Ocean Colour Essential Climate Variables (ECV) Task Team
Update: IOCCG 20, Paris
March, 2015

1. NASA GSFC/OBPG (Franz)

NASA OBPG continues to work toward an ocean color reprocessing of VIIRS, MODIS/Aqua, MODIS/Terra, MERIS, SeaWiFS, OCTS, and CZCS. Recent Developments include:

- transition to netCDF4 file formats following CF and ISO standards and conventions intended to enhance interoperability and consistency with international partners and tools.
- revised instrument temporal and vicarious calibrations, which impacts long-term and interannual trends.
- refined ancillary time-series (ozone, met), which will have some impact on long-term and interannual trends.
- Used common processing algorithms across all sensors, to the extent possible.
- VIIRS calibration, now based primarily on lunar observation, augmented with much improved solar calibration knowledge, has brought VIIRS temporal and spatial stability in-line with expectation. **Given the degradation of MODIS and loss of other sensors, VIIRS is likely the best available source of US global ocean color radiometry today.**
- MODIS/Aqua has shown increasing temporal variability in recent years, primarily in the cross-scan response in the blue channels. Efforts by MCST to resolve the issues using dessert-based vicarious calibration methods have been only partially effective. NASA OBPG efforts for reprocessing are focused on this cross-scan response and potential changes in polarization sensitivity.
- SeaWiFS calibration knowledge has evolved substantially since the last full mission reprocessing in 2010, primarily in the understanding and mitigation of dark-offset changes at the sub 1DN level. The next reprocessing will produce a more stable SeaWiFS OCR time-series, including mitigation of some well-known issues in the 2005-2006 period, but we are still evaluating the impacts to long-term trends.
- Implemented the band-shift method of Melin, as discussed at the last OC-ECV meeting and are evaluating this approach relative to the neural-net approach that we originally developed and simple interpolation.

2. Globcolour (Antoine Mangin and David Antoine)

- Villefranche (LOV)) group is actively working on the joint use of Ocean Colour and bio-Argo floats – this implies a very good characterization of uncertainties (error estimates) on both sides.

- Project has been through a full revision/reprocessing, so that an updated entire time series is now available, and the same web site also includes a number of evaluation products from the just-finished OSS2015 FP7 project (http://hermes.acri.fr).

3. JAXA (Murakami)

- For preparation of inter-sensor comparison and temporal change monitoring, JAXA is planning to make 1-deg X 1-deg extracted TOA radiance data (mapped L1B with the satellite and solar geometry) for fixed (stable) site cal/val, similar with ones produced for previous missions.
- Planning to include CEOS cal/val sites and are considering including monitoring areas by other missions (e.g., Sentinel-3).

4. GlobCoast project (www.foresea.fr/globcoast) (Loisel)

- Entering final year and are analyzing the temporal evolution of bio-optical parameters (using new algorithms) in relation with physical parameters for the global coastal ocean.
- good example of the metric that we are using now at global scale can be found in the last paper published regarding Mekong coastal waters (see reference list below).
- working now on a version of the Polymer with Hygeos for atmospheric correction over coastal areas.

5. CCI Project (Melin)

- Version 1 CCI data projects have been available since early 2014. The V2 set is in preparation and should be released in a few weeks.
- Also see band shifting manuscript in Reference list below. Band shifting projects reflectance data from one sensor onto the bands of another sensor; allows comparison between reflectance products.

6. MEaSUREs (Maritorena)

- For the 2002-2012 period, generated a "one-stop-shop" reflectance product from SeaWiFS, MODIS and MERIS: 19 wavelengths Rrs daily level-3 product where the operational reflectance from the 3 sensors are combined in a single file; data available on MEaSUREs server.
- should have a model-based merged Rrs product available in a year from now.

7. Phenology and Other Applications (Henson)

- Has a couple of PhD students using the ESA CCI data for their research projects, and the data looks of very high quality.

8. NOAA (Wang)

- building the end-to-end capability and deriving accurate VIIRS ocean color product (and to be consistent with those from MODIS-Aqua).
- There are some significant Chl-a differences between VIIRS and MODIS-Aqua, related to VIIRS calibration issue. \
- NOAA Ocean Color team has worked on VIIRS instrument calibration (several papers published), Level-0 to Level-1B data processing, and algorithms improvements for Level-1B to Level-2/3 data. See: http://www.star.nesdis.noaa.gov/sod/mecb/color/index.html
- had a first very successful dedicated Cal/Val cruise from Nov. 11-21, 2014 (participants from 4 US agencies, EU-JRC, and 6 Universities et al.), and planning another cruise in 2015.

Recent Publications

New Reference Book related to ocean colour ECVs: "Optical Radiometry for Ocean Climate Measurements", G. Zibordi, C. Donlon, A. Parr, eds. http://store.elsevier.com/Optical-Radiometry-for-Ocean-Climate-Measurements/isbn-9780124170117/

Mélin, F., and Sclep, G., "Band shifting for ocean color multi-spectral reflectance data", Opt. Exp., 23, 2262-2279, 2015.
http://www.opticsinfobase.org/oe/fulltext.cfm?uri=oe-23-3-2262&id=310866

Signorini, S., B.A. Franz, and C.R. McClain (2015). Chlorophyll Variability in the Oligotrophic Gyres: Mechanisms, Seasonality and Trends, Front. Mar. Sci. doi: 10.3389/fmars.2015.00001.
http://journal.frontiersin.org/Journal/10.3389/fmars.2015.00001/abstract

Melin, F. and B.A. Franz (2014). "Assessment of satellite products in the visible domain", in Optical Radiometry for Ocean Climate Measurements, Elsevier Academic Press, Experimental Methods in Physical Sciences Series, Eds. G. Zibordi, C. Donlon, A. Parr, ISBN: 978-0-12-417011-7.

Saulquin, B., R. Fablet, A. Mangin, G. Mercier, D. Antoine, and O. Fanton d'Andon (2013), Detection of linear trends in multisensor time series in the presence of autocorrelated noise: Application to the chlorophyll-a SeaWiFS and MERIS data sets and extrapolation to the incoming Sentinel 3-OLCI mission, J. Geophys. Res. Oceans, 118, doi:10.1002/jgrc.20264.

Loisel and others. Variability of suspended particulate matter concentration in coastal waters under the Mekong's influence from ocean color (MERIS) remote sensing over the last decadeRemote Sensing of Environment 01/2014; 150:218–230.