

Minutes of the Second Committee Meeting of the IOCCG

Tokyo, Japan, 17-18 March, 1997

The meeting took place at the Headquarters of the National Space Development Agency of Japan (NASDA) in Tokyo. All committee members were present except for Dr. Kopelevich, whose visa did not arrive in time. In addition, several observers also attended (see copy of the participants list).

1. Opening of the meeting and adoption of the agenda

The meeting was opened by Dr. Tasuku Tanaka, Director the Earth Observation Research Center (EORC-NASDA). He welcomed the participants and mentioned that the ocean-colour community would benefit from the new global data set of pigment distributions, recently released by NASDA. The chairman, Dr. Trevor Platt, thanked Dr. Tanaka for hosting the second session of the IOCCG at the NASDA Headquarters and thanked all participants for attending. The adoption of the agenda was proposed by the chairman and was accepted by consensus (see copy of agenda).

2. Matters arising from the previous meeting of the IOCCG

The Chairman gave a brief chronology of the IOCCG since the first meeting in Toulouse, France (22-23 March, 1996). In April of 1996, Dr. Platt met with the Executive Secretary (Dr. Kullenberg) and the Chairman (Mr. Holland) of the IOC to discuss the resolutions of the Toulouse meeting and the intent of the space agencies to commit funds to the IOCCG. On the basis of this discussion, the IOC agreed to commit infrastructure support to the IOCCG at a level commensurate with the level of sponsorship by individual space agencies. Dr. Platt then solicited funding for the IOCCG from the relevant space agencies.

Subsequently, the Executive Committee of the IOCCG (which consists of senior representatives of the principal donor agencies plus the Chairman), met in Washington at the NASDA offices on 5 - 6 December, 1996. At this meeting it was decided that a Project Office should be set up at the Bedford Institute of Oceanography, Canada, and that a project scientist should be appointed, initially on a half-time basis, effective from 1 January 1997. It was also decided that the IOCCG should contribute to existing newsletters to disseminate information about the IOCCG, using the not-for-profit magazine, backscatter, published by the Alliance for Marine Remote Sensing (AMRS) as its primary outlet. The first issue with an IOCCG contribution was published in February 1997. In addition, the IOCCG submitted a contribution for the February 1997 issue of the CEOS newsletter. It was also decided that there should be a server for the IOCCG on the World-Wide Web. Dr. Schlittenhardt of the JRC (Joint Research Center) agreed to make available to the IOCCG use the server in Ispra, Italy for this purpose.

The interim set of Terms of Reference, initially drafted at the workshop in Sidney, Canada, 1995 and amended at the first meeting of the IOCCG in Toulouse, France, 1996 was accepted by consensus.

3. Establishment of a Project Office for the IOCCG

A project office has been set up at the Bedford Institute of Oceanography in Dartmouth, Nova Scotia, Canada and Dr. Venetia Stuart has been appointed as Project Scientist, on a half-time basis, as start-up staffing.

4. Establishment of a Publication Outlet for the IOCCG

The IOCCG is currently using the backscatter magazine, published four times a year, as a publication outlet and has contributed 10 pages to the February 1997 issue of the magazine. Contributions to future issues will probably be 4 - 6 pages long and the Project Scientist will be requesting help from members in supplying articles. The magazine has a targeted circulation of around 7,000 in the marine remote sensing community with a projected circulation of 10,000 including IOC delegates, IOCCG committee members and CEOS Principals and Contacts. Other newsletters, such as the CEOS Newsletter, may be used from time to time. Dr. Mueller suggested that the IOCCG might consider another publication such as EOS to reach a broader distribution.

5. Establishment of the IOCCG on the World-Wide-Web

Following the invitation by Dr. Schlittenhardt that the IOCCG make use of the server in Ispra, Italy, Dr. Stuart travelled to Italy for a week in mid-February to make the necessary arrangements to establish the IOCCG Home-Page. Funding for this trip was kindly provided by Dr. Schlittenhardt through the JRC. Working in collaboration with D.J.L. Software Consultancy Limited (on contract to the JRC) a provisional Home-Page for the IOCCG was set up. After a brief presentation of the structure and demonstration of the Home-Page to the meeting, it was decided that the address of the server would be formally announced in the near future after implementation of some changes. Suggestions for change included implementing links to data archives, national working groups, ground truth programs and OCTS data.

