Meeting of Full Steering Group of the OCR-VC

Session within IOCCG-14 Committee Meeting

20-22 April 2009, Hangzhou, China

AGENDA

Co-Chairs: N. Hoepffner (JRC) and H. Murakami (JAXA)

A draft OCR-VC Implementation Plan was distributed before the meeting. The primary purpose of this session was to obtain approval from the Leadership Group for a final implementation plan to be submitted to SIT/CEOS. The focus of the presentations was on Agency activities that could make a potential contribution to the OCR-VC activities.

Tuesday, 21 April 2009

5.0 Agency Contributions to the OCR-VC Implementation Plan		
5.1	Background to the establishment of the OCR-VC and IOCCG's contributions to GEOSS (J. Yoder)	09:00-09:15
5.2	**NASA:** SeaWiFS, MODIS updates, cal/val and data merging activities with ISRO, support for MERIS calibration, planned NASA missions (P. Bontempi)	09:15-09:35
5.3	**NOAA:** Improvements to VIIRS (on C-1 NPOESS and possibly NPP), support for MOBY, GEO Coastal Zone Community of Practice (P. DiGiacomo)	09:35-09:55
5.4	**ESA:** - Status of MERIS and Sentinel-3, GlobColour and new CoastColour programmes (P. Regner). - Vicarious calibration activities and the MERMAID database (D.Antoine)	09:55-10:30
TEA/COFFEE BREAK		**10:30-11:00**
5.5	**CSA:** Reception of MERIS data in Canada, SAFARI Project (Y. Crevier)	11:00-11:20
5.6	**KORDI:** Geostationary GOCI Mission (Y-H. Ahn)	11:20-11:40
5.7	**CNES:** Parasol mission and geostationary interests (E. Thouvenot)	11:40-12:00
5.8	**JAXA:** Phase 1 development of G-COM C and S-GLI instrument (H. Murakami)	12:00-12:20
LUNCH BREAK		**12:30–14:00**
5.9	**ISRO:** OCM-II on IRS-P7, cal/val, data processing, data sharing/merging, ISRO's interest in OC from a geostationary platform (R. Navalgund/ S. Kumar)	14:00–14:20
5.10	**INPE:** Argentine-Brazilian SABIA/mar mission (M. Kampel)	14:20-14:40
5.11	**EUMETSAT:** EUMETSAT's role in ocean missions (H. Bonekamp/J. Yoder)	14:40-15:00
5.12	**JRC:** ChloroGIN Project, GMES contribution, interdisciplinary GCOS workshop, JRC capacity building activities (N. Hoepffner, M. Dowell)	15:00-15:20
TEA/COFFEE BREAK		**15:30-16:00**
5.13	OCR-VC Implementation Plan and way forward, OceanObs'09 Community White Paper (J. Yoder, N. Hoepffner, H. Murakami)	16:00-17:30

Meeting of Full Steering Group of the OCR-VC

Session within IOCCG-14 Committee Meeting

20-22 April 2009, Hangzhou, China

MINUTES

5.0 Agency Contributions to the OCR-VC Implementation Plan

5.1 Background to the establishment of the OCR-VC and IOCCG's contributions to GEOSS

The Chairman reported that he had attended the various SIT meetings on a regular basis, and that a draft Implementation Plan (IP) for the Ocean Colour Radiometry-Virtual Constellation (OCR-VC) had been developed**.** It was imperative that this Implementation Plan had the full support of all agencies. The draft IP covered Phase 1, up until the launch of Sentinel-3, and was intended to support various societal benefit areas of GEO, as well as GCOS requirements. Ocean-colour radiometry was important in understanding climate and climate impacts, and was relevant to a number of societal benefit areas, so the OCR-VC was an opportunity to encourage cooperation amongst the space agencies represented in IOCCG. Agency activities that helped with the broader goals and objectives of the OCR-VC could be listed as part of the initiative. CEOS had accepted the leadership of the OCR-VC by agency representatives Hiroshi Murakami (JAXA) and Nicolas Hoepffner (JRC, EU), but all agency members were expected to contribute to the Implementation Plan, the final version of which would be ready for review/approval prior to SIT-24 (September 2009).

