Sustained Coordinated Processing
of Environmental Satellite Data
for Climate Monitoring

A Proposed New Path for SCOPE-CM

Jeffrey Privette
SCOPE-CM Chair
NOAA

Purpose of Presentation

- SCOPE-CM Executive Panel is proposing significant changes to its purpose, function and relationship to CGMS, CEOS and WGClimate

- Informational briefing to WGClimate
  - Provide context, background, options, recommendation
  - Capture feedback for incorporation into SCOPE-CM proposal to CGMS and CEOS Plenaries

Context

Action from CGMS-46 (2018)

The WGII noted that the two most important things to achieve for SCOPE-CM in the near future are the successful conclusion of the ongoing projects including a successful delivery of data products and the establishment of a new strategy that takes the WGClimate into account and enables funded activities to maintain and establish efficient climate data records from multi agency mission data. Hence the following action was placed:

CGMS-46 actions – WGII					
Actionee	**AGN item**	**Action #**	**Description**	**Deadline**	**Status**
SCOPE-CM EP Chair	WGII/5	A46.09	SCOPE-CM Executive Panel Chair to convene a strategy planning meeting with high-level representatives from SCOPE-CM members and other interested agencies, who are empowered to authorise resources, to agree on a revised strategy for SCOPE-CM and a new Implementation Plan, which shall be reported back to CGMS-47. (Ref. CGMS-46-WMO-WP-10)	First half of 2019	**OPEN**

Realistically, such a meeting may only happen in the first half of 2019.

Background: SCOPE-CM Phase II (2012-2018)

- Goal: Advancement of the sustained generation of CDRs from satellite data
  - Increase the number of CDR generation capabilities of higher maturity

- Implementation approach
  - Identify and support CDR development or generation activities that could become (more) sustainable
    - Sponsored 8 international CDR projects
    - Sustainability framework: Maturity Matrix
  - Provide guidance and advice
  - Foster partnerships

- Phase II Implementation Plan

Options Considered for Next Phase (SEP-11, 2016)

1. Continue emphasis on maturing projects
2. Emphasize project transitions to sustained production
3. Explicitly support Climate Monitoring communities
4. Focus on coordination and sustainment

- Executive Panel recommended all of the above

Realities and Challenges Emerged

- Phase II+ Implementation Plan perpetually unfinished
- Limited meeting participation and energy
- 2017 Projects Survey: SCOPE-CM partly helpful, not critical
  - Funding sponsor agendas drive project agendas

- Other considerations
  - Who are SCOPE-CM stakeholders?
  - Is SCOPE-CM responsive to their needs?
  - Could and should SCOPE-CM do more to coordinate and sustain CDRs?

- Is SCOPE-CM working?

Task Team on SCOPE-CM Future (2017-2018)

- Convened by Chair in December 2017
- Members: EUMETSAT, WMO Space Programme, NOAA
- Reconsidered SCOPE-CM's purpose, value, options for future

- Options considered
  1. Declare victory and hibernate or dissolve SCOPE-CM
  2. No Changes – Continue Phase II
  3. Evolve into Phase II+ (As proposed in SEP-11, -12)
  4. Start a Phase III with major changes
- Also considered
  - Relationship to CEOS-CGMS Joint WG on Climate
    - Sister organization? Implementation arm? Subgroup?
  - Role and Future of Projects in SCOPE-CM

Task Team Selected Option 4: Major Changes

- Proposal for New SCOPE-CM Role – March 2018
  - Evolve focus from facilitating CDR development projects to coordinating space agency commitments for CDR sustainment

    “From Sustainable to Sustained” CDRs

  - Three primary goals
    1. Facilitate CDR-generation solutions to gaps identified in the WG-Climate Inventory
    2. Facilitate agency commitments to sustain existing production capabilities, and
    3. Facilitate CDR-generation more responsive to WMO user community needs (GCOS)

