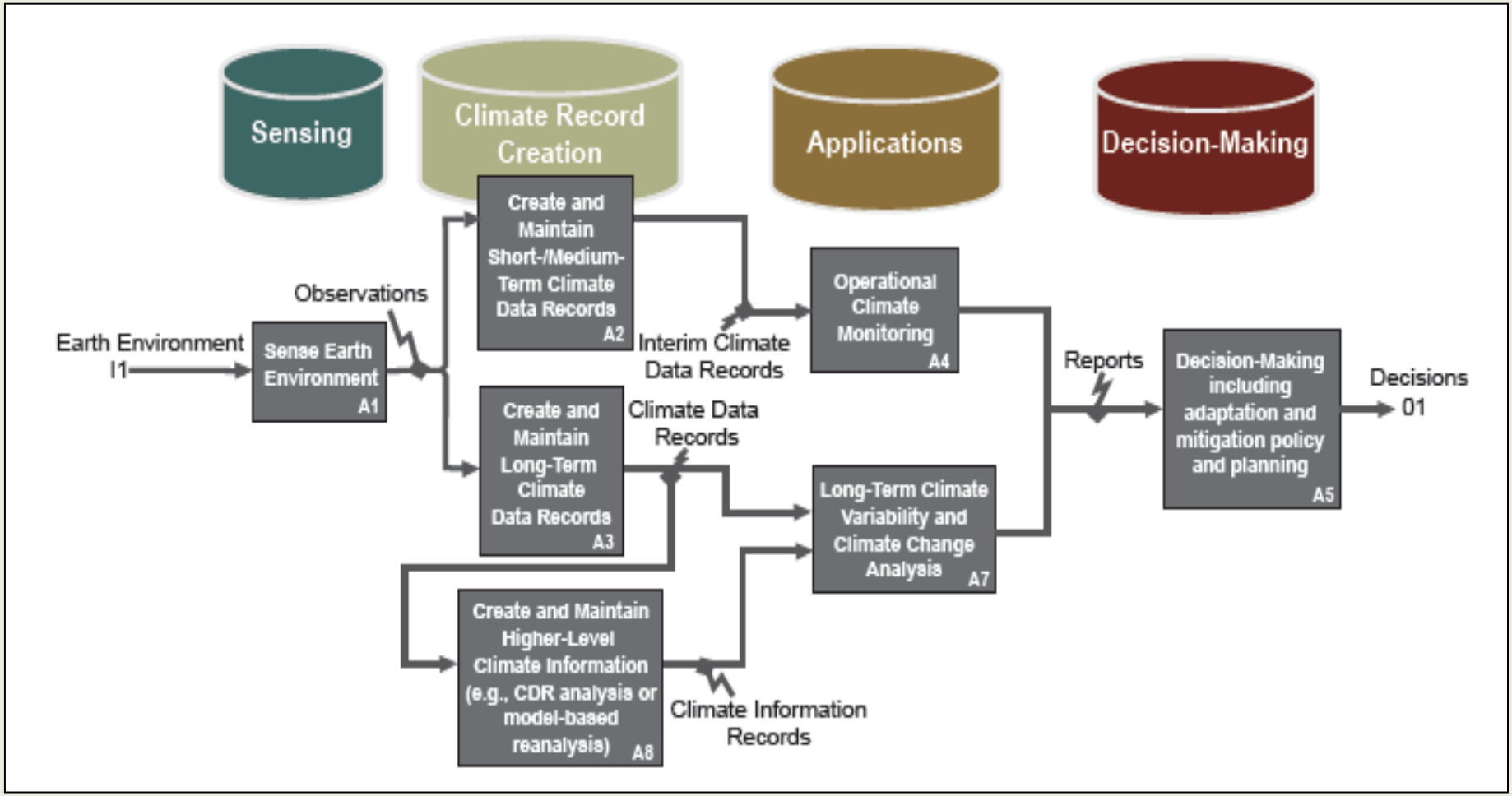
CEOS-CGMS Working Group on Climate

- The Committee on Earth Observation Satellites (CEOS) created the Working Group on Climate (WGClimate) in 2010 to serve as a focal point for Space Agency climate coordination and was joined by the Coordination Group for Meteorological Satellites (CGMS) in 2013.
- The goals of the WGClimate include:
  - Providing a comprehensive and accessible view as to what Climate Data Records are currently available
  - Making best use of currently available data by delivering additional Climate Data Records (e.g. by identifying and targeting cross-calibration or re-processing gaps/shortfalls)
  - Optimizing the planning of future satellite missions and constellations to expand existing and planned Climate Data Records, in terms of both coverage and record length

