



Ocean Colour Radiometry Virtual Constellation (OCR-VC) and INSITU-OCR

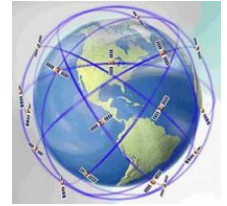
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Contributions from IOCCG (V. Stuart & D. Antoine - Chair)

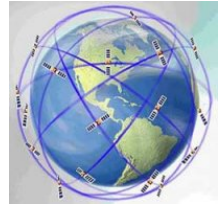
*OCR cal/val workshop
21 October @JRC Ispra*

What is a Virtual Constellation ?



- A CEOS Virtual Constellation is a set of space and ground segment capabilities operating together in a coordinated manner, in effect a **virtual system** that overlaps in coverage in order to **meet a combined and common set of Earth Observation requirements**.
- The Constellation concept builds upon or serves to **refocus already existing projects and activities**.
- The Constellations effort provides a unique forum to **achieve political visibility and increase mutual benefit among space and other environmental agencies** in support of cross-cutting GEO Tasks and Targets.
- The **OCR-VC** is not the replacement of the existing activities basically; it will enhance **visibility of OC activities (IOCCG..) to the CEOS agencies, contribution to the climate issues** (e.g., ECV), and **gap analysis** basing international aspects

What is the Mission of the OCR-VC ?



- The OCR-VC will provide long time series of calibrated ocean color radiance (OCR) at key wavelength bands from measurements obtained from multiple satellites.
- OCR-VC activities will include calibration, validation, merging of satellite and *in situ* data, product generation, as well as development and demonstrations of new and improved applications.
- NASA's *SIMBIOS*, ESA's *GlobColour*, POGO-GEO-GOOS's *ChloroGIN* and CSA/GEO *SAFARI* projects are examples and prototypes of programs the OCR-VC will require to meet its objectives.

OCR-VC Targets

1. Ensuring OCR continuity
2. Provide high quality data sets (with WGCV)
3. Data Harmonization, supporting ECVs (Climate SBA & new Climate group)
4. Facilitate timely and easy access to data (user interface) (WGISS)
5. Capacity building and Outreach (WGEdu)

The OCR-VC implementation plan has been accepted by CEOS in November 2009

see: <http://www.ceos.org/images/OCR/ocrip10aug09.pdf>

in http://www.ceos.org/index.php?option=com_content&view=category&layout=blog&id=72&Itemid=71

OCR-VC Priorities Identified

1. Inter-agency **OCR Essential Climate Variable (ECV*) implementation** strategy and subsequent execution of this strategy

* <http://www.wmo.int/pages/prog/gcos/index.php?name=EssentialClimateVariables>

2. Concerted inter-agency effort on activities relating to sensor inter-comparison and uncertainty assessment of datasets required for ECV generation

→ **International Network for Sensor Intercomparison and Uncertainty assessment for Ocean Colour Radiometry (INSITU-OCR)**

INSITU-OCR components (under discussion)

Mission Feedback

- Science community input
- Comparison with other appropriate products
- New Mission
- Protocol development

Improved Products & Algorithms

- Reprocessing due to improvements in calibration, masks, binning schemes, product compatibilities, etc.
- New products from bio-geochemical, atmospheric fields, etc.
- Data distribution interface

Satellite data processing software

- SeaDAS & BESM for ACE, OCM-2, MERIS, OLCI, SGLI, GOCI, GEO-CAPE, etc.

Satellite Data from Calibrated Sensors

(2010)

Feedback

IN SITU-OCR OFFICE

- SIMBIOS type follow-on office (NASA) with agency representatives (under investigation)

Product & Algorithm Validation

- Atmospheric & bio-optical algorithm validation and development (INSITU-OCR PIs and project staff)
- Match-up analysis via Aeronet OC sites, satellite QC, time series evaluation, Bio-Argo, ChloroGIN etc.
- **Earth System/Climate Model data assimilation**

Calibration Strategy

Prelaunch

- Lab. characterization & calibration (SI-traceable)
- Solar calibration (transfer-to-orbit)

Postlaunch (operational adjustments)

- Solar calibration (daily)
- Lunar calibration (monthly)
- Multiple sites L_{wn} time series for vicarious calibration (ISRO, MOBY-C)