6. Status of Ocean Colour Missions

Brief overviews were given on ocean-colour missions in various agencies in order to update the IOCCG on the status of these missions and to elucidate the role of the IOCCG in helping these missions to achieve their goals.

(a) MOS

Dr. Neumann of DLR (German Aerospace Research Establishment) gave a brief presentation on the MOS sensor, launched on 21 March, 1996 aboard the IRS-P3 satellite. Data from European coastal waters and parts of the Arabian Sea are now available to the community, but only for scientific applications, with certain restrictions. Algorithms are being developed and validated for specific regions - yellow substances are presenting a problem, especially in the Baltic Sea. DLR intends to establish regional receiving stations at various locations around the world, which may include South Africa, Australia, Brazil and Argentina. DLR has also recently purchased a mobile decoding terminal from India which can receive MOS data and which could be used for interactions between missions.

Dr. Neumann stressed that inter-mission calibrations should be encouraged. He also suggested that the IOCCG help in NASA/MOS negotiations, which Dr. Yoder of NASA agreed to follow up. The second MOS sensor (on the Priroda satellite) has a smaller swath, lower resolution and less coverage than the one on the IRS-P3. No data have been received from this sensor yet, but should be available within the next few weeks.

Following the presentation, some discussion ensued over the availability of MOS data, especially in the USA where there are problems with the specific frequency of the downlink. Dr. Platt resolved to write to NASA to motivate for downlink capabilities of MOS data over USA.

(b) OCTS

Dr. Kawamura of NASDA presented a summary on the current status of the OCTS sensor, which was launched in August 1996. The first images became available in September 1996 and the sensor has been in routine operation since November 1996. OCTS has the capability of observing the global ocean at a high spatial resolution (700 m) and daily chlorophyll and sea surface temperature data are currently available to PI's and other interested parties through the internet. A good agreement has been obtained between OCTS data and sea truth measurements for the open ocean, but discrepancies exist for coastal waters. Fine tuning of the algorithms should alleviate this problem (target date June 1997). Currently, the OCTS data processing capability is not sufficient for the present data load and the EORC (Earth Observation Research Center) resources are also inadequate. A national data exchange scheme is desirable and sea-truth data are required for calibration and validation, especially in the coastal regions. Dr. Tanaka recommended that all participants cooperate in the provision of measurements for match up data sets.

(c) POLDER

Dr. Lifermann of CNES gave a brief presentation of the status of the POLDER sensor, designed to produce global ocean-colour data sets. In-flight and on-ground calibrations were successful and intercalibration between the OCTS and POLDER sensors (both on the ADEOS satellite) will subsequently be undertaken. The coincidence of two ocean-colour sensors on the same satellite presents a unique opportunity for sensor intercomparison. POLDER images of the global distribution of pigments revealed

features that are consistent with historical data. The next step is the implementation of an ocean-colour validation plan to be carried out in four stages: firstly, a statistical approach, followed by a global network approach with emphasis on atmospheric correction using sun photometers as well as SIMBAD instruments on ships around the world. Thirdly, marine parameters can be validated through access to bio-optical in-situ measurements and finally comparison with other sensors, such as OCTS. Rapid access to validation data sets should be ensured.

(d) SeaWiFS and MODIS

Dr. Yoder of NASA reported that the launch of the SeaWiFS ocean-colour sensor is imminent, scheduled for June 1, 1997 (now rescheduled for 9 July, 1997). NASA is also working on the MODIS ocean-colour sensor as part of the Earth Observation Program (EOS). This is a very large, advanced ocean-colour instrument which is in the final stages of characterization and is scheduled for launch on the EOS-AM1 platform in June 1998.

(e) MERIS

Dr. Rast of ESA provided information on the Medium Resolution Imaging Spectrometer (MERIS), which is scheduled for launch on the Envisat-1 satellite in the spring of 1999. MERIS is currently under construction and is meeting most of the performance requirements. The primary goal of this sensor is bio-optical oceanography, which includes detection of pigments, yellow substances and suspended matter, with a secondary goal of atmospheric research. Data products up to level 2 will be provided by the agency and browse products will be available on-line after launch.

(f) LRC

Dr. Kim reported on the new Low Resolution Camera (LRC) being developed by the Korean Aerospace Research Institute, KARI. (Note: this sensor has since been renamed the Ocean Scanning Multispectral Imager or OSMI). It is scheduled for launch in August, 1999 on board the Korea Multi-Purpose Satellite, KOMPSAT. Mission objectives are to provide ocean-colour measurements for biological oceanography, using 6 programmable spectral frequency bands to meet these goals. Dr. Kim also mentioned that KARI would appreciate input from the user community and the IOCCG during the planning stages of this mission, especially in the areas of data collection strategies, exploring band selection capabilities and validation and application of LRC data.