Climate Monitoring Logical Architecture 4 Pillars

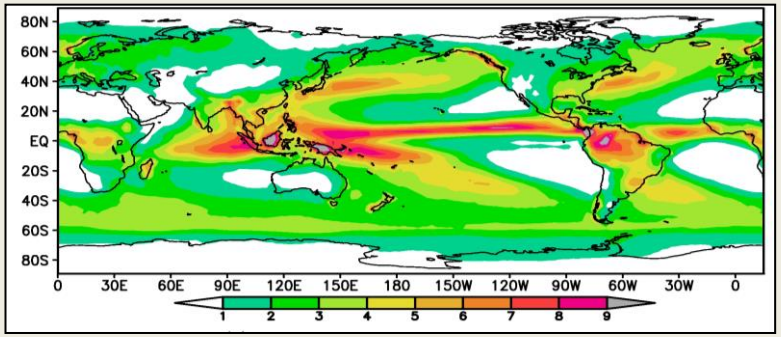


Climate Monitoring Logical Architecture – Data Flow

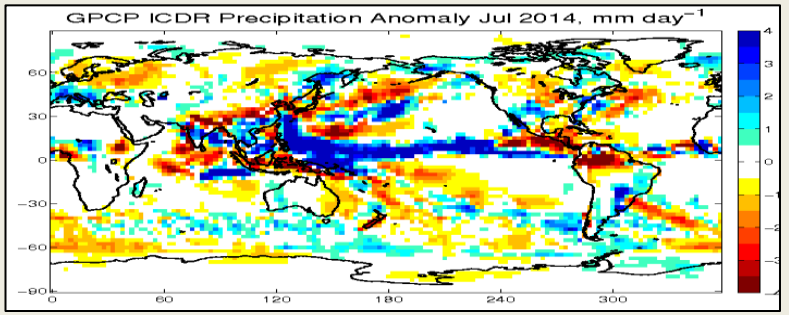


Climate Record Creation, Applications, and Decision Making Examples

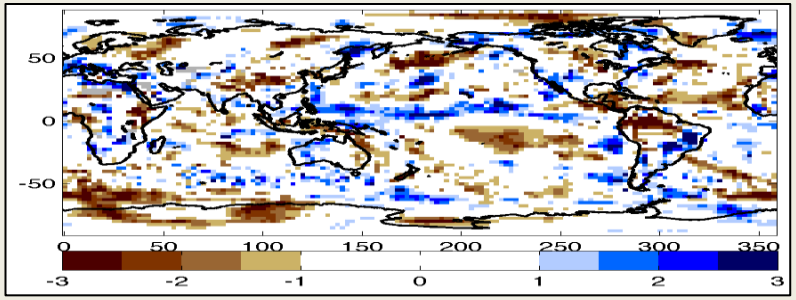
- EVC/CDR Mean - Precipitation 1979-2013