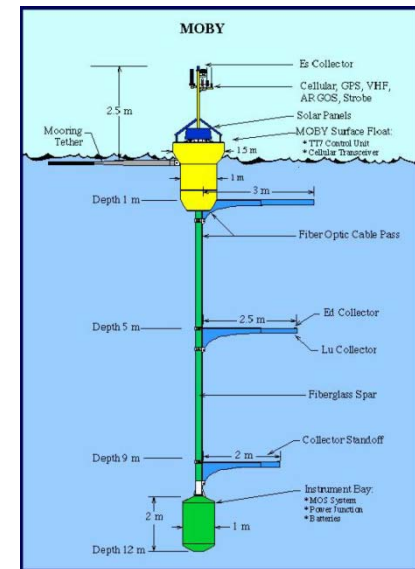
In Situ Data

- Collection of required bio-optical and atmospheric measurements (INSITU-OCR PIs)
- *in situ* instrument calibration (Project round robin SI-traceable, IOPs, AOPs)
- Data collection following NASA Ocean Optics protocols
- Archive of calibrated QC *in situ* data (SeaBASS)
- Calibrated instrument pool
- Development of new instrumentation

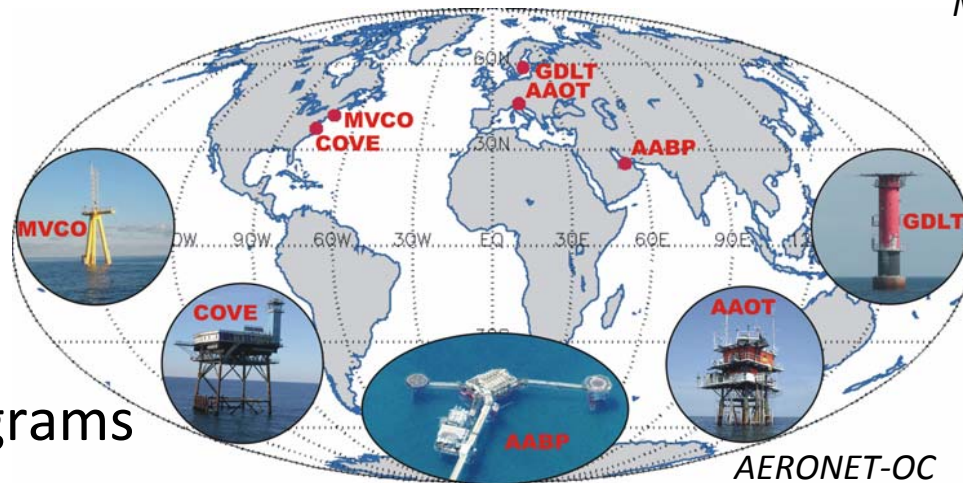
Cal/Val of INSITU-OCR

International Network for Sensor InTercomparison and Uncertainty assessment for Ocean Colour Radiometry

- Sensor inter-comparison
- Product validation *incl. networking and campaign of international observations*
- Investigate vicarious calibration approaches
- Algorithm parameterization
- Instrument inter-calibration
- Building from previous investments/prototype programs



MOBY & MOBY-C



BOUSSOLE

INSITU-OCR evolution

- ✓ Proposal of an international SIMBIOS-like activity at IOCCG#15 (Jan. 2010)
- ✓ Meetings at Oceans from Space conference in Venice April 2010: Town Hall meeting on OCR-VC and dedicated side-session on INSITU-OCR
- ✓ INSITU-OCR was introduced to space agency principals in the CEOS plenary (last week in Rio)
- ✓ [OCR workshop held in conjunction with WGCV-IVOS conference \(Oct. 2010\)](#)
- The discussion will be continued at IOCCG#16 (Feb. 2011)
- IOCCG Working Groups addressing many aspects including atmospheric correction, vicarious calibration, Level 1 req., etc.
- Report of the OC L1 req. (a chapter of international collaboration) (Nov. 2010 and Feb. 2011)
- Preliminary OCR community (scientists and space agency reps) **white-paper** on requirements for inter-agency initiative on INSITU-OCR (summer 2011)

SIMBIOS Lessons Learned and Addition of Possible Follow-on to OCR-VC

Sensor Intercomparison & Merger for Biological & Interdisciplinary Ocean Studies

- Ensure development of internally consistent research products and time series from multiple satellite ocean color data sources
- Develop methodologies for cross-calibration of satellite ocean color sensors
- Develop methodologies for merging data from multiple ocean color missions
- Promote cooperation between ocean color projects

INSITU-OCR components *(An idea):*

- Research Announcements could be drafted and released together
- Agencies could target specific scientific problems of interest, supporting what is most relevant
- Centralized database like SeaBASS, QA/QC and data submission requirements (e.g., 3 months for data submission), protocol development, exchange of personnel possible, connectivity to Round Robins

Discussion points *(TBD)*

- Document current and planned OCR cal/val activities (presentations from each representatives)
- Expected outputs from the INSITU-OCR
- Gap analysis between the current achievement and INSITU-OCR
 - Identify gaps (incl. long-term sustainability)
 - Identify priorities for networking
 - Identify additional resources required