(g) GLI

Dr. Ishizaka reported on NASDA's new GLI ocean-colour sensor, scheduled for launch on ADEOS-2 around August 1999. This sensor will have a total of 36 spectral bands for use in land, atmosphere, ice and ocean-colour measurements (15 bands will be dedicated to ocean-colour). NASDA is also in the planning stages for the ADEOS-3 satellite, which will carry a similar sensor, S-GLI (super-GLI).

(h) OCI

Dr. Yoder briefly mentioned the Taiwanese OCI sensor, which is scheduled for launch in April 1998 aboard the Taiwanese ROCSAT-1 satellite. This sensor is currently under construction by NEC in Japan. Dr. Yoder also mentioned that weather satellites, such as NPOESS (National Polar Orbiting Environmental Satellite Systems) might be a potential platform for ocean-colour sensors. The IOCCG could influence the specifications of such a sensor, and it was suggested that a working group be formed to make such recommendations (see agenda item 11 below.)

(i) OCM

Dr. Neumann reported briefly on the new Ocean Colour Monitor (OCM) built by the Space Applications Center of ISRO (Indian Space Research Organization). The sensor is scheduled for launch late 1998 aboard the Indian IRS-P4 satellite. It will have 9 bands to monitor ocean-colour with a resolution of 700 m. At present there is no Indian representative to the IOCCG, an issue which should be addressed.

Following these presentations, some discussion ensued about the trends in design of ocean-colour sensors: more capability is being gained by additional spectral bands in the new advanced optical sensors, but capability is also being lost in the areas of tilt, coverage and downlink capabilities. Other problems frequently encountered are equatorial crossing times (which are often optimized for land use), gain changes for land observation and the tremendous expense in calibrating these advanced sensors. Since it is very difficult to develop a sensor for both land and ocean use, some compromises have to be made.

7. Calibration of Ocean-Colour Sensors to Common Standards

Dr. Neumann presented a brief summary of the problems regarding the absolute radiometric calibration of ocean-colour sensors to universal common standards. Different ocean-colour sensors use different radiometric sources, diffuser materials and measurement setups. The IOCCG could contribute by initiating standard protocols for setup, sources and algorithms as well as supporting intercalibration sites, promoting annual multi-mission calibration experiments and encouraging intercomparisons of national standards.

8 (a) Validation of Ocean-Colour Sensors to Common Standards

Dr. Morel gave an informal review of the four categories of activities related to validation of ocean-colour sensors: i) absolute and relative radiometric calibration of sensors, as discussed above; ii) validation of the signal measured at the top of the atmosphere: comparison between received and reconstructed signals using coincident measurements made by ship or satellite; iii) calibration/validation of algorithms used for atmospheric correction: comparison of measured in situ water-leaving radiance or reflectance with retrieved measurements, and also comparison of actual aerosols with retrieved aerosols; and iv) validation of final marine products either directly, through comparison of measured and retrieved concentrations (which requires coincident measurements), or

indirectly, by comparing actual concentrations with that retrieved from apparent optical properties (coincident measurements not required).

8 (b) Validation of Atmospheric Correction for Ocean-Colour

Dr. Deschamps presented information on the SIMBAD (Satellite Validation for Marine Biology and Aerosol Determination) instrument, designed to measure aerosol and marine reflectances underway using commercial ships and research vessels of opportunity. The development of the SIMBAD instrument was initiated for POLDER ocean-colour validation, but is available to support other sensors such as OCTS and SeaWiFS. In general, a good agreement was found between chlorophyll and reflectance ratios for SIMBAD and the model of Morel (1988). To date there are ten SIMBAD radiometers which will be used in intensive operations this year with SCRIPPS, PML, and ORSTOM with additional US participation through the SIMBIOS project.