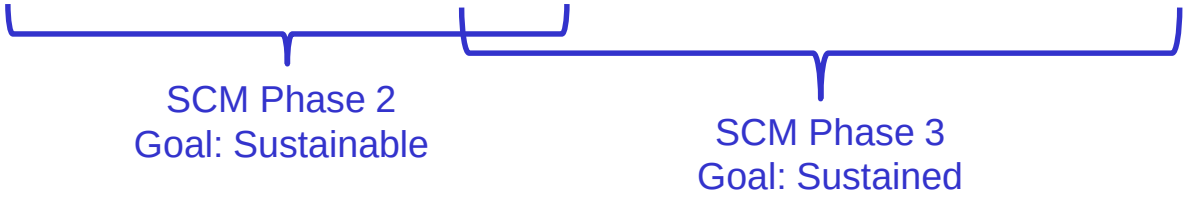
Recommendation to WGClimate: Option 4

"From Sustainable to Sustained" CDRs

- Role of organizations and agencies varies with phase

- CDR Phases

Development→ Maturation→ Intercomparisons→ Sustainment→ Monitoring & Use



- Notional ownership for phases

Researchers & Agencies→ International organizations→ Agencies → Mixed

In Phase III, SCOPE-CM Shall

1. **Coordinate CGMS agencies' contributions to Architecture for Climate Monitoring...**
   - Responds to WGClimate Objective 2: "Creation of the conditions for delivering further Climate Data Records … to fulfil GCOS requirements"
   - CDR sustainment and monitoring is closer fit to CGMS and WMO (vs. CEOS)

2. **Report to CGMS-WG II and Plenary for endorsement of plans/activities.**
   - CGMS Principal level (Plenary) provides opportunities for resources

3. **Keep Maturity Matrix for CDR sustainment and for introducing to new agencies**

4. **Next steps**
   - Document Phase II successes, challenges, lessons-learned for agency evaluation
   - Identify CGMS agencies' planned CDRs, correlate with Phase II projects to assess potential for continuation
   - Analyze CGMS contributions vs. gaps (e.g., FCDRs) to develop initial agenda.
   - Include next generation satellites to interest more agencies

Thank You!

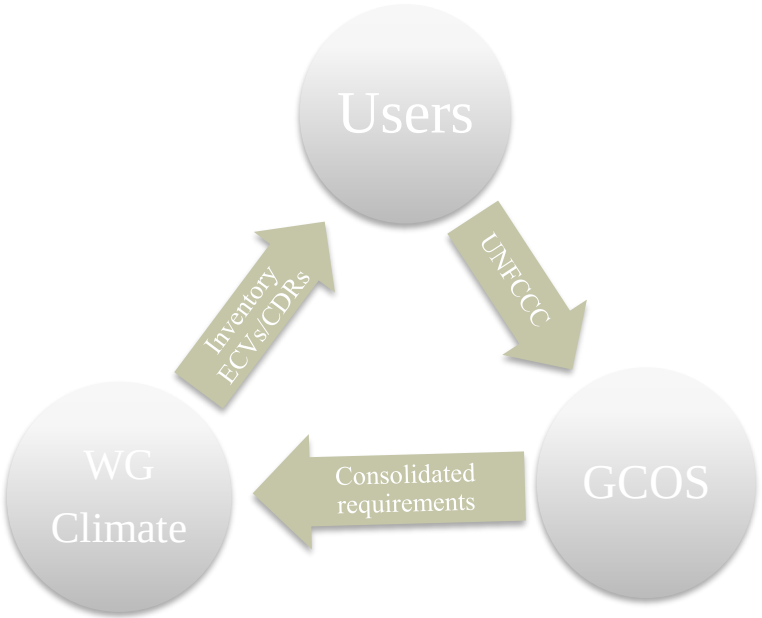
Backups

Background

- The purpose of Sustained, Co-Ordinated Processing of Environmental Satellite Data for Climate Monitoring (SCOPE-CM) is **to enable a network of facilities ensuring continuous and sustained provision of high-quality dataset for climate monitoring**.