5.2 NASA update

Paula Bontempi reported that NASA would undertake a reprocessing of the full suite of sensors within the next few months (MODIS-Aqua, MODIS-Terra, SeaWiFS, OCTS and CZCS). Highlights of the reprocessing would include sensor calibration updates, updated aerosol models based on AERONET size distributions, updated vicarious calibration, updated MOBY dataset etc. Lunar calibration trends for SeaWiFS had begun to deviate from the exponential model in 2006, and the satellite had drifted from noon to approximately 1:30pm orbit, which was being addressed. The band center of MODIS-Aqua had been moved from 551 nm to 547 nm and the instrument calibration had been updated. These changes resulted in reduced discrepancy between MODIS-Aqua and SeaWiFS chlorophyll in oligotrophic waters, and also reduced the high-latitude seasonal differences in MODIS-Aqua vs. SeaWiFS water-leaving radiance trends. MODIS-Terra had well documented issues with radiometric stability which had taken a long time to sort out. Reprocessing would start June 2009, and the fully reprocessed data sets should be available to the research community by Fall 2009. This was the first complete end-to-end re-evaluation and update of ocean colour processing methodology, radiative transfer tables, sensor calibration, ancillary sources, file formats, etc. and was a very big job. It was also noted that all sensors were beyond their planned mission life.

An IOP Algorithm workshop was held at Ocean Optics XIX (3-4 Oct 2008) to achieve community consensus on an effective algorithmic approach for producing global-scale, remotely-sensed IOP products from semi-analytic algorithms (SAA). Participants reached

consensus on a processing framework within which NASA would start producing SAA data products for community evaluation. Following the reprocessing, global IOP products would be generated and distributed in a parallel evaluation data stream, with source codes available via SeaDAS.

The fifth SeaWiFS HPLC Analysis Round-Robin Experiment (SeaHARRE-5) was being conducted with an emphasis on coastal (Case 2) waters. It was noted that the problems with the historic HPLC data in SeaBASS had been corrected, and the data would be put back in SeaBASS within the next few months. Dr. Bontempi also announced that she would be willing to request NASA to undertake the processing of HPLC samples from ChloroGIN or GO-SHIP. NASA planned to hold an Apparent Optical Property (AOP) data processing workshop to specify the requirements of a community-maintained, web-based interface for the processing of AOP data.

ESA/NASA partnerships had been strengthened: Bryan Franz and Gerhard Meister represented NASA on the MERIS Data Quality Working Group. In addition, the NASA Ocean Biology Processing Group had formally applied (as a group) to be one of the "Champion Users" for MERIS full resolution coastal data (CoastColour). SeaDAS had been enhanced to support the display and analysis of standard MERIS Level-2 products.

NASA and NOAA were interested in ISRO's Oceansat-2 OCM data (as well as scatterometer data). ISRO had agreed to provide online access to global OCM-2 data (4-km) at Level-1B, to all international users for research use at no cost. NASA would provide processing capability (Level-1B through Level-3) for use by ISRO and the international community (distributed in SeaDAS). NASA and NOAA would also participate in a joint Cal/Val Team.

NASA had plans for 16 new missions by 2025. The ACE (Aerosol, Cloud, Ocean Ecosystem) Mission would include an aerosol-cloud component, as well as an ocean ecosystem component to characterize and quantify changes in the ocean biosphere, and to characterize the role of the oceans in the carbon cycle. For ocean ecosystems, the ACE payload was considering an ocean colour multi-channel spectrometer with 22 aggregate bands (5 nm resolution) from 335 to 865 nm, plus 3 SWIR bands. The ocean-colour component could be developed in conjunction with Earth Care and launched in 2012, otherwise it would be launched in 2018. Other planned missions included a Geostationary Coastal and Air Pollution Events (GEO-CAPE) Mission (launch 2013-2016) to examine coastal ecosystem health and air quality, and the hyperspectral HyspIRI Mission which would be used to produce the first ever global measurements of ecosystem function and composition. Its focus would be on land vegetation, but there was an interest in doing ocean retrievals for phytoplankton physiology. The tentative launch date was around 2014. Another instrument being developed at NASA was the ocean colour aircraft-based PRISM instrument, to identify constituents and quantify properties of complex coastal ocean waters using spectroscopic measurements with UV to SWIR channels.

NASA was funding a range of research programmes from development of algorithms to remotely-sensed inland and coastal water quality, to the development of new sensors for marine ecosystems. NASA agreed to support the OCR-VC in its entirety.