9. European Calibration/Validation Programmes

Dr. Schlittenhardt gave a brief overview of four of the major ocean-colour cal/val projects in Europe: i) CoASTS (Coastal Atmosphere and Sea Time Series) project aimed at collecting a two year time series of optical and bio-geochemical data in the North Adriatic Sea to support calibration and validation activities for MOS, SeaWiFS and OCTS; ii) CEVEx (Concertation on European Validation Experiments) for coastal/shelf water remote sensing, aimed at co-ordinating the already existing long term European calibration/validation projects such as PlyMBODY and CoASTS and to assess measurement strategies for the future; iii) COLOURS (Coastal Region Long-Term Measurements for Colour Remote Sensing Development and Validation), the objectives of which are to produce a time series of optical and bio-geochemical data for the major types of European coastal waters for the development and assessment of new bio-optical and atmospheric models/algorithms and; iv) COASTLOOC (Coastal Surveillance Through Observation of Ocean-Colour), the objectives of which include producing a large data set of the inherent optical properties of the main classes of optically active substances in European coastal waters for the establishment of new algorithms. In addition, Dr. Schlittenhardt drew attention to the new OCTOPUS (Ocean Colour Techniques for Observation, Processing and Utilization Systems) project, aimed at supporting and exploiting, in Europe, the present and upcoming missions of advanced optical sensors devoted to coastal and marine areas.

10. The SIMBIOS project

Dr. Mueller gave a presentation on NASA's SIMBIOS (Sensor Intercomparison and Merger for Biological and Interdisciplinary Oceanic Studies) project, which has the following aims: to quantify the relative accuracies of the products from international ocean colour missions, to improve the level of confidence and compatibility among the products and to generate merged, improved level-3 products. To date, there have been 17 funded SIMBIOS investigations, with annual science team meetings and technical focus workshops as well as instrument intercalibrations.

Following these presentations, considerable discussion ensued as to the role of the IOCCG in helping various projects realize their goals. It was concluded that the primary goal should be validation of existing sensors and that the IOCCG should help NASDA calibrate and validate the OCTS and POLDER sensors. Dr. Kawamura identified a need for ground truth data from various regions of the world for validation of the sensors, and Dr. Platt resolved to notify various international agencies such as the NSF (National Science Foundation) and IGBP (International Geosphere and Biosphere Programme) and request their co-operation in providing such data. It was also suggested that a technical workshop be held in 1998 to compare results from the POLDER, OCTS, MOS and SeaWiFS sensors.

11. Compatibility of Existing and Future Ocean Colour Sensors

Dr. Morel lead the discussion on the role of the IOCCG in proposing a minimum set of common channels to be included in all future ocean-colour sensors, so as to ensure continuity in ocean-colour measurements, to facilitate intercomparison between sensors and to allow compatibility of algorithms. After some discussion, Dr. Morel agreed to host a workshop, tentatively in the last week of September 1997, to determine the prospective ocean-colour user requirements and the technical requirements of the sensor. The workshop is to be funded by the IOCCG.

12. The Atlantic Meridional Transect (AMT) project

Dr. Aiken presented the latest results from the large-scale observational AMT project. The objectives of this programme are to collect optical and bio-optical data bi-annually along a transect from Britain to the Falkland Islands to support calibration and validation of the SeaWiFS sensor. A range of bio-geochemical, optical and bio-optical parameters are measured with the ship underway as well as from daily fixed stations. A wide range of bio-geochemical provinces are covered along this transect and much of the bio-optical variability between provinces was found to be driven by accessory pigments of phytoplankton, especially the ratio of photoprotective/non-photoprotective pigments.

13. Educational Materials Concerning Ocean-Colour

Dr. Platt proposed documenting lecture material (on a video tape or CD-ROM) dealing with the fundamentals and applications of ocean-colour data in order to broaden the expertise and increase the awareness and benefits of ocean-colour data. This material could be prepared by committee members or those outside the committee, and would require contributors to donate their time (approximately 1 day each). The tapes/CD's would then be distributed through the IOCCG at a minimal cost. There was a general consensus among the committee members for this proposal. In addition, Dr. Neumann pointed out that DLR was preparing a CD-ROM (in German and English) on ocean-colour to commemorate the anniversary of the MOS sensor, which should be ready for distribution by the next IOCCG meeting.

Dr. Frouin then drew attention to a proposal by Dr. Kopelevich (who was unable to attend the meeting), for an international cruise aimed at collecting bio-optical data and publicising the value of ocean-colour data through a series of lectures in various ports. The committee felt that this was an expensive proposition which could not be dealt with immediately, but Dr. Frouin agreed to follow up this issue with Dr. Kopelevich.

Dr. Lifermann also mentioned the ACE-2 campaign (Aerosol Characterization Experiment), an ESA funded programme aimed at determining the aerosol characteristics in Southern Europe (cruise goes from Portugal to Madeira, mid June to end July 1997) which also has the potential for international co-operation. This is an atmospheric ground based experiment, which would require supporting satellite data, so it would be a good opportunity for OCTS to process LAC data over that area for the specified time period.