- Interim CDR - Precipitation anomaly for July 2014

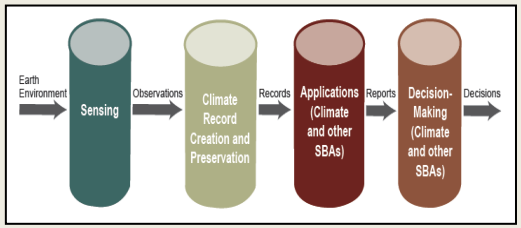


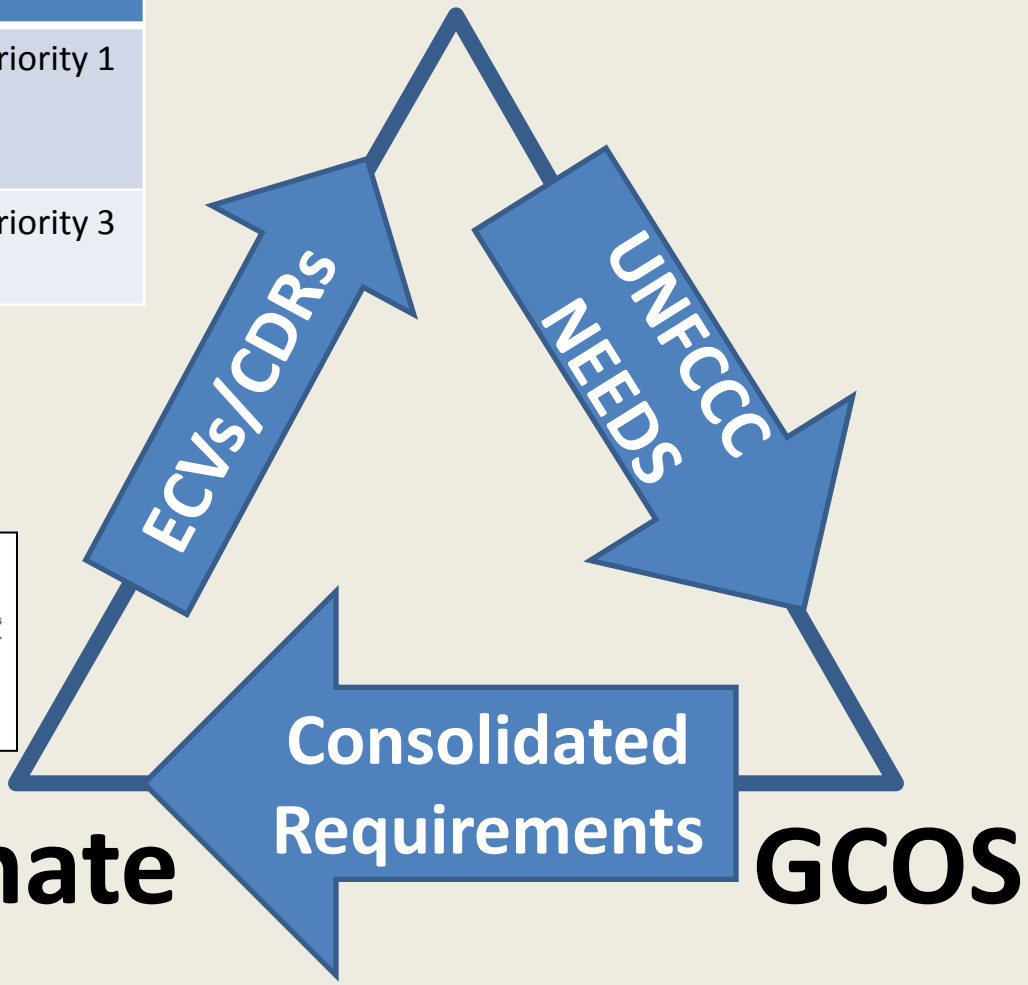
- Climate Information Record - Standardized Precipitation Index for July 2014



