



International Ocean Colour Science
Meeting 2013

Advancing Global
Ocean Colour
Observations

Splinter 9

Climate Splinter: Relation involving international bodies

Mark Dowell

European Commission – Joint Research Centre



ACRONYM soup

GCOS

IPCC

GEO

CGMS

IOCCG

GFCS

CEOS

GOOS

GEOSS

WCRP

OCR-VC

Lots of “OS” – bones (!?)



World Climate Conferences

- 1990 – IPCC – Intergovernmental Panel on Climate Change. **SCIENCE**

- 2000 – GCOS – Global Climate Observing System.

OBSERVATIONS

- 2010 – GFCS- Global Framework for Climate Services.

SERVICES

- These programmes report directly to the United Nations Framework on Climate Change (UNFCCC) and there Parties are expected to support them.





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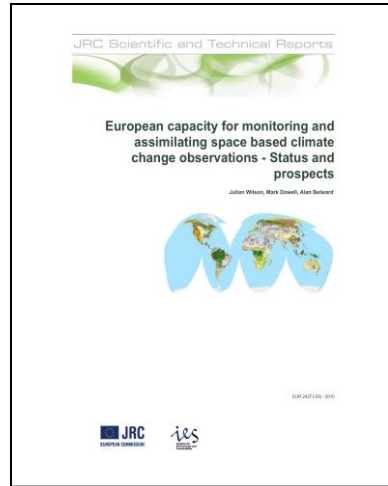
EU Capacity Study:
Request by Space Council



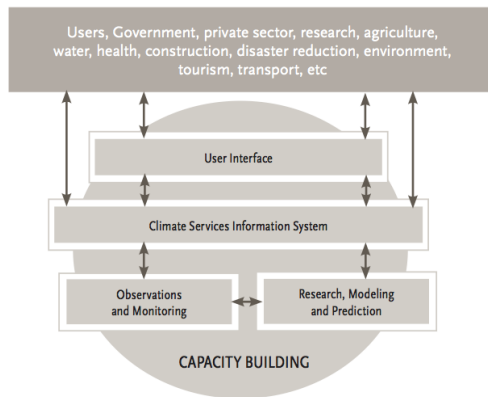
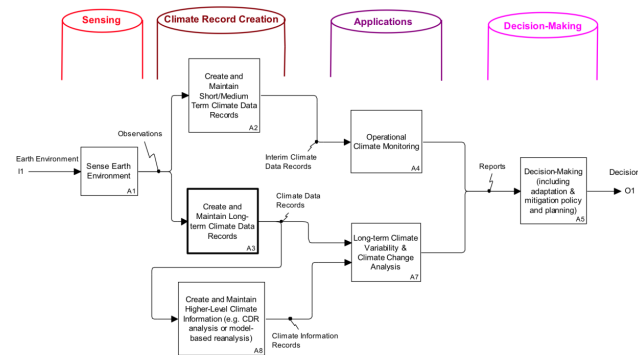
“Coordinate and encourage collaborative activities between the world’s major space agencies in the area of climate monitoring”



Requirements



Climate Monitoring Architecture



Global Framework
for Climate Services



Table 1: Essential Climate Variables that are both currently feasible for global implementation and have a high impact on UNFCCC requirements

Domain	Essential Climate Variables
Atmospheric (over land, sea and ice)	<p>Surface:⁸ Air temperature, Wind speed and direction, Water vapour, Pressure, Precipitation, Surface radiation budget.</p> <p>Upper-air:⁹ Temperature, Wind speed and direction, Water vapour, Cloud properties, Earth radiation budget (including solar irradiance).</p> <p>Composition: Carbon dioxide, Methane, and other long-lived greenhouse gases¹⁰, Ozone and Aerosol, supported by their precursors¹¹</p>
Oceanic	<p>Surface:¹² Sea-surface temperature, Sea-surface salinity, Sea level, Sea state, Sea ice, Surface current, Ocean colour, Carbon dioxide partial pressure, Ocean acidity, Phytoplankton.</p> <p>Sub-surface: Temperature, Salinity, Current, Nutrients, Carbon dioxide partial pressure, Ocean acidity, Oxygen, Tracers.</p>
Terrestrial	<p>River discharge, Water use, Groundwater, Lakes, Snow cover, Glaciers and ice caps, Ice sheets, Permafrost, Albedo, Land cover (including vegetation type), Fraction of absorbed photosynthetically active radiation (FAPAR), Leaf area index (LAI), Above-ground biomass, Soil carbon, Fire disturbance, Soil moisture.</p>



1. Products, Target Requirements, Benefits
2. Rationale
3. Currently Achievable Performance
4. Requirements for satellite instruments and data
5. Calibration, Validation and Archiving Needs
6. Adequacy and Inadequacy of Current Holdings
7. Immediate Actions, Partnerships and International Coordination.