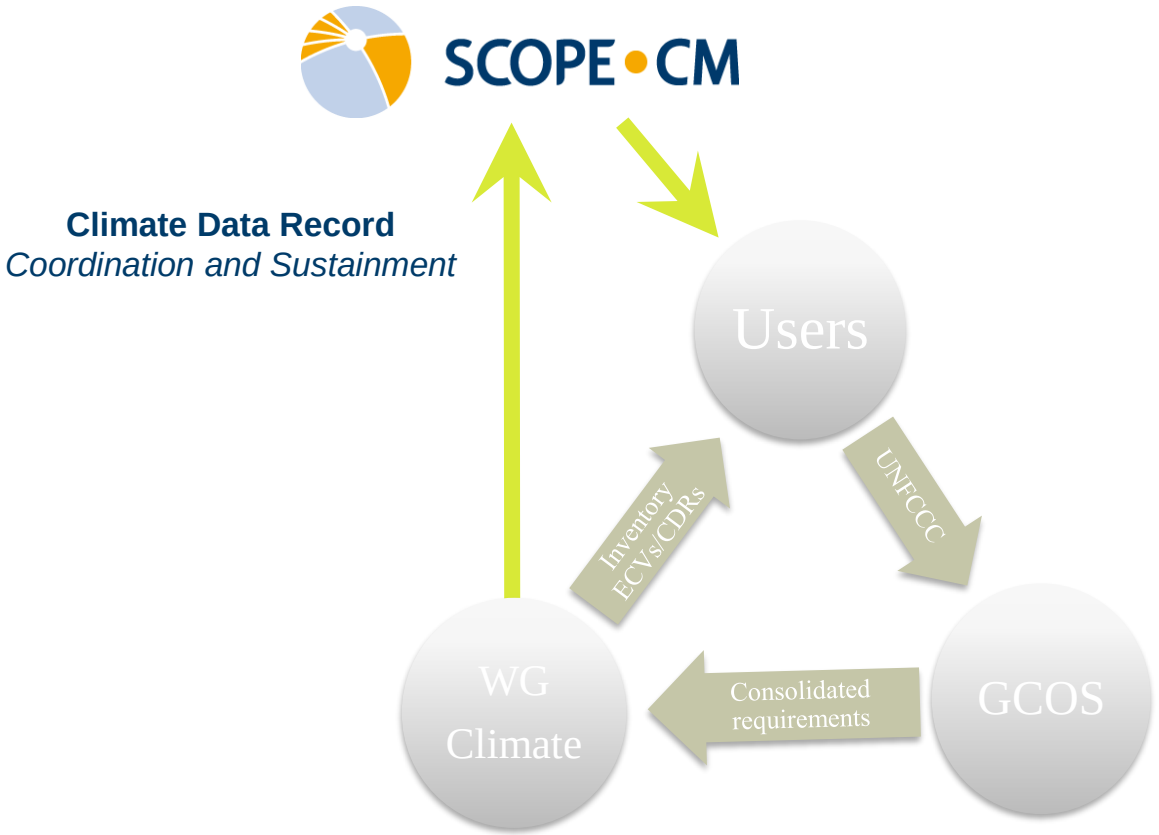
- The foundation of SCOPE-CM is the network of relevant space agencies and other organizations (including GSICS) with the aim to **develop, extend and preserve the capabilities and skills of generating and re-generating Climate Data Records (CDR).**

Partner Context

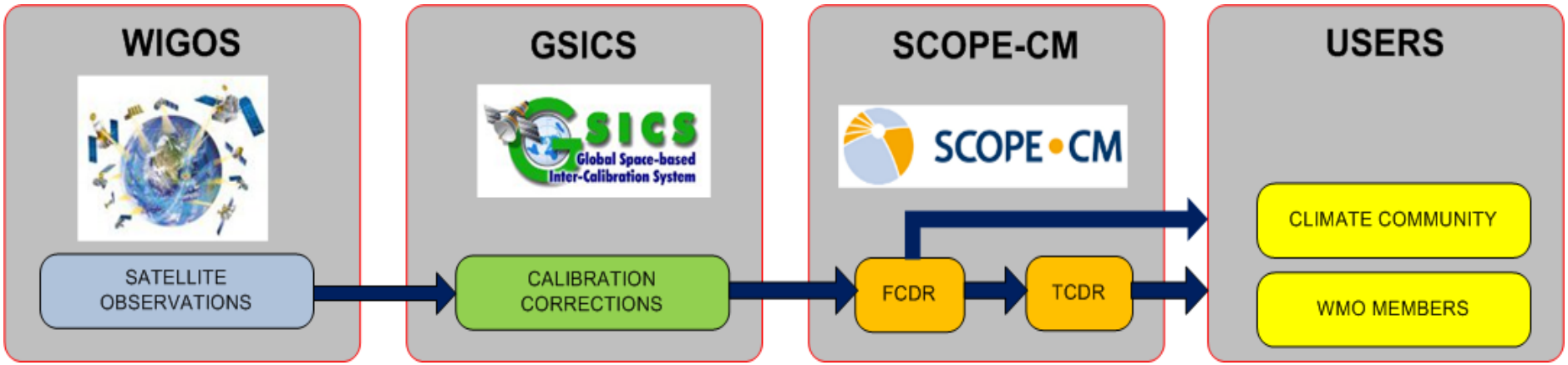


SCOPE•CM

Partner Context



Path for Exploiting Satellites in Climate Monitoring



CDR is defined as a time series of measurements of sufficient length, consistency, and continuity to determine climate variability and change.

FCDR = a homogeneous long-term dataset of calibrated radiances/BT/bending angles encompassing different sensors and platform with spatial and temporal overlaps.