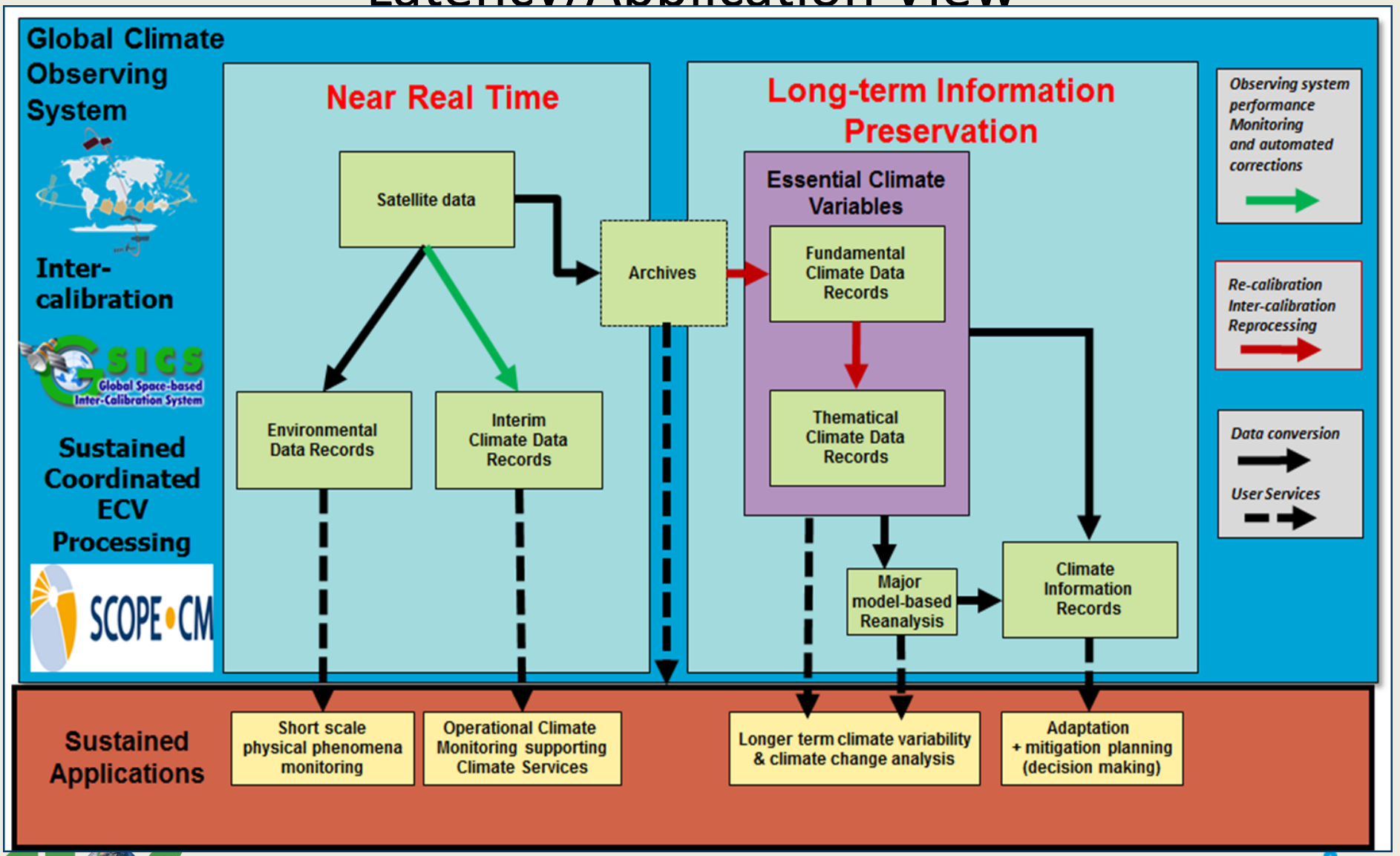
Flow of Essential Climate Variable Requirements to Products

	Carbon Cycle	Water Cycle
ECV Precipitation	Priority 2	Priority 1
ECV CO2	Priority 1	Priority 3