Variable/ Parameter	Horizontal Resolution	Vertical Resolution	Temporal Resolution	Accuracy	Stability
Water Leaving Radiance	4km	N/A	Daily	5%*	0.5%
Chlorophyll-a concentration	30km	N/A	Weekly averages	30%	3%

GCOS Satellite Supplement 2011 update

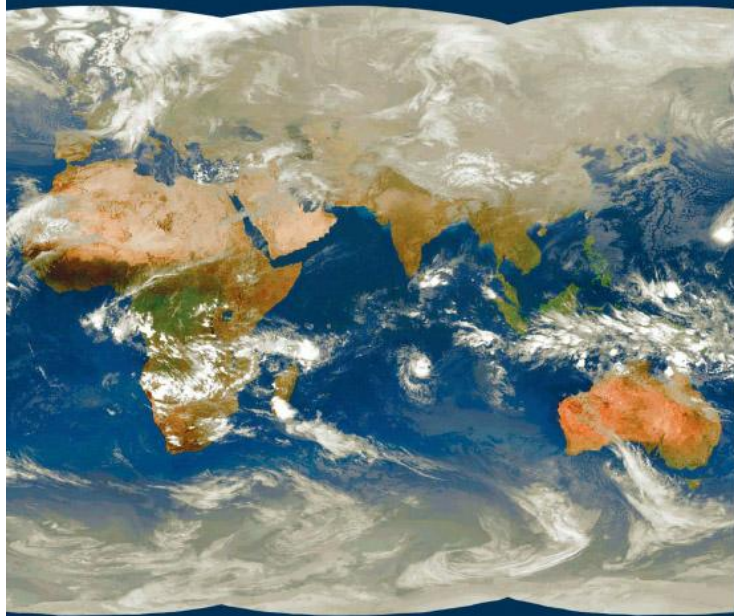
WT*!



- Why should we care? GCOS provides a process and an explicit set of requirements that space agencies are adopting in implementing their programmes (e.g. ESA CCI, NOAA CDR)
- How could the IOCCG/IOCS community be a catalyst for the definition of OCR ECV requirements?
- IOCS can benefit from the iterative capability of user requirement and product definition and implementation

GEO 1000R
February 2005

Global Earth Observation System of Systems GEOSS



10-Year Implementation Plan Reference Document

Group on Earth Observations

ENVIRONMENT PROGRAMME

THE CEOS IMPLEMENTATION PLAN FOR SPACE-BASED OBSERVATIONS FOR GEOSS

Version 0.1.10
7th May 2007



global collaborative framework



CEOS Background

- Established in 1984 under auspices of G-7 Economic Summit of Industrialized Nations
 - Focal point for international coordination of space-related Earth Observation (EO) activities
 - Optimize benefits through cooperation of members in mission planning and in development of compatible data products, formats, services, applications, and policies
- Operates through best efforts of Members and Associates via voluntary contributions
- 29 Members (Space Agencies), 21 Associates (UN Agencies, Phase A programs or supporting ground facility programs)
- As the space component of the Global Earth Observation System of Systems (GEOSS), CEOS is implementing high priority actions in support of Group on Earth Observation (GEO) Tasks



CEOS Structure 2012-2013

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Troika

Past Chair

ISRO/India

Chair

CSA/Canada

Future Chair

EUMETSAT/Europe

(1-year terms)

Strategic Implementation Team (SIT)

Chair: NASA Vice Chair: CNES

(2-year terms)

Systems Engineering Office (SEO)

NASA

Permanent Secretariat

Chair Agency
ESA, EUMETSAT,
JAXA, NASA, NOAA

CEOS Executive Officer (CEO)

USGS (CEO) &
NOAA (DCEO)

(2-year terms)

WGCV

Chair
CSA

Vice Chair
DLR

WGISS

Chair
JAXA

Vice Chair
CNES

WGCapD

Chair
INPE

Vice Chair
NOAA

WGClimate

Chair
EC-JRC

Vice Chair
NOAA

(2-year terms)