5.3 NOAA contributions to implementation of the OCR-VC

Paul DiGiacomo reported on NOAA's contribution to the five main objectives of the OCR-VC Implementation Plan. Regarding "Ensuring OCR Continuity", the launch of VIIRS-NPP was anticipated for the first quarter of 2011. A supporting interagency Cal/Val Program for VIIRS ocean products (ocean colour and SST) is now in execution phase, with three goals: 1) validation of NPOESS program delivered ocean products, 2) evaluate the usability of VIIRS data and products for operational and scientific use by the agencies and 3) evaluate the VIIRS products in relation to the heritage instrument products with the goal of producing comparable products and combining heritage instrument and VIIRS products to assess climate variations. VIIRS-NPOESS will be launched in 2013 or 2014 and anticipated updates include an improved filter, improvements in spectral out of band characterization, and algorithm improvements.

To fulfill the objective "Provision of high quality data sets", all data from MOBY are now freely and openly available free of charge via the NOAA-CoastWatch website, and have been/will be incorporated into SeaBASS. The next generation MOBY (i.e., MOBY-C) has been presented to NOAA / NESDIS management and could possibly be ready for deployment by 2011. MOBY-C would support vicarious calibration of current and future satellites, and has a number of advantages over MOBY (simultaneous measurements, high data rate, more flexible design and more portable).

Regarding "Data Harmonisation", NOAA CoastWatch participated in the ESA CoastColour meeting, and they intend to continue working with ESA. Several US regions were put forward as potential test-sites for evaluating MERIS FR data products in coastal waters. NOAA also participated in an expert meeting on updating the GCOS Implementation Plan.

To fulfill the objective "Facilitating Timely Access to Data" the NOAA CoastWatch programme has set up a new website to facilitate easier and quicker user access to data through a variety of mechanisms (applications portal, OceanWatch portal etc.). VIIRS NPP and NPOESS ocean colour data will be distributed by via both NOAA CoastWatch and OceanWatch, in addition to other NOAA portals. Furthermore, NOAA were now distributing MERIS NRT reduced-resolution products for U.S. coastal waters via CoastWatch, and were also initiating efforts toward distribution of MERIS full-resolution data for U.S. coastal waters.

Regarding the "Capacity Building and Outreach" objective of the OC-VC, the GEOSS Coastal Zone Community of Practice (CZCP) was bringing together data providers and users in the context of GEOSS, to ensure that user coastal observational needs are coordinated and addressed (co-chaired by Paul DiGiacomo and Hans-Peter Plag). A series of regional user workshops are also underway. A number of activities are also addressing remote sensing of water quality including the GEO Inland and Coastal Water Quality Remote Sensing Algorithm Workshop, (19-21 May 2009, Washington, DC). A draft report of the workshop should be ready by the end of summer.

5.4 ESA: Status of MERIS and Sentinel-3, GlobColour and CoastColour Programmes

Peter Regner informed the Committee that the main limiting factor of the Envisat mission was onboard fuel. A new orbit control strategy (lowering by 17.4 km) would allow the "nominal

mission" to continue until 2010, and would ensure continuity of most Envisat applications until 2013. No significant impact was expected for MERIS products. The MERIS instrument was still very stable with excellent performance. With the current ageing rate, the required radiometric accuracy of the instrument and the on-board diffusers could be maintained until 2013. The MERIS Quality WG had been working with experts from MODIS and SeaWiFS on instrument characterization, Cal/Val methods and algorithm development. The MERMAID database was used to support worldwide activities on Cal/Val. The third reprocessing of MERIS would be completed by December 2009 with a number of significant improvements.

ESA's GlobColour Project, initiated in 2005, provided a consistent long time-series (10 years) of ocean-colour information by merging together data streams from SeaWiFS, MERIS and MODIS. There were 21 official parameters and 4 demonstration products with improved spatial and temporal coverage (removal of clouds). Data were freely available via two portals: Hermes plus an ftp server. GlobColour products were being intensively used by a significant number of users. ESA funding for GlobColour would end in July 2009, after which the time-series production would continue as part of EC GMES Marine Core Services *i.e.* MyOcean. Users had requested a coastal version of GlobColour, as a result of which the CoastColour project was initiated. This new Data User Element (DUE) project for 2009 had been established to increase the use of MERIS data in Case 2 coastal waters. The first User Requirements workshop was held in Ireland (March 2009) and was well attended. The next step was asking "Champion Users" to provide detailed user requirements and to advise ESA during the execution of the project. The project should be completed by the end of 2011.