Climate Monitoring Architecture – Latency/Application View

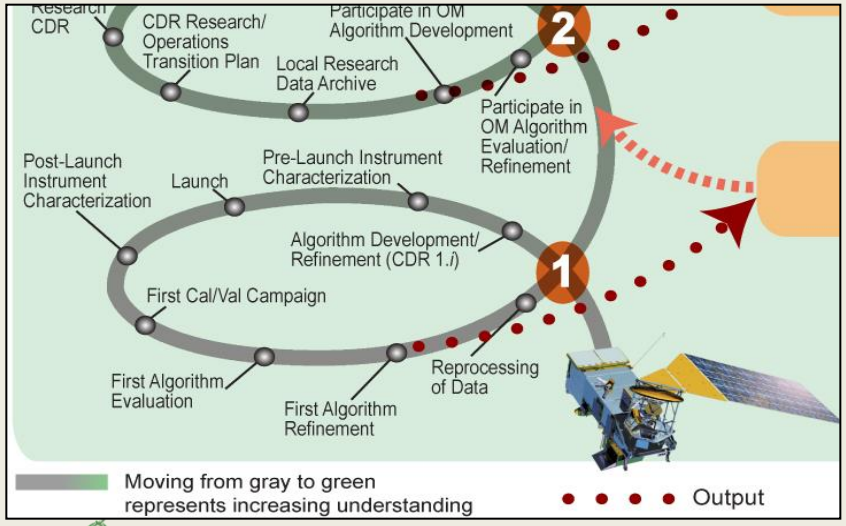


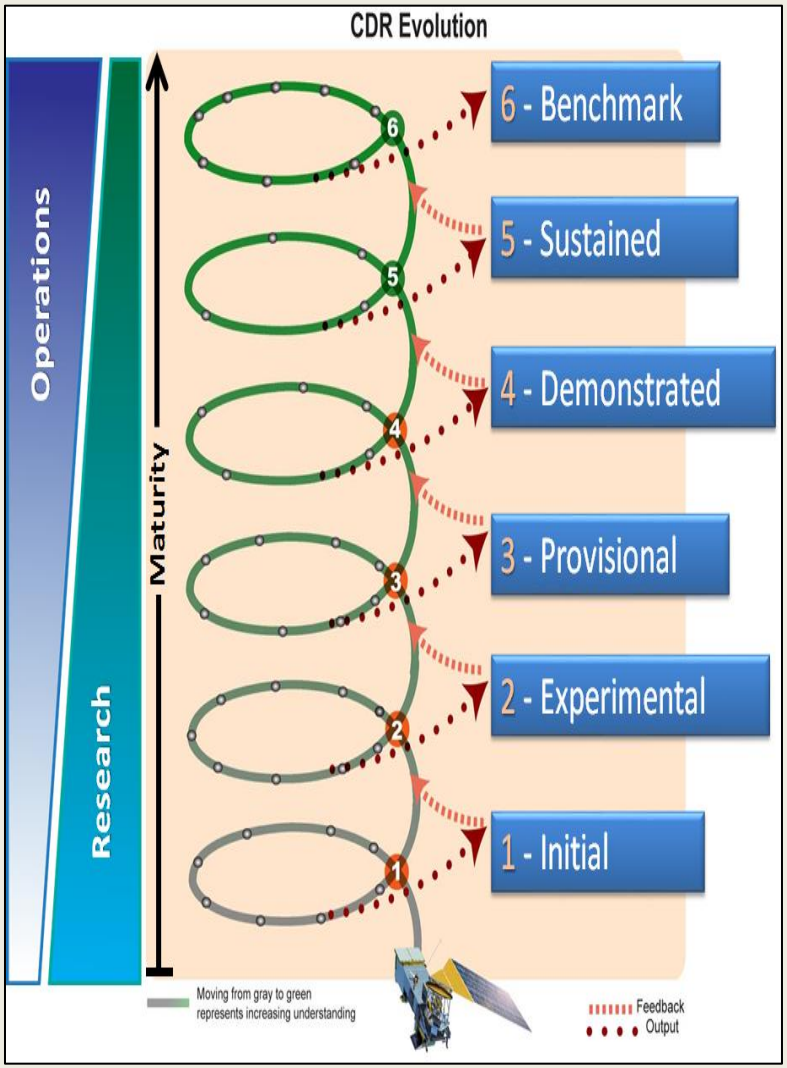
Consider Requirements for Essential Climate Service Variables (ECSVs)

- ECSVs share some heritage with ECVs, however, we expect ECSVs to
  - Have shorter time and higher space resolutions
  - Have a latency requirement
  - Have a sustained and routine delivery requirement
  - Be connected to a decision-maker for additional tailoring
- Tools being developed for ECV maturity assessment and tiers of stewardship and access can then be identified to form an end-to-end value chain using the climate monitoring architecture