14. Training Courses for Ocean-Colour

Dr. Platt drew attention to the first announcement for the Intensive Course on Remote Sensing of the Oceans. This course is to be held in Chile from 10 - 22 November, 1997 and will be sponsored primarily through the Inter-American Institute for Global Change Research (IAI). Preference will be given to participants from Latin America, but the IOCCG will make a contribution to enable people to attend who would not qualify for IAI funding. NASDA is also a sponsor of this course and will be sending a Japanese expert to demonstrate the new OCTS data.

Dr. Yoo urged the IOCCG to pay special attention to ocean-colour research in third world countries, especially SE Asia. Dr. Platt noted that the IOCCG could not help with expensive hardware facilities but could help with training, and Dr. Tanaka suggested that the IOCCG could perhaps organize an educational course in SE Asia next year. NASDA is making an I-LAC (intensive-local area coverage) archive available, which includes SE Asia.

In addition, Dr. Neumann pointed out that DLR had been receiving many requests for MOS data from Argentina, Brazil and Chile but these countries do not have receiving stations or the infrastructure to deal with the data. He agreed to keep the IOCCG informed on the progress in these areas.

15. Liaison between CEOS and IOCCG

One of the obligations of the IOCCG is to liaise with CEOS (Committee on Earth Observation Satellites) and in this regard Dr. Schlittenhardt gave a brief presentation on the activities of CEOS and its various working groups. He pointed out that the IOCCG could potentially interact with two working groups: the working group on calibration and validation (WGCV) and the working group on information systems and services (WGISS). In addition, Dr. Haruyama drew attention to the CEOS Analysis Group and the formation of the new IGOS (Integrated Global Observing Strategy) and SIT (Strategic Implementation

Team) projects, conceived to promote rationalization of long-term ocean- colour measurements. Dr. Haruyama proposed that the Analysis Group interact with and complement the IOCCG and SIMBIOS as well as other affiliates such as GOOS, JGOFS, WGISS and OCTOPUS. Dr. Platt recommended that there be formal representation from the IOCCG to the Analysis Group as well as to the relevant entities of the CEOS working groups. Dr. Rast pointed out that he was already a member of a subgroup of WGCV.

16. Election of the Chairman

According to IOC regulations, Mr. Withrow raised the issue of election of the Chairman. Dr Yoder moved that Dr. Platt be re-elected by acclamation, and this proposal was so passed.

17. Time and Place of the Next Meeting and Closure

The group resolved to hold the next meeting sometime between October 1997 and January 1998. There being no further business, the meeting was adjourned. Dr. Platt thanked the staff of NASDA for hosting the meeting and for their assistance and co-operation in preparations for the meeting.

**The Second Meeting, IOCCG
Participants List**

Committee members

Dr. J. Aiken	-	Plymouth Marine Laboratory, United Kingdom
Dr. R. Frouin	-	Scripps Institution of Oceanography, USA
Dr. H. Kawamura	-	Center for Atmospheric and Oceanic Studies, Sendai, Japan
Dr. A. Lifermann	-	CNES, France
Prof. A. Morel	-	Laboratoire de Physique et Chimie Marines, France
Dr. J. Mueller	-	NASA /GSFC, USA
Dr. A. Neumann-		German Aerospace Research Establishment, Germany
Dr. J. Parslow	-	CSIRO Division of Fisheries, Tasmania, Australia
Dr. T. Platt	-	Bedford Institute of Oceanography, Nova Scotia, Canada
Dr. M. Rast	-	ESA/ESTEC, Netherlands
Mr. P. Schlittenhardt	-	Joint Research Center, Ispra, Italy
Dr. T. Tanaka	-	EORC/NASDA, Tokyo, Japan
Dr. J. Yoder	-	NASA Headquarters, Washington, D.C., USA
Dr. S.Yoo	-	Korea Ocean Research and Development Institute, S. Korea

Absent

Dr. O. Kopelevich	-	P.P. Shirshov Institute of Oceanography, Russia
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Observers