The OLCI instrument on the Sentinel-3 spacecraft will have a number of improvements over MERIS, including tilting to avoid sun-glint, more spectral bands (21 instead of 15) and a 2% absolute radiometric accuracy. EUMETSAT will be the operator for ocean ground segment, while ESA will handle the land ground segment. The Sentinel data policy was in preparation and would ensure open and free access to the data. Funding for the GMES Space Component Programme was on solid financial ground and had been approved by ESA Member States.

David Antoine gave a brief report on vicarious calibration activities and the MERMAID database. MERMAID is a centralized database of *in-situ* optical measurements with concurrent MERIS acquisition, which facilitates the assessment of MERIS Level-2 marine products delivered by the ground segment. The project was initiated in 2008 and was partially supported by ESA. Data access was given to MERIS QWG members as well as scientists contributing *in-situ* data to the database. ARGANS was in charge of the data formatting while ACRI-ST was in charge of the final delivery on the web site. MERMAID would be one of the tools used for validating the next reprocessing of MERIS data.

5.5 CSA: Reception of MERIS data in Canada, SAFARI Project

Trevor Platt reported on the SAFARI initiative on behalf of Yves Crevier, who was unable to attend the meeting. This initiative was funded by CSA, and was addressing one of the GEO tasks within the societal benefit area of agriculture. SAFARI represented an international forum for coordination and exchange of views on the use of remotely-sensed data in fisheries oceanography, and intended to stimulate new research and knowledge in this area. In addition,

there was a capacity building element, with outreach to fishermen, which would be good to do in other countries as well. An informative brochure on this topic had been published, which could be translated into other languages if there was interest. The group was also publishing a monograph in the IOCCG series, which would be printed soon. The next initiative would be an international symposium on remote sensing and fisheries, scheduled to take place in Kochi, India (15-17 February 2010). Dr. Platt was optimistic about Phase 2 of the project, and welcomed broader participation by other countries, as well as suggestions.

Jim Helbig gave the second half of Yves Crevier's presentation on MERIS reception in Canada. CSA had reached an agreement with ESA for MERIS reception in Canada, which was being implemented in two phases. Data is being downlinked via two ground stations in Canada (Prince Albert and Gatineau) where it is processed to Level 0, then sent to Kiruna in Sweden. Phase 1 consisted of repatriating the data via the internet, and using existing PDS infrastructure to provide a 'same day' MERIS FR L1 / L2 service for Canadian-acquired data. This service is working well. Phase 2 had been delayed because of hardware and software problems but would be implemented by October 2009, and would encompass deployment of a Linux-based MERIS processing chain and rolling archive directly in Canada. The data policy was the same as for the rest of ESA data (available free of charge to registered users) and MERIS data could also be distributed to ESA- approved investigators through NOAA CoastWatch website.

5.6 KORDI: Geostationary GOCI mission

Yu-Hwan Ahn reported on the pre-launch status of GOCI on the COMS-1 satellite. A number of issues related to radiometric calibration had been addressed, and a requirement of 0.01% had been confirmed by test results. An accuracy requirement of less than 3.8% had been achieved (solar calibration only). The GOCI instrument was shipped to Korea in November 2008, and had been successfully integrated into the COMS satellite in KARI, where a final ground test campaign was on going. The launch from the Kourou Space Center, French Guiana, was scheduled for November 2009, or more likely the beginning of 2010.

The Korea Ocean Satellite Centre (KOSC) of KORDI had the intellectual property rights to GOCI data, as well as distribution rights. KOSC was responsible for mission scheduling, receiving and archiving satellite data, providing standard data processing services and sensor optical calibration, while the Satellite Operation Center (SOC) of KARI was responsible for the operation of the satellite including ground control, orbit determination etc. For domestic users, GOCI-1 L1B/L2 data would be distributed free of charge to the public and researchers, who would have priority over commercial users. Data access would be via online distribution in near real time (within 2 hours). For foreign users, GOCI-1 data would be distributed free of charge to registered PIs for research purposes, in delayed mode (within 1-3 days) to avoid line traffic. Redistribution was not authorized except under a special contract with KOSC/KORDI. It might be possible to set up direct receiving stations, with a mutual agreement between two countries.

