



MINUTES

4th IMBER Scientific Steering Committee Meeting

Dunsmuir Lodge, Victoria, Canada
12-14 June 2007

Present:

SSC members (and IPO)

Julie Hall
Dennis Hansell
Mary-Elena Carr
Jay Cullen
Wilco Hazeleger
Carina Lange
Jack Middelburg
Coleen Moloney
Wajih Naqvi
Raymond Pollard
Mike Roman
Carol Turley
Jing Zhang
Sylvie Roy (IPO)
Sophie Beauvais (IPO)

Invited participants

Wendy Broadgate (IGBP)
Ed Urban (SCOR)
Ian Perry (GLOBEC)
Kristin Orians (GEOTRACES)
Ken Denman (SOLAS)
Eugene Murphy (ICED)
Mark Ohman (OCB)

Apologies:

SSC members

Patrick Monfray
Arne Körtzinger
Hiroaki Saito

Invited participants

Ed Harrison (OOPC)

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1 Introduction

1.1 Welcome from the IMBER chair

Julie Hall welcomed the SSC Members to the fourth Meeting. She also welcomed two new members: Marie Elena Carr (NASA) and Mike Roman (University of Maryland).

She gave an overview of the aims of the Meeting, which were to:

- Review the IPO activities
- Review the Working Groups and Task Team activities
- Review the regional and national activities
- Identify the interactions with other projects and contributing programs
- Develop plans for IMBER Open Science Conference.
- Identify the priorities for next year and funding requirements
- Review the Budget

1.2 Update on the International Project Office activities

(Report by Sylvie Roy)

Sylvie Roy gave an overview of the accomplishments of the IPO over the past year including working group support, organization of meetings and activities, meetings attended on behalf of IMBER and products developed.

So far, 5 projects have been endorsed by IMBER: BIOSOPE (France), National Chinese IMBER/GLOBEC, Galathea route (Denmark), ECOMADR (Italy), and "Role of eukaryote pico- and nanoplankton in the biogeochemical processes of the deep sea" (USA). IMBER also provided letters of support to unfunded projects: BOUM (France), Amazon River (USA), MALINA (France), EPOCA (France), mesocosm facility (Germany).

Since May 2006, IMBER sponsored the following activities:

- Sustained Indian Ocean Biogeochemistry and Environment (SIBER) Workshop, Goa, India (October 3-6, 2006)
- Oxygen Minimum Zone Workshop, Concepción, Chile (October 24-26, 2006)
- IMBER/ PICES Session at PICES XV Annual Meeting , Yokohama, Japan, (October 13-21, 2006) (Interactions between Biogeochemical Cycles and Marine Food Webs in the North Pacific Ocean)
- Humboldt Current System: Climate, Ocean Dynamics, Ecosystem Processes, and Fisheries Conference. Lima, Peru (November 27 – December 1, 2006)
- Austral Summer Institute VII, Concepción, Chile (January 2-26, 2007)

Sylvie listed the future activities that the IPO will be involved in organizing:

- Joint IMBER/LOICZ Continental Margins Conference (Shanghai, Sept. 17-21, 2007)
- Joint IMBER/GLOBEC Executive meeting (Brest, Oct. 7-9, 2007)
- Climate Sensitivity Workshop (Brest, April 21-24, 2008)
- IMBER Open Science Conference (late 2008).
- 2008 IMBER SSC meeting (Cape Town, May 4-9, 2008)
- Summer School in Turkey (August 2008)

Sylvie presented a list of potential sources for funds such as EUR-OCEANS (for Summer School, Workshops), ESF (for conferences, workshops), APN (for Capacity Building activities, Brittany Region (for workshop organisation)).

2 IMBER IPO activities

2.1 e-mail/mailling list

(Report by Sylvie Roy)

A list of over 650 names is managed and used by Elena for IMBER announcements. The IPO has a National contact for 20 countries. IMBER needs a Belgium contact: Alberto Borges was proposed for Belgium.

Action: All to continue to identify national contacts.

Action: Elena to contact Alberto Borges to become the Belgium National contact for IMBER. If he declines the proposition, IPO will contact Franck Dehairs.