CEOS SBA Coordinators

- Agriculture
- Biodiversity
- Disasters
- Ecosystems
- Energy
- Health
- Water

Virtual Constellations for GEO

Atmospheric Composition

- NASA
- ESA

Precipitation

- JAXA
- NASA

Land Imaging

- USGS
- ISRO
- INPE

Ocean Surface Topography

- NASA
- EUMETSAT

Ocean Color Radiometry

- ESA
- ISRO
- NASA

Ocean Surface Vector Wind

- NOAA
- ISRO
- EUMETSAT

Sea Surface Temperature

- ESA
- NOAA

WGCV=Working Group on Calibration and Validation
 WGISS=Working Group on Information Systems and Services
 WGCapD=Working Group on Capacity Building and Data Democracy
 WGClimate = Working Group on Climate
 SBA = Societal Benefit Area (GEO)



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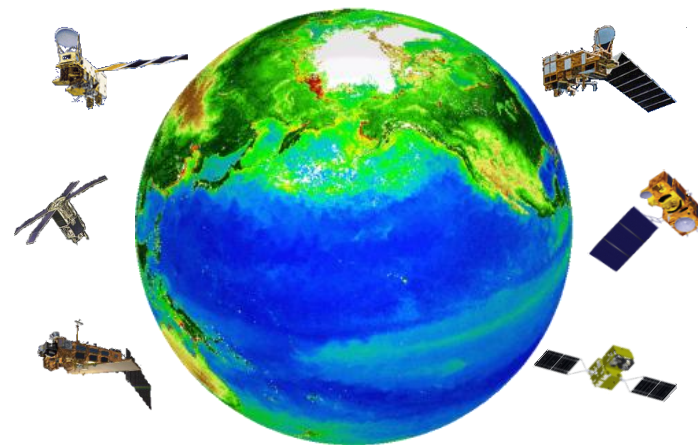
Background

- The Ocean Colour Radiometry Virtual Constellation (OCR-VC) will provide long time series of calibrated ocean color radiance (OCR), enable networking to avoid duplication of efforts, and ensure availability of OCR data to benefit everyone
- OCR-VC activities will include Cal/Val, satellite & in-situ data merging, product generation, as well as development and demonstrations of new and improved applications
- An *in situ* complement to the VC is in development, **INSITU-OCR: The International Network for Sensor InTercomparison and Uncertainty assessment for Ocean Colour Radiometry**”

Objectives

The OCR-VC implementation plan includes followings.

- ① Ensure continuity of global OCR data (VIIRS, OLCI, SGLI, OCM-2, GOCI..)
- ② Provide high quality data sets (int'l algorithm development, calibration/validation, data processing/re-processing)
- ③ Data harmonization supporting GCOS/ECVs
- ④ Facilitate timely and easy access to data, i.e., user interface
- ⑤ Capacity building and outreach, supporting training courses of research and applications (the right photo shows an example of the training course)



Ocean Colour provides a global view of the marine biosphere and chemosphere, and contributes to many Societal Benefit Areas: Agriculture, Ecosystems, Climate, Water...



Practical sessions in the Training Course on "Methods and Applications of Ocean Colour Remote Sensing in

OCR-VC is led by Mark Dowell (EC / JRC), Paula Bontempi (NASA)



