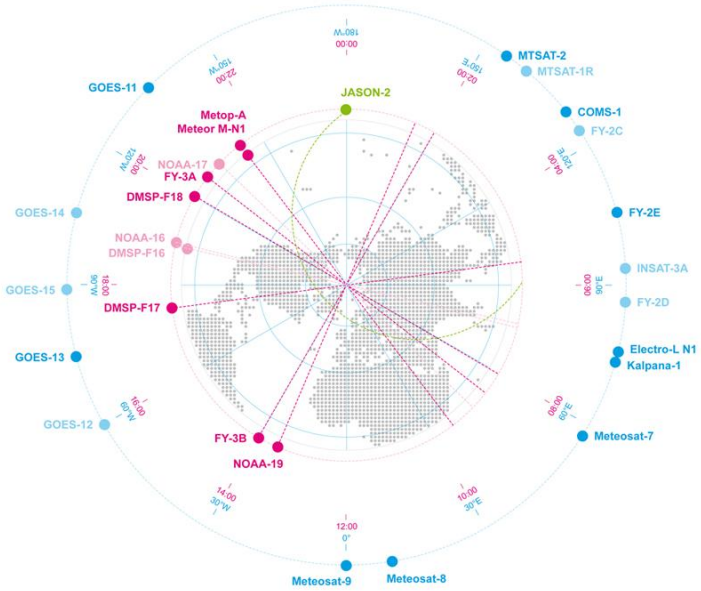


SCOPE-CM

Sustained, Co-Ordinated Processing of Environmental Satellite Data for Climate Monitoring

by

EUMETSAT

Introduction to SCOPE-CM

Background

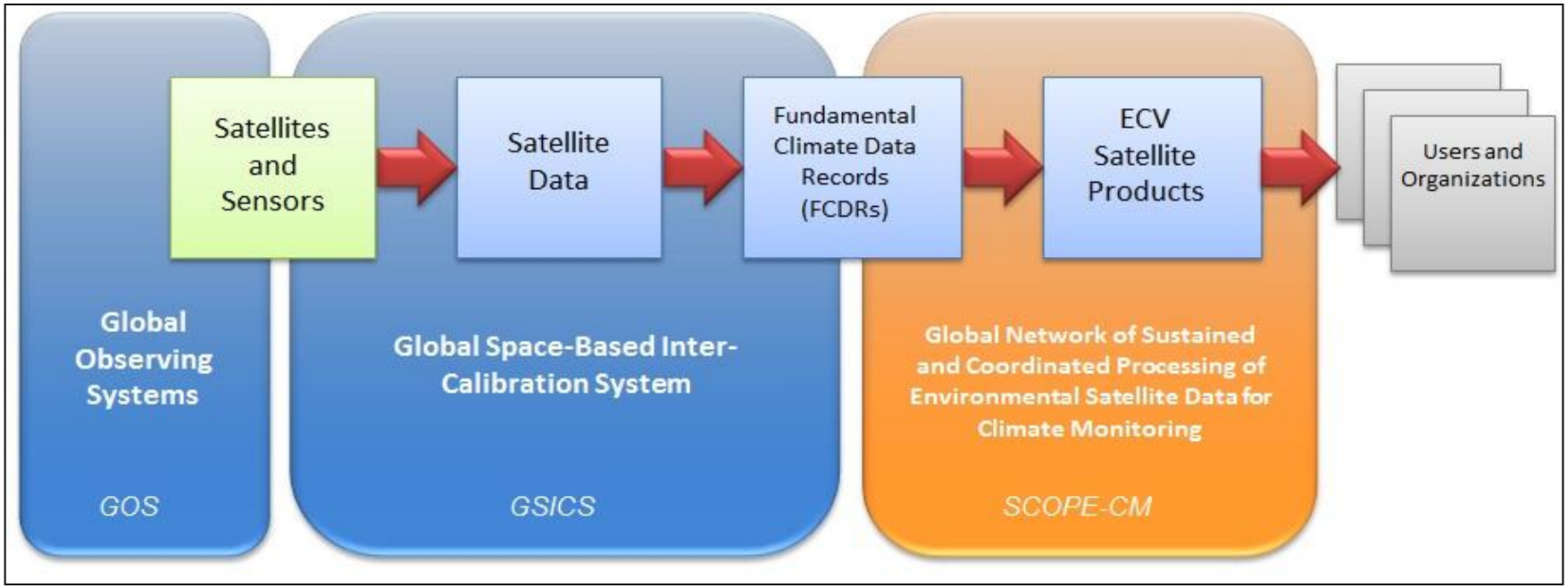
- The aim of the Sustained, Co-Ordinated Processing of Environmental Satellite Data for Climate Monitoring (SCOPE-CM) is to **enable a network of facilities ensuring continuous and sustained provision of high-quality Climate Data Records (CDRs) from satellite observations.**

- 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 CDRs**.