2.2 IPO report

(Report by Sylvie Roy)

In order to improve interactions between the IMBER IPO and the SSC members, the IPO started producing a monthly IPO Report. The aim is to keep SSC up-to-date with the IMBER and IPO activities and allow a better synergy between the IPO and the SSC. It was suggested to embed the IPO report directly in an e-mail. For particular requests, Mary-Elena suggested sending targeted e-mails directly to whom it concerns. Raymond Pollard argued to keep the report short.

Action: IPO to produce a short IPO report embedded in an e-mail, and send specific requests to specific SSC members.

2.3 IMBER Update

(Report by Sylvie Roy)

It was agreed that the design of the IMBER Newsletter needs to be reviewed. The challenge is to find a compromise between “on screen” and “printed” issues. The purposes are to: 1) improve the “onscreen” readability of the IMBER update and 2) reduce file size.

Possible improvements that were proposed:

- edit the NL as an html page with clickable links (ex: table of contents with links toward articles)
- have the newsletter directly opened in the e-mail (not as an attached file)
- have a light downloadable version on the website.
- reduce number and length of articles: articles must be concise (to write instructions for authors with template)
- accept brief reviews of published articles by young scientists
- keep the banner as it is IMBER identity
- find a simpler layout for onscreen reading.

Action: IPO to review the *IMBER Update* design following the above suggestion and to write clear guidelines for authors. The new version of IMBER update is to be published by the end of the year.

2.4 Brochure

(Report by Sophie Beauvais)

Ten thousands copies have been printed for 1500 USD. Sophie reminded the SSC to contact Elena Fily in advance if brochures are required for meetings.

2.5 Poster

(Report by Sophie Beauvais)

The poster is downloadable from the IMBER web site at http://www.imber.info/restricted_area.html (SSC restricted area) or available on request from the IPO.

2.6 Website

(Report by Sophie Beauvais)

This year, 3 new sections have been developed: A “restricted area” for the SSC, a section for “Young Scientists” including early career scientist conferences, summer schools, cruise opportunities, opportunities for developing country young scientists and students, and a section dedicated to Science Highlights.

Sophie plans to develop 3 new sections in the coming year:

1. A common portal with SOLAS for highlighting the activities of the Joint Carbon Research Group.
2. An IMBER data portal
3. An Outreach Portal to support the Capacity Building group.

Sophie presented a report based on information provided by “Google Analytics”, a free tool providing statistics about the website visitors. The IMBER web site was visited 8500 times over a period of 11 months. The number of visit per day has increasing regularly. In terms of visibility, there has been increasing interest from South America, Australia and Africa.

Action: Sophie to give Mike Roman and Mary-Elena Carr the login and password for access to the SSC restricted area.

Action: Sophie to develop the 3 new sections, the priority being Data Portal.

Action: Sophie to update the web site on a regular basis.

2.7 e-NEWS

(Report by Sophie Beauvais)

Since April the IPO has edited a monthly electronic newsletter, e-news. It contains information regarding IMBER, funding opportunities, information for young scientists, jobs, publications, Meetings and so on...The SSC judged this electronic bulletin very useful. It has been suggested to keep the blue banner as it is part of the IMBER identity.

Action: Sophie to keep the blue banner instead of the black and white one for the e-NEWS.

2.8 Gorick Image

(Report by Sophie Beauvais)

Sophie presented the latest version of Gorick’s image. A small committee (including Dennis, Carol, Carina, Mary-Elena, Wendy and Sophie) was appointed to prepare recommendations for Glynn Gorick.

The committee suggested giving Glynn some flexibility to allow him to use his artistic skills, to create an attractive image.

General recommendations are:

- mix between the first draft and the second one
- needs to be attractive and balanced
- showing some relief/depth, perspective and dynamics (particularly at the surface) not limited to a cube (2D or 3D)
- resolve issue of scale (e.g. instrumentation vs ship)
- add some land or coast but not to dominate the image
- more interactions between food web and biogeochemistry
- not all IMBER processes need to be illustrated (it is too busy, maybe show less objects but magnified so we can see the details). Definitely keep fish, net, need balance of trophic and biogeochemical cycles.