Dr. Y. Ahn	-	Fisheries and Oceanography Division, Korea.
Dr J. Campbell	-	University of New Hampshire, USA
Dr W. Campbell	-	NOAA N/ORCA-1, Maryland, USA
Dr P. Deschamps	-	Laboratoire d'Optique Atmospherique, France
Prof. K. Furuya	-	University of Tokyo, Japan
Dr Y. Haruyama	-	NASDA, Tokyo, Japan
Dr. N. Hoepffner	-	Joint Research Center, Ispra, Italy
Dr. J. Ishizaka	-	National Institute for Resources and Environment, Japan
Dr Y. Kim	-	Korea Aerospace Research Institute, Korea
Mr. S. Matsumura	-	National Research Institute of Far Seas Fisheries, Japan
Prof. T. Saino	-	Institute for Hydrospheric-Atmospheric Sciences, Japan
Prof. H. Shimoda	-	Tokai University Research & Information Center, Japan
Dr. V. Stuart	-	Bedford Institute of Oceanography, Nova Scotia, Canada
Prof. S. Taguchi	-	Faculty of Engineering, Soka University, Japan
Ms. K. Uchida	-	EORC/NASDA, Tokyo, Japan
Mr. J. Withrow	-	IOC/UNESCO, France

**AGENDA for the Second Meeting of the IOCCG
Tokyo, Japan, 17-18 March, 1997**

1. Adoption of the Agenda (Platt)

2. Matters Arising from Previous Meeting of IOCCG (Platt)

A Summary Report of the Toulouse Meeting (March 1996) was issued by the IOC as IOC/INF-1039. The principal elements of that report will be examined in the light of the experience of the past year.

Specifically, the following will be discussed:

- a) Terms of Reference
- b) Work Planning
- c) Operating Procedures.

3. Establishment of a Project Office for IOCCG (Platt)

The establishment, present status and future activities of the Project Office will be described.

4. Establishment of a Publication Outlet for IOCCG (Platt)

The steps undertaken to find publication outlets through which to disseminate information about the activities of IOCCG will be described.

5. Establishment of IOCCG on the World-Wide Web (Schlittenhardt)

The actions taken to establish a presence for the IOCCG on the World-Wide Web will be described: the present status and future directions will be discussed.

6. Status of Ocean-Colour Missions

Brief reports will be given on the status of ocean-colour missions in various agencies.

What could be the role of IOCCG in helping these missions to achieve their goals?

What role could IOCCG play in facilitating access to the data?

- a) MOS (Neumann)
- b) OCTS (Kawamura)
- c) POLDER (Lifermann)
- d) SeaWiFS (Yoder)

In addition, it will be discussed how IOCCG can facilitate the programmes for sensors further away from launch (MERIS, MODIS, GLI, OCI).

7. Calibration of Ocean-Colour Sensors to Common Standards} (Neumann)

The role of IOCCG will be discussed in working towards the goal of absolute, radiometric calibration of ocean-colour sensors to universal common standards on a world-wide scale.

8. Validation of Ocean-Colour Sensors to Common Standards (Morel)

The role of IOCCG will be discussed in working towards the goal of universally-agreed procedures for

- a) Calibration of algorithms (including sensor algorithms) for atmospheric correction (that is, validation of the retrieved signal)

- b) Validation of the final products (estimation of optically-active substances).

9. European Calibration/Validation Programmes (Schlittenhardt)

A summary will be given of various European Commission projects established at the national, European Community and international levels.

10. The SIMBIOS Project (Mueller)

An account will be given of the goals, structure, status and future directions of the NASA SIMBIOS Project. What role could the IOCCG play in helping to make this a more international programme?

11. Compatibility of Existing and Future Ocean-Colour Sensors (Morel)

The role of the IOCCG will be discussed in advocacy of a minimum set of common channels to be included in all future ocean-colour sensors.

12. The Atlantic Meridional Transect (Aiken)

An account will be given of the goals, structure and results to date in the AMT programme, a large-scale observational programme concerning optically-active substances in the sea.

13. Educational Materials concerning Ocean Colour (Platt)

The role of IOCCG will be discussed in preparation and distribution of educational materials (such as video tapes and CD ROM).

14. Training Courses for Ocean Colour (Platt)

Members will be informed of proposed training courses and workshops of interest to IOCCG.

15. Liaison between CEOS and IOCCG (Schlittenhardt)

One of the obligations of the IOCCG is liaison with CEOS and its various subgroups. Members will discuss how this can be done in the most effective manner.

16. Election of the Chairman (Withrow)

The IOC regulations require an election of the Chairman before the close of the session.

17. Time and Place of Next Meeting (Platt)

18. Any Other Business

19. Closure