- **Participants:**
  Operational Satellite operators: *NOAA, JMA, CMA, EUMETSAT*
  Stakeholder: *WMO Space Programme, GCOS, CEOS, GEO, CGMS/GSICS, WCRP/GEWEX, ESA (observer)*

CDR = *a series of observations over time that measure variables believed to be associated with a climate variation and change. These changes may be small and occur over long time periods (seasonal, interannual, and decadal to centennial) compared to the short-term changes that are monitored for weather forecasting.* Thus a CDR is a time series of a climate variable that tries to account for systematic errors and noise in the measurement.

Conceptual Framework



FCDR = *well-characterised, long term data record, usually involving a series of instruments, with potentially changing measurement approach, but with overlaps and calibrations sufficient to allow the generation of products that are accurate an stable, both in space and time, to support climate applications 9e.g calibrated radiances, backscatter of active instruments, or radio occultation bending angles. FCDR also include the ancillary data used to calibrate them.*

ECV = *geographical variable that is associated with climate variation and change as well as the impact of climate change onto Earth.*

SCOPE-CM
Current Status

Phase 1 Establishing International Collaborations

The primary activities accomplished in Phase 1 of SCOPE-CM include:

- Establishing the initial network and structure
- Agreeing on principles and standards
- Establishing the first pilot projects on selected subjects
- Assessing current capabilities
- Establishing feedback mechanisms with users

	Sensors	*Parameters and topics*	*Lead*	*Contributors*
1	AVHRR	Clouds and Aerosols	NOAA	CM SAF
2	SSM/I	Water vapour, clouds, precipitation	CM SAF	NOAA
3	GEO	Surface albedo, clouds and aerosols	EUMETSAT	EUMETSAT, NOAA
4	GEO	Winds and clear sky radiances	EUMETSAT	EUMETSAT
5	GEO	Upper tropospheric humidity	NOAA	EUMETSAT, EUMETSAT, CM SAF

Phase 2 -Sustained Production of Climate Data Records (CDRs)

Objectives:

- Establish a systematic approach to increase the sustainability (maturity) of CDR generation capabilities;
- Establish structures for sustainable generation of Fundamental CDRs and Thematic CDRs.

Mechanisms:

- Initiate Phase-2 projects;
- Generate SCOPE-CM CDR products;
- Increase coverage of products in terms of ECVs, time and spatial dimension;
- Foster extension of the network to additional partners.

Benefits for space agencies (and associated institutes):

- Ensures their role in the field of climate data stewardship;
- Improves their capacity to deliver data services for Global Climate Services;
- Improves their capacity to serve the scientific community.