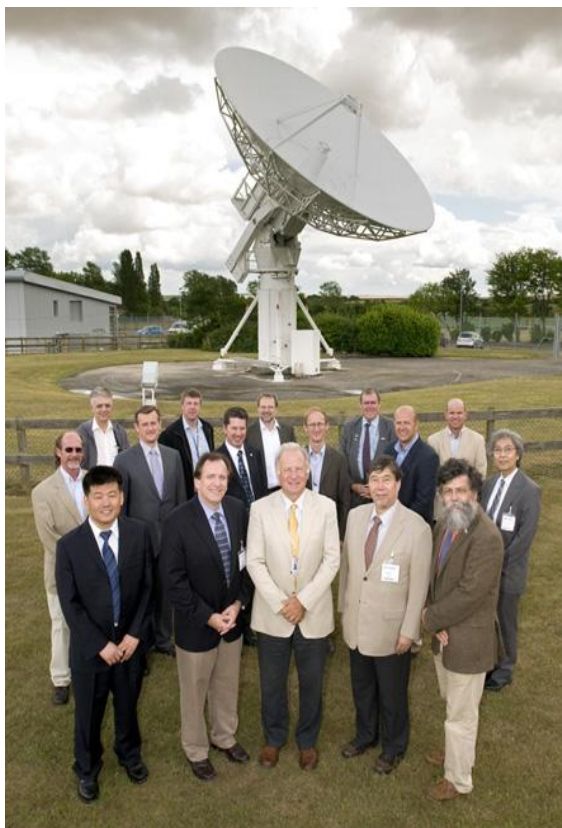
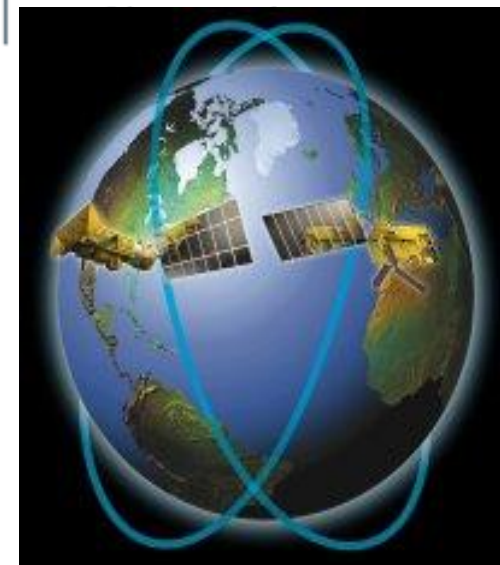
Committee on Earth Observing Satellites Working Group on Climate International Ocean Colour Science Meeting 2013

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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 by 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

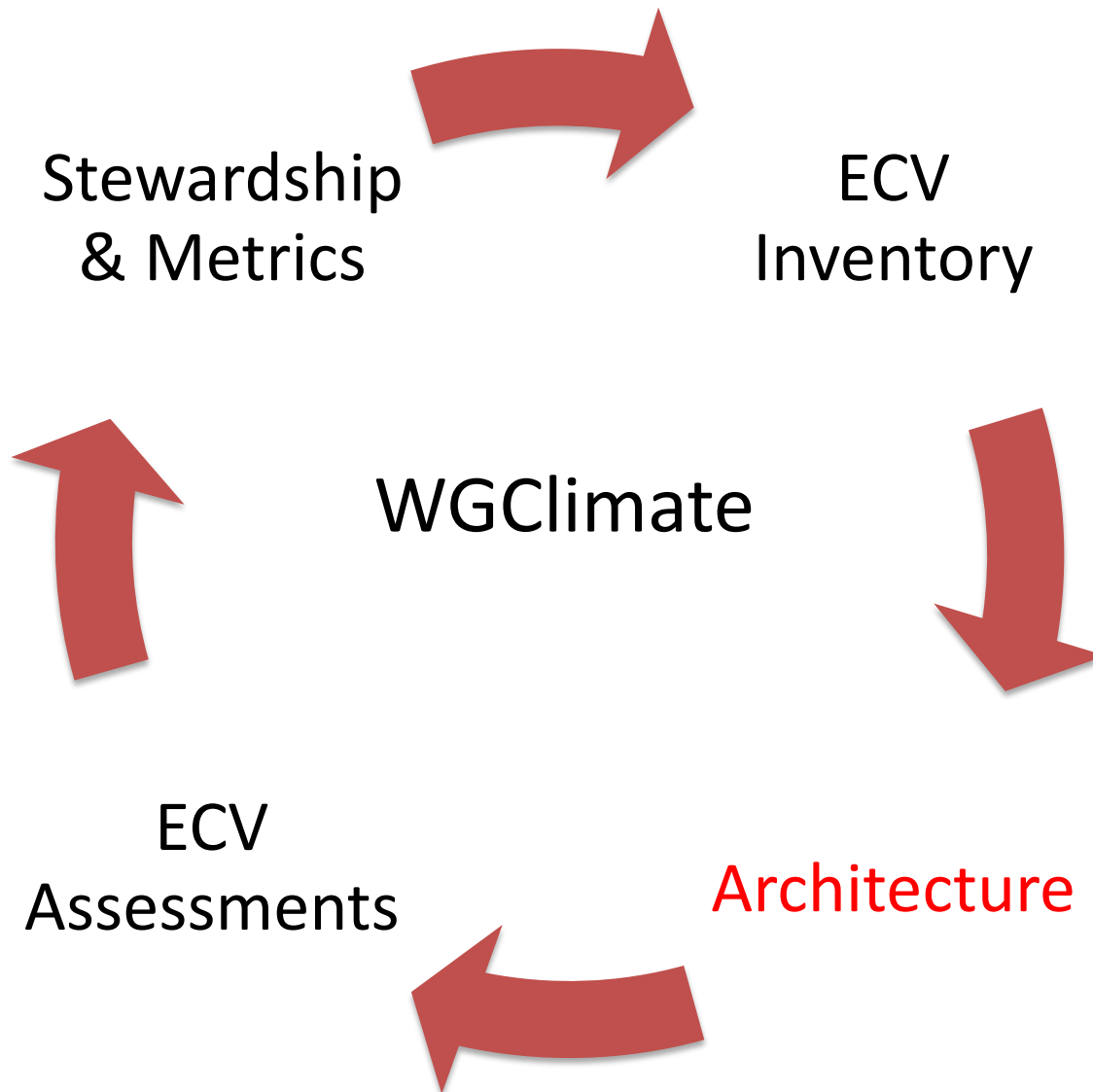
Mark Dowell (EC/JRC)