TCDR = geophysical variables derived from the FCDR that can be understood as a satellite product associated with an ECV

Phase II Projects

1. SCM-01: Upper tropospheric humidity CDRs from geostationary and polar satellites
2. SCM-02: Surface albedo demonstrator from polar satellites
3. SCM-03: Land surface albedo from geostationary satellites
4. SCM-05: AVHRR Fundamental CDR
5. SCM-06: Inter-calibration of passive imager observations from geostationary satellites
6. SCM-07: Liquid Water Path and Rain Water Path Climatologies in the GPM era
7. SCM-08: Radio occultation-based gridded climate data sets
8. SCM-09: Sustained International Satellite Cloud Climatology Project (ISCCP) cloud products
9. SCM-10: Atmospheric Motion Vectors and Clear/All Sky Radiances from geostationary and polar satellites

Architecture for Climate Monitoring From Space*

CGMS agencies are committed to ensure the sustained availability of data from satellites that form the CGMS Baseline 3. The 'Baseline' constitutes the commitments and plans of CGMS members to provide observations, measurements, and services.

WGClimate … guide actions of CEOS and CGMS agencies to … further improve the delivery of CDRs. This includes activities to ensure the sustainability and secure the sustainment of needed measurements into the future…

The Sustained, Coordinated Processing of Environmental Satellite Data for Climate Monitoring (SCOPE-CM), a network of agencies and operators of meteorological and environmental satellite systems with interfaces to WMO, WCRP, GCOS, CGMS, CEOS and GEO, provides a means to follow up on the WGClimate Coordination Action Plan. It facilitates international cooperation on sustainable and, ultimately, sustained generation of CDRs from satellite data.

*Excerpts from current draft version of Progress Report

Outline of Proposal to CGMS-46 (2018)

- Requirement: Phase III Concept Paper (Implementation Plan)

- Outline
  1. SCM history and phases to date
     - Project Summary
     - Successes, Lessons learned
  2. Evolved community capabilities (WGClimate) and needs (GCOS)
  3. Options for Phase III strategy
  4. Options for organizational home and relationships
  5. Mini Analysis of Alternatives
  6. Recommendation for Approval

- Path to Approval
  1. February 8: SCOPE-CM Executive Panel – Strategy Meeting
  2. February 12: WMO (IPET SUP) – Brief strategy proposal
  3. Feb-March: Draft Concept Paper [size, steps, contributors]
  4. March 22: Joint WGClimate – Submit for Comment
  5. May 20: CGMS Plenary – Submit for Approval

SEP-13 Darmstadt: Key Points

- Special Focus on SCOPE-CM Purpose and Future
  - Prompts
    - Phase II Terminating
    - Phase II+ Implementation Plan and Agency interest
    - “Bottom-up” Project Model: Lessons Learned
    - WGClimate invigoration and ECV Inventory Success
      - Fast growing/maturing CDR development community
  - Agencies willing to invest as function of SCM value, results
  - Closer relationship with CEOS-CGMS Joint Working Group on Climate
    - Implementation arm, focusing on CDR coordination, sustainment
  - Organizational home remains WMO

SEP-14 Geneva: Lessons Learned from Phase II

- Rolled up and most important lessons learned
  - 'Best effort' approach makes it difficult to respect a progress plan
  - MM: important for sustainability, organizational responsibility, subjective, valuable to users and programs, less so as roadmap to PI
  - Ownership of collaborative international projects/products needs attention
    - Physical location, distribution, data services in future, identity changes w/ technology
    - Project, legal and policy decisions complicated with different funding lines
      - whose apply?
      - Currently no one size fits all – but address this early in projects
  - Network development/collaborations should persist – valuable
    - WMO framework valuable – helped 'form the group'
  - SCM collaboration too loose – more meetings would be helpful
- Options for SCM-Project relationships in Phase III
  - Keep relationship to data access
  - Assessment concept needs thinking – who, funds, how, when? Focus on strengths/weaknesses, avoid picking winners, drive by application, promote awareness of need,

SEP-14 Geneva: Discussion

- Project models
  - Federation around common variable: Loose (SCM-1), Close (SCM-8)
  - Federation around common variable and algorithm (SCM-3, -6)
  - Algorithm Development/Maturation (SCM-2, -5, -9, -10)

- Phase II closing activities
  - Persistence of SCM relationship/affiliation
  - ECV Inventory
  - Capturing SCM evolution, lessons, successes, challenges
    - Publication, News article, website update

- Technical, Funding and SCOPE-CM phases rarely align…
  - SCM supporting future: Storage (archive, service copies), doi, release

ECV Generation Coordination Opportunities

- Possible coordination models
  - Vertical Coordination
    - Coordinate CDR processing chains: Obs→ FCDR→ TCDR1→ …TCDRn
  - Horizontal Coordination
    - Agencies sustain given CDRs independently or cooperatively, leading to greater coverage of full GCOS ECV list
  - Robustness Coordination
    - Agencies provide back-up generation capabilities for one another