SCOPE-CM – Phase 2 Projects

ID	Title	Leader	SCOPE-CM Partners	Other Partners
SCM-01	Sustained generations of upper tropospheric humidity Climate Data Records from multiple sensors with multi-agency cooperation	L. Shi	**NOAA**, EUMETSAT (CM SAF)	Kiruna Univ. NCAR, Univ. of Miami
SCM-02	Multiplatform surface albedo demonstrator from polar-orbiting satellites	T. Manninen	**EUMETSAT (CM SAF** and CF) NOAA	Univ. Massachusetts
SCM-03	Land surface albedo from geostationary satellites (LAGS)	A. Lattanzio	**EUMETSAT (CF)**, NOAA, JMA	-
SCM-04	Utility of Satellite derived winds for Monsoon and Cyclone studies over Indian region	S. Goyal	*[EUMETSAT]*	**Indian Meterological Departement**
SCM-05	Advancing the status of the AVHRR FCDR	K-G Karlsson	**EUMETSAT (CM SAF)** NOAA	ESA CCI
SCM-06	Inter-calibration of passive imager observations from time-series of geo stationary satellites (IOGEO)	R. Roebeling	**EUMETSAT (CF** and CM SAF), NOAA , JMA	-
SCM-07	Liquid Water Path and Rain Water Path Climatologies in the GPM era	R. Bennartz	**NOAA (**CIRA) EUMETSAT(CM-SAF)	CIMSS, University of Wisconsin
SCM-08	Radio occultation based gridded climate data sets (RO-CLIM)	A. von Engeln	**EUMETSAT (CF** and ROM SAF)	GFZ, NASA JPL, Moog, UCAR, Univ. of Graz
SCM-09	Sustained production of the International Satellite Cloud Climatology Project (ISCCP) cloud products	K. Knapp	**NOAA,** JMA, CMA , EUMETSAT	INPE , NY City College
SCM-10	Atmospheric Motion Vectors and Clear/All Sky Radiances from historical meteorological satellites in geostationary and polar orbit	Y. Tahara	**JMA**, EUMETSAT (CF), NOAA (NCDC, CIRA)	CIMSS, JMA (reanalysis), ECMWF

Elevating the maturity of CDRs

Motivation

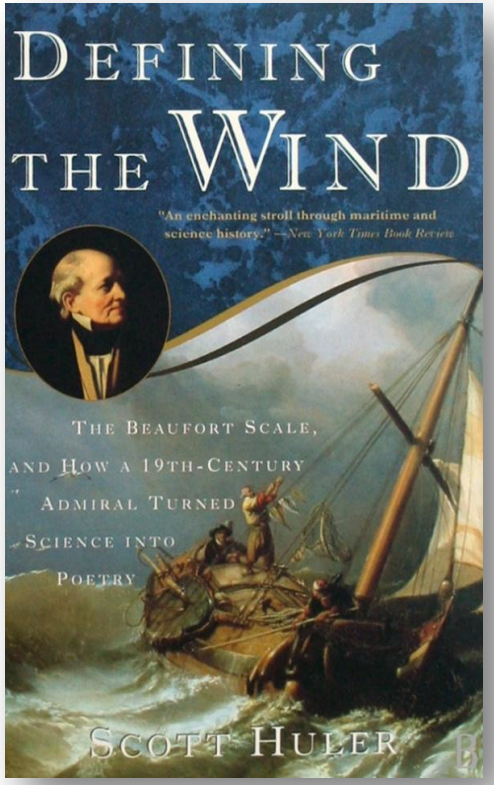
What is at stake?

History shows that weather observations did not become useful for society until a lexicon was agreed to

- ✓ The Beaufort scale did this for wind climatology and maritime commerce in the 19th century

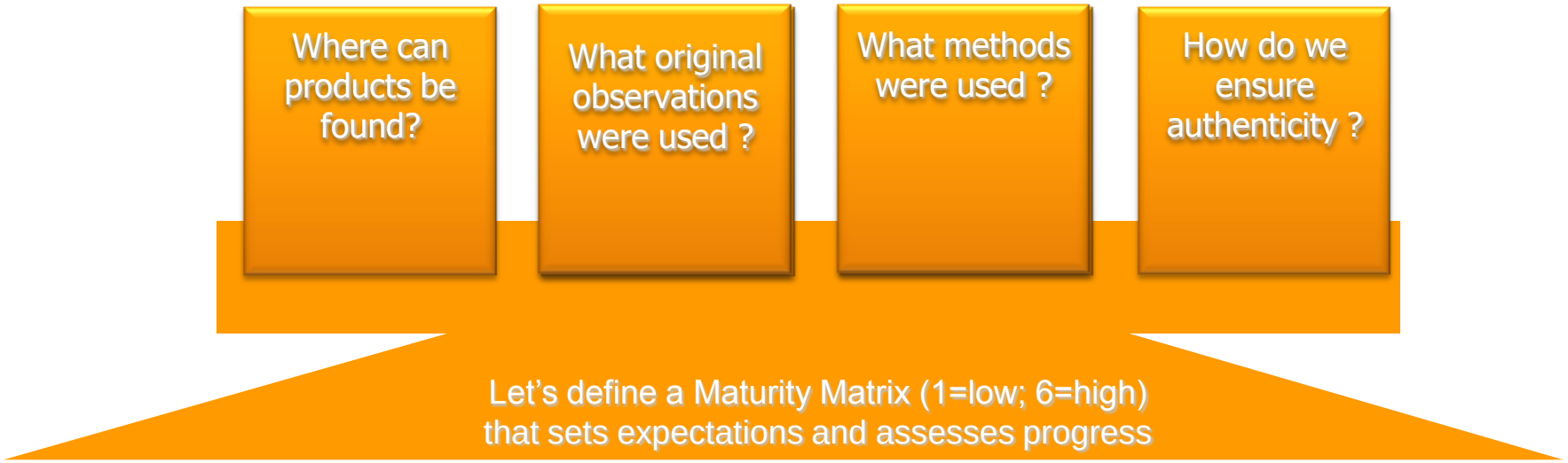
For the Climate Service to benefit society, it must adopt a lexicon that sets expectations for openness, process and transparency that are accessible to the public