Plans for GOCI-2 were on going and would succeed and expand the GOCI-1 mission. The new mission would establish an ocean observation system to monitor long-term climate changes with full disk observation, and would monitor the environment for the efficient management of coastal waters with high resolution (250 m). Key user requirements would be 13 spectral bands (up from 8), spatial resolution of 250 m and 1 km (up from 500 m) and a temporal resolution of

1 h and 12-24 h, with night time observation for observation of fishing ships. KORDI welcomed suggestions for band changes for GOCI-2 from the IOCCG.

ACTION 14/7: IOCCG COMMITTEE MEMBERS TO PROVIDE SUGGESTIONS FOR BAND CHANGES FOR GOCI-2.

5.7 CNES: Activities contributing to the OCR-VC Implementation Plan

Eric Thouvenot reported that CNES was actively contributing to most of the objectives of the OCR-VC implementation strategy and plan. Contribution to OCR continuity was being accomplished through the ongoing Parasol mission, research and development activities, as well as a feasibility study on a geostationary mission. The Parasol mission (carrying the POLDER sensor) was designed to operate for 1-2 yrs, but was still working well after more than 4 years. It was not initially planned for ocean colour use, but CNES made a decision to do so after the loss of ADEOS-2. Comparisons with MODIS revealed that the data was qualitatively acceptable, with known limits. One of the main concerns after launch was the problem with the 443-nm channel, which had been lost for ocean colour. CNES was a research and development agency and had undertaken many ocean-colour related activities at various levels, including development of state-of-the-art instruments (*e.g.* MERIS, GOCI, OLCI and Hyperspectral sensors) as well as feasibility studies for ocean-colour missions in geostationary orbit. Added value of GEO observations included a very short access delay, cloud removal and capacity to track the evolution of fast-changing events (pollution, red tides). There was a trade off between geostationary and geosynchronous orbits (30^o inclination).

CNES was also contributing to high-quality data sets by performing a number of vicarious calibration activities, including funding the BOUSSOLE buoy, SIMBADA radiometers, gliders and BIO-Argo floats. Research and development activities included adaptation of radiative transfer codes, algorithms for atmospheric correction and bio-optical algorithms for coastal waters. CNES also contributes to data assimilation and forecasting for Mercator-Ocean. In conclusion CNES was ready to contribute to the tasks of the OCR-VC group to promote ocean colour missions and activities. In particular, CNES would recommend using this group to define a strategic plan for observation of the oceans from a geostationary orbit.

5.8 JAXA: Phase 1 development of G-COM C and S-GLI instrument

Hiroshi Murakami reported on the Phase-1 development of the GCOM-C satellite, one of JAXA's earth observation missions for global environmental observation which would carry the SGLI instrument. GCOM-C targets included monitoring radiation budget changes and global environmental change including the carbon cycle, and reducing the uncertainty in global warming estimates. The mission would also contribute to operational uses such as fishery estimation and prediction and catch management.

The GCOM-C satellite series would provide more than 10 years of observations from 3 satellites, each operating for 5 years, with a one-year overlap (GCOM-C1, C2 and C3). The launch date was still under discussion, but most likely the end of 2013 or early 2014. A GCOM-C1 research announcement was released in Jan-March 2009 and proposals were currently under evaluation. This phase would include the initial development of new algorithms

and improving the theoretical accuracy. SGLI features included a finer spatial resolution (250 m and 500 m), 11 visible channels as well as two multi-angle channels at 670 and 865 nm to improve land, coastal, and aerosol observations. International collaboration with NOAA/NPOESS and discussions with NASA, ESA and CNES regarding science and applications, with possible data merging with other sensors in a few years, had been undertaken. The GCOM-C concept harmonizes with the CEOS/OCR-VC as well as the CEOS/WGCV/IVOS concept.

5.9 ISRO: OCM-II on Oceansat-2

Rangnath Navalgund and Srinivas Kumar were unable to attend the meeting, but Dr. Navalgund had informed the Committee that there had been some delay in the launch of Oceansat-2, which was now likely to be launched some time in June/July 2009.

5.10 INPE: Argentine-Brazilian SABIA/mar mission

Milton Kampel reported on the Argentine-Brazilian SABIA/mar mission. Presidents from both countries had approved the joint development of a remote sensing satellite, and they also requested financial authorities to identify sources of funding for this project. The satellite would target a number of applications (oceanography, sustainability of marine living resources, fisheries, environmental and coastal management, hazards etc.) with daily observation at 1-km spatial resolution, using 12-13 bands in the visible. Brazil would provide the payload, Argentina would provide the platform, and both countries would be responsible for development of applications and the ground segment. There would be an open data policy. The satellite could accommodate two sensors: a global instrument plus one for more regional applications. The specifications would be completed soon. There were plans for another workshop in Brazil for wider consultation with both the scientific and engineering end-user communities. Mission specifications would be completed this year, and funding would be requested. Instrument design was still under discussion and it had not been decided whether there would be international collaboration or local development. Paula Bontempi stated that if there was an Announcement of Opportunity for instrument design, NASA would most likely respond.

