OCR – VC Progress towards established CEOS-GEO Priorities

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OCR –VC Activities, achievements, deliverables

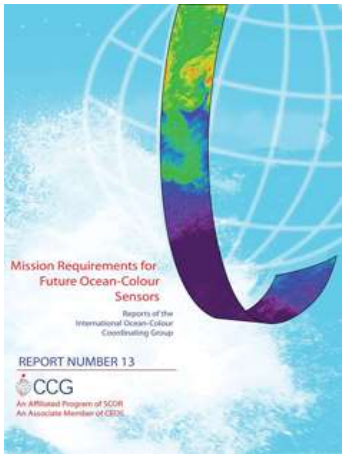
OCR-VC Development

- Progress in implementation
- Revised OCR-VC Terms of Reference (ToR) circulated to CEOS lists on 20 Dec 2013

- **Highlights of ToR:**
  - Well defined Mission Statement – focus on basic and applied research and management, addressing broader community needs, issues and gaps
  - Key Activities/Outcomes/Deliverables (see forthcoming slides for details)
    1. Implementation of ocean color minimum mission requirements for global polar-orbiting sensors and data harmonization
    2. Coordination of geostationary ocean color missions and facilitating coastal ecosystem research, applications and services using OCR data
    3. Implementation of the INSITU-OCR
    4. Implementation and coordination of an OCR satellite sensor calibration task force
    5. Support for implementation of the GEO Blue Planet Task

OCR –VC Activities, achievements, deliverables

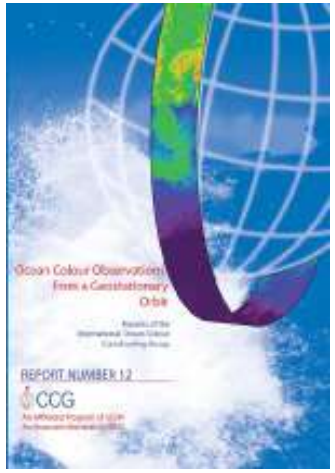
- **Implementation of ocean color minimum mission requirements for global polar-orbiting sensors and data harmonization**
  - **Long-term goal**: consistent & uniform implementation of OCR missions
  - **Achievement:** IOCCG Report #13: **"***Mission Requirements for Future Ocean-Colour Sensors"* **published**
  - **Action:**
    - CEOS agencies to respond to IOCCG Report #13 recommendations, i.e., review and assess existing & planned OCR missions relative to these requirements (completed by ESA and CSA already for planned missions, underway for NASA)
    - CEOS agencies to make freely available and accessible historical, current and future OCR mission data (including uncalibrated Level-0 or Level-1A data as well as calibration information and source/processing codes)
    - develop a catalogue of cal/val infrastructure and activities to help in cal/val planning, to identify risks, collaborative opportunities and the needs for advancement



http://ioccg.org/reports_ioccg.html

OCR –VC Activities, achievements, deliverables

❑ Coordination for geostationary ocean color missions and facilitating coastal ecosystem research, applications and services using OCR data



- **Objective:** facilitate and ultimately harmonize geostationary ocean colour observations
- **Achievement:** IOCCG Report #12: "*Ocean-Colour Observations from a Geostationary Orbit*" **published**
- **Action:**
  - Establishment of an IOCCG WG on "*Earth Observations in Support of Global Water Quality Monitoring*" ; WG approved by IOCCG, Jan 2014 - 1st meeting in Washington, DC, summer 2014 (TBC)
  - Formulation of a Water Quality Community of Practice (WQ-COP) under the auspices of GEO/GEOSS, 2014-5
  - Longer term goal: Implementation of a global water quality monitoring service under the auspices of GEO (ultimately underpinned by geostationary ocean color observations)
  - Demonstrations of utility/applications of geostationary ocean color data using observations from the GOCI sensor

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OCR –VC Activities, achievements, deliverables

- **Implementation of the INSITU-OCR (*I**nternational **N**etwork for **S**ensor **I**n**T**er-comparison & **U**ncertainty assessment for **O**cean **C**olor **R**adiometry)***
- The INSITU-OCR is a crucial component for realization of the broader OCR-VC objectives

  - **Achievement:**
    - **INSITU-OCR white paper** finalized in 2012; Recommendations/fall into four categories:
      - ✓ Space sensor radiometric calibration, characterization and temporal stability
      - ✓ Development and assessment of satellite products
      - ✓ *In situ* data generation and handling
      - ✓ Information management and support
    - **1st International Ocean Colour Science Meeting** held 6-8 May 2013 (see later slide)

  - **Actions:**
    - CEOS Agencies to identify existing contributions and define future commitments for implementation of INSITU-OCR white paper recommendations
    - Establish coordinating multi-agency **INSITU-OCR Office**
    - Finalization of IOCCG Report 14 – *Calibration of Satellite Ocean-Colour Sensors (2013)*
    - Finalization of IOCCG Report 15 – *Remote Sensing in Polar Seas (~2014)*
    - Establishment of an **IOCCG Task Force on Calibration** interfacing with CEOS WGCV (Task Force approved by IOCCG, Jan 2014)

OCR –VC Activities, achievements, deliverables

❑ Implementation of the INSITU-OCR (continued):

- **Near-future plans:**
  - 21 March 2014 – NASA ocean color vicarious calibration competition (~ US$10M/3 yrs.) to assess the state of the art in science and technology in ocean color vicarious calibration approaches, and develop the next generation of vicarious calibration system(s) in preparation for the PACE mission.
  - Capabilities developed and risks retired will benefit all agencies with satellite ocean color missions planned
  - Requirements for this competition were developed in accordance and conjunction with all IOCCG reports and subsequent IOCS meeting recommendations from working groups and workshops.
  - This will be NASA's initial contribution to the implementation of the INSITU-OCR for the benefit of the OCR community.