Vice Chair John Bates (NOAA/NCDC)



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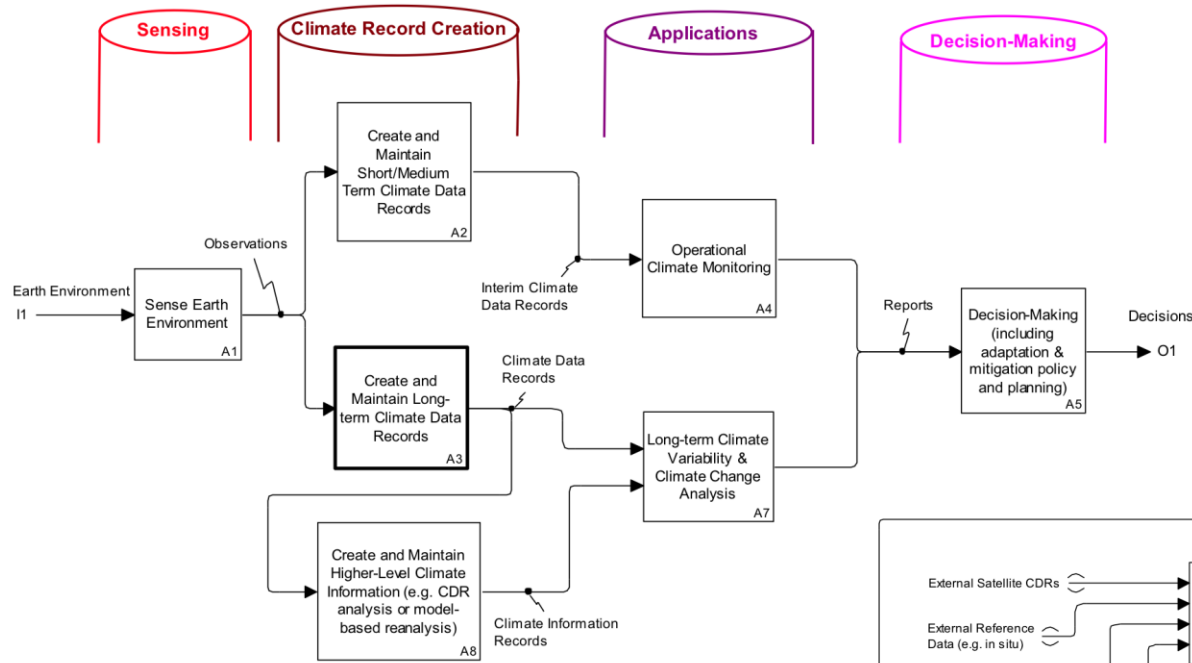
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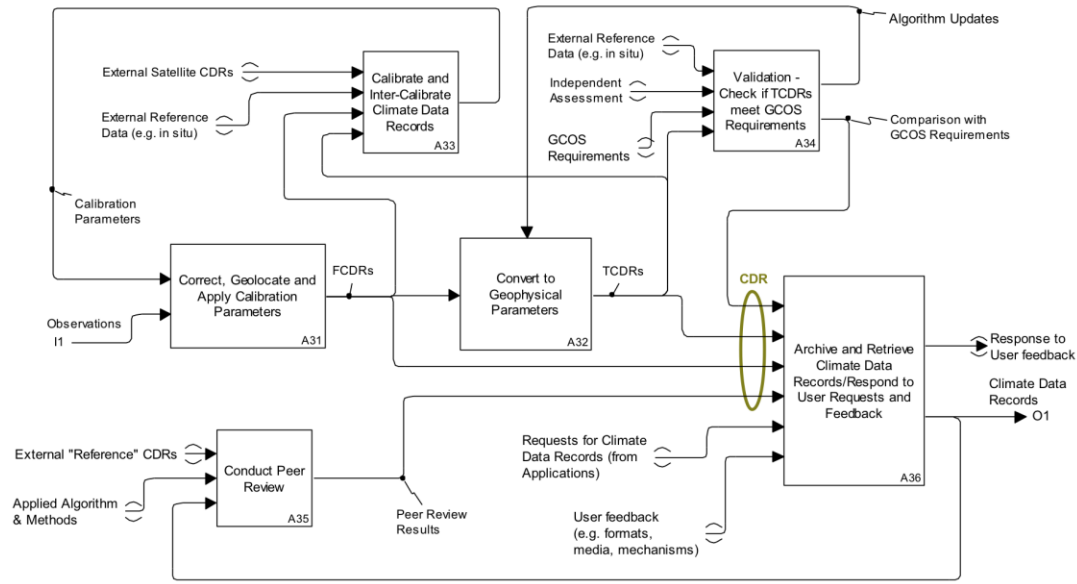
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Traceable to GCOS Guidelines and GCOS Climate Monitoring Principles