Best Practices => Maturity

- Climate scientists have established an iterative process for best practices
- The maturity model captures these to facilitate inter use and establish common expectations and nomenclature



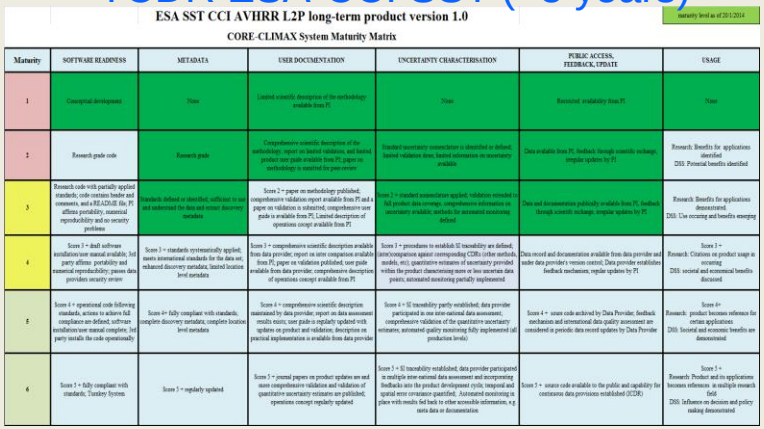


Maturing Takes Time

The maturity model needs to be applied regularly to assess progress

MATURITY	SOFTWARE READINESS	METADATA	USER DOCUMENTATION	UNCERTAINTY CHARATERISATION	PUBLIC ACCESS, FEEDBACK, UPDATE	USAGE
1						
2						
3	←					→
4						
5						
6						

TCDR ESA-CCI SST (~5 years)



ESA SST CCI AVHRR L2P long-term product version 1.0

CORE-CLIMAX System Maturity Matrix

Maturity	SOFTWARE READINESS	METADATA	USER DOCUMENTATION	UNCERTAINTY CHARACTERISATION	PUBLIC ACCESS, FEEDBACK, UPDATE	USAGE
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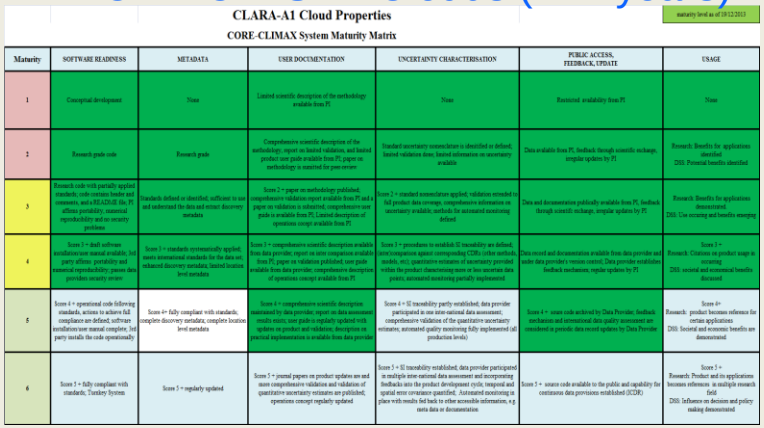
TCDR CM-SAF Clouds (~12 years)



CLARA-A1 Cloud Properties

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*Courtesy CORE-CLIMAX J. Schulz

Is the Core-Climax maturity concept generally applicable? Yes

(In-situ, Satellite, and Reanalysis CDRs)

Baseline Surface Radiation Network (BSRN)

Baseline Surface Radiation Network

maturity level as of 01/10/2014

not applicable

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NKDZ Precipitation time series

NKDZ Precipitation time series (daily station data)

maturity level as of 01/09/2014 (mm/dd/yyyy)

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Providers of Maturity Assessments for In-Situ CDRs initially indicated that the Software Readiness and User Documentation categories are not applicable to their data.