5.11 EUMETSAT's Role in Ocean Missions

The Chairman reported on EUMETSAT's contribution to the OCR-VC on behalf of Hans Bonekamp who was unable to attend the meeting. EUMETSAT's mission was to deliver operational satellite data and products that satisfy the meteorological and climate data requirements of the 24 EU member states and 6 cooperating states. EUMETSAT would be responsible for the operation of the Sentinel-3A and -B satellites including the command and control of the satellites, the payload data processing (marine component) and dissemination of the marine products to the user community through EUMETSAT Data Dissemination Systems (EUMETCast, EUMETSAT EO portal). EUMETSAT also had third party cooperation agreements to secure data from NOAA (POES, NPP and NPOEES), China (CMA HY-2) and India (ISRO SARAL, Oceansat-2 and -3) and were also involved in a number of other CEOS virtual constellations (Ocean Surface Topography and Ocean Surface Winds). The Chairman warmly welcomed EUMETSAT into the group and remarked that he was pleased that they were interested in contributing to the OCR-VC.

5.12 JRC: Contributions to the OCR-VC

Nicolas Hoepffner gave a brief overview of ChloroGIN: a network of networks established to promote *in situ* measurements of chlorophyll in combination with satellite-derived estimates and associated products. ChloroGIN was an explicit task under the GEO Ecosystem SBA (Societal Benefit Area), with a number of implicit links to other SBAs. ChloroGIN facilitates dissemination of satellite data and advanced products through dedicated web portals, improved connections between networks and receiving stations, with links to the EU project DevCoCast. ChloroGIN also reviewed protocols for *in situ* measurements and had a strong component in capacity building. New members were encouraged to be part of network and he noted that it would be very beneficial to have SIO as part of the network (ChloroGIN China). ChloroGIN had been selected as one of the demonstration projects for the EU DevCoCast initiative which uses the GEONETCast concept to provide processed land and ocean satellite data and value-added products to developing countries. A training session on the GEONETCast data dissemination system would be held at the IGARSS meeting in Cape Town (13-17 July 2009).

Dr. Hoepffner also reported on GMES (Global Monitoring for Environment and Security), a European initiative for the implementation of information services dealing with environment and security, incorporating *in situ* systems, space systems and data integration and information management. GMES was now in its implementation phase: MyOcean was the implementation project of the GMES Marine Core Service. The project consisted of 7 Monitoring and Forecasting Centers (MFC) and 6 Thematic Assembly Centers (TAC). The objectives of the ocean colour TAC was to build and operate a European Ocean-Colour Service for GMES marine applications. The EU was committed to supporting capacity building efforts in Africa and recently started GMES Africa to improve long-term use of EO in management of natural resources in Africa (duration 2010-2018). JRC was also responsible for science and data requirements for GCOS ECVs, including assessing uncertainties of individual ECVs used in the calculation of primary production. A workshop would be held at JRC from 3-5 June 2009 with a theme of biosphere primary production. Another JRC initiative was an ocean-colour training course to be held in Zanzibar (Tanzania) from12-23 October 2009, in partnership with a number of other organisations, including support from the IOCCG.

5.13 OCR-VC Implementation Plan and way forward

The Chairman highlighted some of the agency activities from the previous presentations that could contribute towards the Phase 1 Draft OCR-VC Implementation Plan, which would cover the period 2008 through to the launch of Sentinel-3 (late 2012).

Objective 1: Ensuring OCR Continuity

- Improvements to VIIRS on NPOESS C1: currently trying to mitigate cross-talk issues with improved filter and better spectral out of band characterization for VIIRS on NPOESS C-1 platform (scheduled for launch in late 2012).
- NASA was initiating the first end-to-end reprocessing of ocean-colour data, including OCTS and CZCS.
- Several agencies were evaluating geostationary or geosynchronous orbits for OCR sensors. In addition, an IOCCG Working Group was evaluating user requirements as

well as new capabilities for OCR measurements from geostationary platforms. Some sort of inter-agency coordination of coverage was highly desirable. Perhaps CNES could host a workshop to discuss these issues.
- NASA would include ISRO OCM-2 data processing capability in SeaDAS.
- Pre-launch cooperative activities for Sentinel-3A and -B were approved.
- Brazil and Argentina would launch a two-sensor OCR mission with instruments for both global and regional coastal coverage. Mission specifications would be completed in late 2009.