Traceable from ECV Inventory and physical representation of Climate Monitoring Architecture





ECV Inventory Questionnaire

- Joint activity with CGMS and WMO
- 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



Home [View ECV Records](#) Editor LOGIN Administrator LOGIN

Search Category Show All	
ECV Record Id	CDR_ECV24_2
Responder name	Nadine Gobron
Responder email	nadine.gobron@jrc.ec.europa.eu
Data Set Identifier	JRC-ESA MERIS
Responsible organization	ESA
International Coordination	no
Assessment body	yes CEOS WGCV
Quality control organization	yes GCOS
Climate applications	Carbon Cycle - Land Surface Dynamics - Drought
Essential Climate Variable (ECV)	Maps of the Fraction of Absorbed Photosynthetically Active Radiation
Collection organization	ESA
Calibration organization	ESA
Intercalibration organization	ESA
FCDR organization	ESA
TCDR organization	ESA
GCOS Requirements Assessments organization	EC
Independent peer review organization	EC
Archiving organization	ESA
User service organization	ESA
User feedback organization	EC
Start date (month/year)	4/2002
End date (month/year)	5/2012
Commitment end date (year)	05/2012
Physical quantity	Fractionally absorbed PAR (FPAR)
Units	-

- CDR_ECV14_5
- CDR_ECV15_1
- CDR_ECV15_2
- CDR_ECV15_3
- CDR_ECV15_4
- Land
- CDR_ECV20_1
- CDR_ECV20_2
- CDR_ECV21_1
- CDR_ECV21_2
- CDR_ECV21_3
- CDR_ECV22_1
- CDR_ECV22_2
- CDR_ECV22_3
- CDR_ECV22_4
- CDR_ECV22_5
- CDR_ECV22_6
- CDR_ECV22_7
- CDR_ECV23_1
- CDR_ECV23_2
- CDR_ECV23_3
- CDR_ECV24_1
- CDR_ECV24_2
- CDR_ECV24_3
- CDR_ECV24_4
- CDR_ECV24_5
- CDR_ECV24_6
- CDR_ECV25_1
- CDR_ECV25_2
- CDR_ECV25_3
- CDR_ECV25_4
- CDR_ECV25_5
- CDR_ECV27_1
- CDR_ECV28_1
- CDR_ECV28_2

- ECV inventory now contains ~ 220 records
- <http://www.ecv-inventory.com>



OCR Sensing Capacity



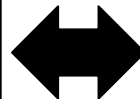
IOCCG Level 1 Requirements Report



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

External Requirements
e.g. GCOS