*Courtesy CORE-CLIMAX J. Schulz

CEOS Committee on Earth Observation Satellites

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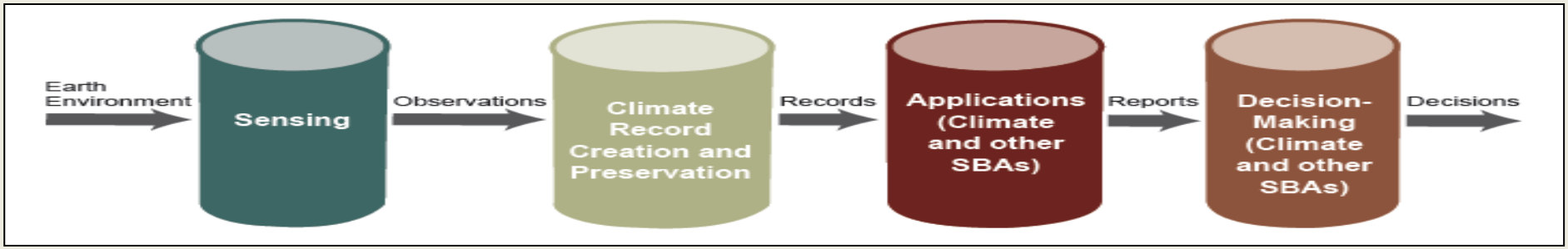
Proposed Roadmap for ECSV Requirements, Maturity Assessment, and Tiers of Service to Decision Support

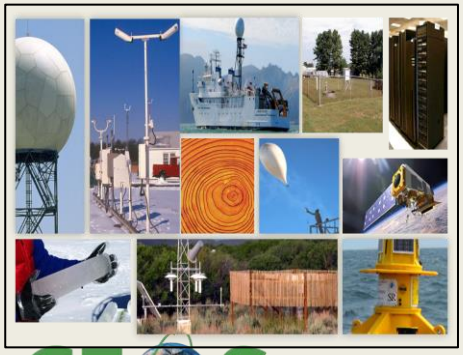


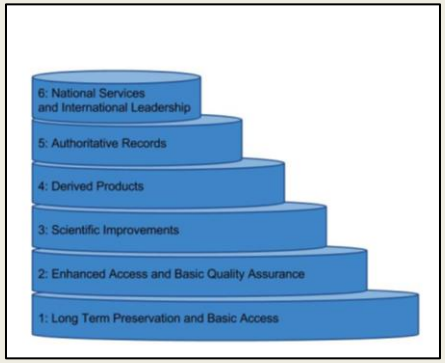
Observing System ECSV Needs Assessed

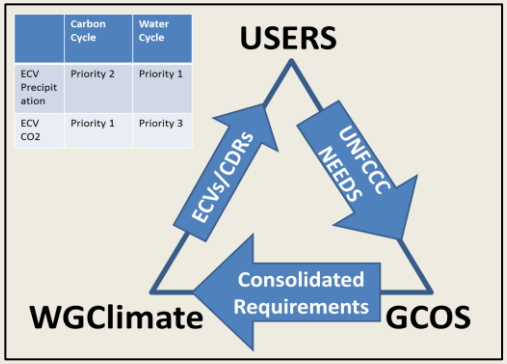
WGClimate Assesses ECSV Maturity

GCOS Captures ECSV Requirements

Establish Interface with Regional Providers







CEOS Committee on Earth Observation Satellites

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Challenge and Question

- Challenge - GCOS has established the concept of Essential Climate Variables (ECVs) to provide a consolidated and vetted set of requirements for agencies making observations. The consolidated set of requirements has been a key in organizing Space Agency observing capabilities. The current set emphasize requirements to detect anthropogenic climate change on large space and long time scales. The move to support Climate Services requires a shift in this approach to identify the requirements to support applications and decision making for a subset of the ECVs, which I am calling Essential Climate Service Variables (ECSVs).

- Question - How can GCOS/IPCC/UNFCCC work with application and decision making experts to rapidly identify climate service requirements, including quality and access/timeliness, for a few ECSVs of highest priority?