OCR –VC Activities, achievements, deliverables

❑ Implementation of the INSITU-OCR (continued):

Other contributions:

- Also, NOAA continues to move forward with the tech refresh of the Marine Optical BuoY (MOBY) being used for VIIRS (and other existing/upcoming sensors) vicarious calibration as the existing MOBY system is aging.

- ESA actively looking for long-term solutions for the funding of cal/val activities through the establishing of the Sentinel-3 MPC (Mission Performance Center), jointly funded by the EC and ESA, including the continuing support to the Bussolle (ESA acknowledges the substantial contribution of CNES).

OCR –VC Activities, achievements, deliverables

- **1st International Ocean Colour Science Meeting**:
  - Successfully held: 6-8 May 2013, Darmstadt, Germany
  - 244 participants from 36 nations in attendance
  - The overarching theme was ***"Building of Ocean Colour Climate Data Records"***.
  - IOCS Meeting Report available at:

http://iocs.ioccg.org/wp-content/uploads/report-iocs-2013-meeting.pdf

  - **Recommendation for follow-on activities**:
    - ✓ Workshop on Ocean Colour System Vicarious Calibration: held 2-3 Dec 2013, ESRIN
    - ✓ Workshop on Phytoplankton Functional Types (PFT) (Oct 2014, same venue for Ocean Optics XXII, TBC)
    - ✓ Establishment of an IOCCG Water Quality WG (approved by IOCCG, Jan 2014)
    - ✓ Establishment of an IOCCG Task Force on Sensor Calibration (approved by IOCCG, Jan 2014)
    - ✓ Establishment of an IOCCG task force on ocean optics *in situ* protocols (approved by IOCCG, Jan 2014; workshop in Oct 2014, same venue for Ocean Optics XXII)
    - ✓ Next IOCS meeting planned for May 2015, USA

OCR –VC Activities, achievements, deliverables

❑ Ocean Colour ECV support

- **Achievement:**
  - IOCCG WG on ECV assessment (since 2011): Focus on basin to global scale ECV/CDR time series for climate related studies which require long records
  - Background: International efforts to produce time series of ECVs
    - ✓ **NASA-GSFC**: Lw and Chl time series from SeaWiFS, Aqua, Terra, MERIS
    - ✓ **MEaSUREs** (NASA): inherent optical properties (IOPs) from SeaWiFS, Aqua, MERIS
    - ✓ **GLOBColour** (ESA): time series of merged data from SeaWiFS, Aqua, MERIS
    - ✓ **ESA's CCI program**: new (Dec 2013) merged and bias corrected times series from MERIS, MODIS, SeaWiFS with associated per-pixel uncertainty information

- **Next steps:**
  - Evaluate differences among existing OCR ECV products
  - Recommend comparison/evaluation metrics
  - Identify opportunities for further improvement
  - Encourage convergence on a cooperative approach for a common product assessment or common processing approach

OCR –VC Activities, achievements, deliverables

❑ Support for implementation of the GEO Blue Planet Task

- **Objective:**
  - OCR-VC output will contribute to the following Blue Planet Components (as identified in the revised Blue Planet Task White Paper, Nov 2013 and GEO 2012-2015 Work Plan):
    - ✓ Sustained Ocean Observations (e.g., OCR ECVs)
    - ✓ Sustained Ecosystems and Food Security (e.g., ChloroGIN, harmful algal blooms)
    - ✓ Ocean Forecasting (e.g., GODAE OceanView Science Team (GOVST)-Marine Ecosystem Analysis and Prediction (MEAP) Task Team);
    - ✓ Services for the Coastal Zone (e.g., water quality monitoring service);
    - ✓ Developing Capacity and Social Awareness (e.g., ChloroGIN, SAFARI).
    - ✓ Ocean Carbon and Climate (ECVs);

- **Action:**
  - OCR-VC to generate an action plan addressing the corresponding ocean color components in the updated GEO Blue Planet Task Plan.

OCR-VC implementation and coordination issues

❑ OCR-VC implementation an coordination issues to be addressed by SIT

- SIT encouragement for CEOS agency implementation of the IOCCG Report 13 will be critical to the success of the OCR-VC and future OCR continuity and user engagement.
- SIT encouragement for CEOS agency participation and support toward implementation of the INSITU-OCR.
- SIT endorsement for the formulation of a Water Quality Community of Practice, and subsequent development of a pathfinder activity for a global coastal and inland water quality monitoring service, to be developed under the auspices of GEO/GEOSS.
- CEOS agency endorsement of sensor calibration approaches advocated by OCR-VC.
- SIT endorsement for the OCR-VC action plan to be generated addressing the ocean color components in the updated GEO Blue Planet Task Plan.
- CEOS agency adoption of free, easy and timely access to and sharing of calibrated, as well as uncalibrated Level-0 or Level-1A OCR data, calibration information and source/processing codes.
- SIT encouragement for CEOS agency participation and support for sustained projects for calibration and validation of OCR data, and merging of OCR data across satellite sensors with determination of uncertainties/errors.