Objective 2: Providing High Quality Data Sets

- NOAA would continue support for the MOBY optical buoy. MOBY-continuation (MOBY-C) would ensure continuity of vicarious calibration across past, present and future ocean color sensors, and should be in the water before the end of 2011.
- The SeaWiFS HPLC round-robin experiment would improve the quality of HPLC phytoplankton pigments for the SeaBASS archive, and would also establish new HPLC measurement protocols.
- Continued interactions between NASA and ESA related to MERIS calibration and characterization, and extended to pre-launch Sentinel-3 activities.
- MERIS would be reprocessed for the third time by December 2009 using the same vicarious adjustment approach as used by NASA for SeaWiFS.
- MERMAID, a centralized data base of *in situ* bio-optical data measurements plus concurrent MERIS extractions, would be one of the tools for validating the next MERIS reprocessing. NOMAD data had been incorporated into MERMAID, as well as ocean colour AERONET data (a ground validation network for the aerosol community) via a cross ESA/NASA agreement (AERONET could be inserted into the IP as a separate item funded by NASA).
- ChloroGIN promotes *in situ* measurement of chlorophyll in combination with satellite-derived estimates. China expressed an interest in establishing a network for Chinese regional waters (contact Xianqiang He of SOED/SIO/SOA).
- André Morel pointed out that the NOMAD database was strongly biased towards coastal waters, and he recommended a balance between coastal and open ocean waters for match-ups. Also, no data for CDOM was available for open-ocean, oligotrophic waters because of spectrophotometric limitations (no CDOM data for ~80% of ocean). He suggested that a recommendation be made to use new techniques for measuring CDOM, even if they were very complicated.

Objective 3: Data Harmonization

- ESA's GlobColour project demonstrated the benefits of a multi-sensor data merger as an important step towards an ocean-colour Essential Climate Variable (ECV) for global products. GlobColour products would continue as part of the EC GMES Marine Core Service *i.e*. MyOcean
- ESA is currently planning the CoastColour Project for several coastal study areas using MERIS 300-m data. "Champion Users" would be selected by Q4 2009.

- MERIS Quality WG includes members from SeaWiFS and MODIS teams. The next meeting was scheduled for 27-29 April 2009 at ESRIN, and meetings would continue in the future.
- The IOCCG BIO-Argo working group was evaluating requirements and applications for bio-optical sensors on Argo floats. A pilot study was under consideration, which NASA had agreed to fund.

Objective 4: Facilitate Timely and Easy Access to Data (User Interface)

- CSA was upgrading ground infrastructure at the Canada Centre for Remote Sensing (CCRS) for the reception and processing of full resolution (300 m) MERIS data. Coverage included most of the Canadian Arctic, Pacific and Atlantic coasts. Beginning in Q4 2009, data would be processed in Canada rather than in Europe. Access was available to Canadian Government users or to ESA-approved users from any country.
- Starting in Q4 2009, INPE would acquire, process and distribute MERIS full resolution data for South American waters.
- VIIRS NPP data, and possibly data from other international sensors, would be incorporated into NOAA's OceanWatch portal for operations and climate applications.

Objective 5: Capacity Building and Outreach

- Support GEO Coastal Zone Community of Practice (CZCP)
- Include INPE ocean-colour training course, sponsored by POGO and the Nippon Foundation (Rio de Janeiro, October 2009)
- Include IOCCG report on "*Partition of the Ocean into Ecological Provinces*", as a contribution to the GEO Ecosystems SBA.
- Include GeoNetCast / DevCoCast (text to be provided by Stewart Bernard)

The next SIT meeting would take place from 10-11 September 2009 in Darmstadt, Germany. Nicolas Hoepffner agreed to attend the meeting as the OCR-VC Co-Chair. A final draft of the implementation plan would be submitted before the meeting. Dr. Hoepffner suggested that the document should be structured with deliverables and timelines, and that omissions should be highlighted to encourage one of the agencies to take responsibility.