- ✓ How might we define a climate record lexicon useful to both scientists and the general public in the 21st century?



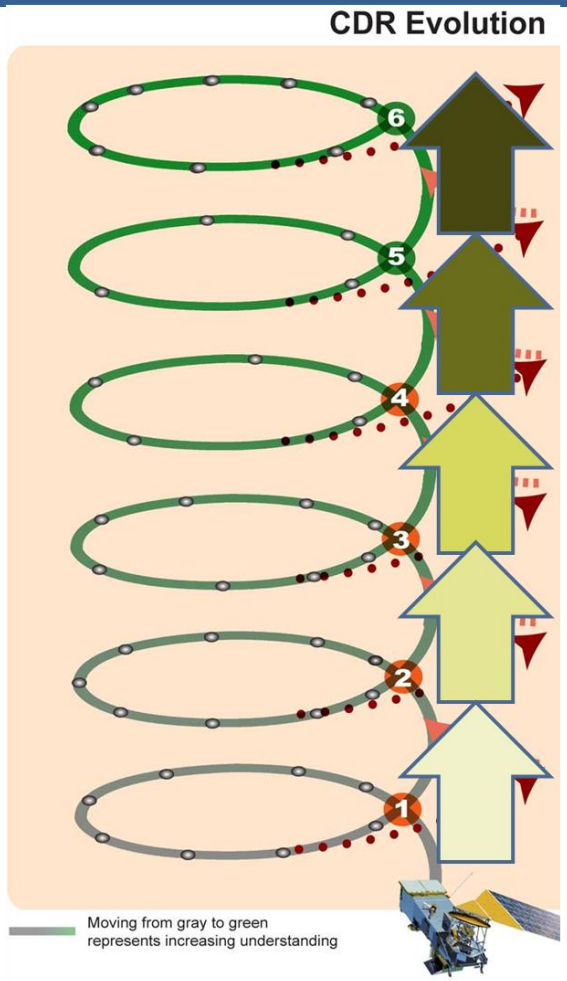
Courtesy: John Bates (NOAA)

System Maturity Matrix (concept EU-FP7 Core Climax based on the NOAA development)



Software readiness	Metadata	User documentation	Uncertainty Characterization	Public Access, Feedback and Update	Utility
Are to codes compliant with standards, stable, portable and reproducible?	Do the metadata meets international standards, and allows provenance tracking?	Are the formal documents and peer-reviewed papers up-to-date public?	Are the uncertainties assessed systematically in a standard manner?	Are the data, source code, and documents publicly available?	Are the data wildly used in the scientific, and decision and policy making communities?

Evolution of CDR maturity



Courtesy: John Bates (NOAA)

High Maturity
SCOPE-CM Projects

Moderate Maturity
SCOPE-CM Projects

Initial Maturity
SCOPE-CM Projects

EUMETSAT

Conclusions

Conclusions

- **Phase 1 of SCOPE-CM has been completed successfully** with Pilot Projects and implemented algorithms at different climate processing centers;
- **Phase 2 uses the Maturity Matrix concept** to organize development and sustaining CDRs into initial, moderate and high maturity to better characterize completeness of CDRs for the user community;
- GSICS activities are fundamental for FCDR generation, specific interaction and cooperation being planned;
- **Phase 2 approved projects will be kicked off in 2014;**

Thank You

Any Questions?