Some specific suggestions:

- remove the arrows
- remove benthic diatoms from the pelagic zone
- possibly remove physics at the surface (as currently portrayed)
- possibly add particles raining into the trap

The SSC would like the Gorick image to be finalized by the end of 2007.

Action: Sophie to report to Glynn with recommendations and suggestions.

2.9 Outreach activities

(Report by Sophie Beauvais)

Sea Tech Week

IMBER IPO attended the International Marine Science and Technology week, in Brest on October 17-19th, 2006. IMBER and EUR-OCEANS had a joint stand to promote both projects and present our activities. Sea Tech week offered a program of conferences, symposia and workshops on ocean depth, sea rescue, corrosion, and European maritime policy. The participants include researchers, engineers, policy makers, funders and students.

Celebration 10 years of IUEM

From September 2006 to March 2007, IUEM celebrated its tenth Anniversary. A series of activities for scientists and the public were organised. IMBER and EUR-OCEANS organised a joint display on "Oceans and Climate Change".

3 IMBER Working Groups and Task Teams reports

3.1 End-to-End Task Team

(Report by Coleen Moloney and Ian Perry)

Coleen presented a report from the task team. The group has re-submitted a paper for publication in *Trends in Ecology and Evolution*. The publication will be a short concept-type paper that lays out:

- (i) why we need to tackle end-to-end food webs in our studies at this time,
- (ii) what the key challenges are and how we can meet them, and
- (iii) how we can make headway in the experimental, observational and modelling components of marine end-to-end food webs.

The team is preparing a longer review manuscript. The first draft will be completed in July 2007.

The team has been involved in organising two events:

1. BASIN (Mike St John): Basin-scale Analysis, Synthesis and INtegration: resolving the impact of climatic processes on ecosystems of the North Atlantic basin and shelf seas (Hamburg, Germany, 23. – 25. January 2007).
2. Symposium on Parameterisation of Trophic Interactions in Ecosystem Modelling (St John and Monfray). Spain, March 2007.

The team has submitted an abstract for presentation at:

1. CLIOTOP Symposium (Dec 2007): *Top predators in end to end food webs: current gaps and future challenges* (Moloney and St John, funding requested) and
2. IMBER/LOICZ Continental Margins OSC (Sept 2007): *End to end food webs from high to low latitudes: current understanding and future challenges* (Hall, Moloney, St John).

Ian Perry reported on GLOBEC SSC recommendations (Hiroshima, Japan 24-26 May 2007). GLOBEC requests the co-chairs of the End-to-End Task Team to complete a report of the discussions of the group by September 30, 2007. GLOBEC encourages drafting of the vision paper to continue and to publish it as soon as possible. GLOBEC does not approve the travel requests submitted to the SSC by the task team co-Chairs, because it would like to assess the groups' report and/or the vision paper before planning further steps. GLOBEC proposes that IMBER take the lead responsibility for future end-to-end activities. GLOBEC considers that the IMBER-GLOBEC Transition Task Team may be an ideal vehicle to assess the next implementation phase of the end-to-end activity. GLOBEC remains supportive of the concept of Ecosystems End-to-End, possibly as part of the new phase of the program after the merger with IMBER.

The End-to-End TT proposed to foster an international meeting between marine ecosystem modellers and experimentalists. Coleen presented the goals of a possible international workshop that would aim at taking end-to-end forward:

- To bring together researchers studying end-to-end food webs and components of end-to-end food webs
- To summarize the structure and dynamics of end-to-end food webs in different regions (pre-workshop publications)
- To synthesize the common features and major differences among the different end-to-end food webs (working sessions)
- To identify a range of possible responses to change among the different types of end-to-end food webs (working sessions)
- To review key processes in food webs at different trophic levels (e.g. nutrient uptake, mortality, migration, predator-prey interactions, feeding selectivity) (pre-workshop publications)
- To identify areas of future research into key processes, especially through comparative studies across trophic levels.
- To produce a special issue/ publication that showcases E2E food webs and the results of the workshop

The SSC was concerned by the timeframe; it is important to go forward before 2009.

A small team (Mike, Ian, Eugene, Coleen, and Julie) were asked to identify the next priority actions for 2007-2009 and reported on SSC on Thursday 14th June. The following issues rose from this report:

It was recommended that E2E will participate in the following meetings:

- CLIOTOP Symposium (Dec 2007)
- ICED Modeling workshop (Dec 2007) to stimulate more discussion
- GLOBEC OSC (2009)
- Continental Margins OSC (Sept 2007) to stimulate interest.

The task team supported the project having an “advanced course” in collaboration with Temel Oguz focusing on end-to-end food webs and biogeochemical cycles (see section on Capacity Building”).

The group proposed to organize a Joint IMBER/GLOBEC/EUR-OCEANS end-to-end workshop (Sept 2008) as part of the IMBER IMBIZO leading to the development of an implementation plan. The proposed topics include:

- Biogeochemistry of high trophic level species - what are the relative impacts of change at each of the trophic levels (looking from the top down)
- Transformations of elements and modifications of stoichiometry from nutrients to top predators (looking from the bottom up)

The implementation Plan will be presented at the GLOBEC OSC in May 2009.

Action: End-to-End Task Team to submit papers and forward report of discussions to IMBER and GLOBEC SSC before the joint Executive meeting in October.

Action: An end-to-end workshop should be organized as part of the IMBER IMBIZO.

3.2 Continental Margins Task Team

(Report by Jack Middelburg)

Jack reported on the Continental Margins OSC that will be held in Shanghai, 17-21 September 2007. This meeting is being co-convened by Jack and Nancy Rabalais who will also lead the development of an implementation plan for continental margins research. The OSC aims to develop collaborative research activities on biogeochemical cycles and ecosystems in the continental margins. The geographic focus of the conference is the mid to outer continental shelves, shelf breaks and upper slopes and exchanges across the coastal ocean and oceanic transition. Jack presented the plan for program of the meeting. Four days will be dedicated to scientific presentations divided into 8 sessions. The last session will focus on “Low oxygen on Continental Shelves”. This will be linked with the Coastal hypoxia SCOR Working Group Meeting (SCOR WG128) which will be held 22-23 September. So far, representation is not high for US and EU but is strong for Asia. Wajih Naqvi explained that SCOR has a new working group on Coastal exchanges that meets in July in Italy.

Jack sought the SSC’s feedback on how to organize the writing of the implementation plan and get the scientific committee involved. It was suggested to have clear guidelines for discussion sessions at the conference with clear objectives. Selection of chairs is critical: rapporteurs should be selected from the steering committee. It is important to keep the discussion sessions small to stimulate the discussion. Mike Roman suggested writing some ideas (such as bullets and headings) before the meeting. Discussions could be 1.5 h after each session in breakout room. It was suggested that the final chapter of the Continental Margins book that KK Liu is editing would be a good document to provide for the conference participants and the writing team.

A small group including Jack, Sylvie, Julie and Jing met Tuesday 12th evening to discuss OSC logistics. The abstracts and financial support applications will be reviewed by Jack and Nancy by

10th July. The IPO will be in charge of circulation of acceptance notifications. The conference abstract book will be edited by the IPO and printed by the LOC in Shanghai. It has been decided that there will not be CD of abstracts. Jing Zhang (member of the scientific committee and local organizing committee, LOC) reported on the local funding. The LOC has received the first funds from National Science Foundation of China and the ministry of Education will contribute too.

Action: Jack to contact KK Liu to get a copy of the last chapter of his book.

Action: Jack and Nancy to identify 4-5 people who will compose the writing committee of the implementation plan and to circulate the list of people to the SSC for comment.

Action: Wajih is to be the link person for IMBER with the new SCOR working group on coastal exchanges.

Action: Jack and Nancy to review the abstracts and financial support applications and to send their decisions to the IPO by 10th July 2007.

Action: IPO to send acceptance notification to authors and support acceptance to scientists from developing countries by the end of July at the latest.

Action: IPO to prepare the conference abstract book.

Action: LOC to print the conference booklet in Shanghai.

3.3 SOLAS/IMBER Carbon Research Working Group

(Report by Dennis Hansell)

Dennis reported on the Joint SOLAS/IMBER Carbon (SIC) Research Group. SIC promotes and coordinates development of science activities designed to meet objectives and goals identified in the carbon implementation plan.

Sub-Group 1. Surface ocean systems

SG1 organized the "Surface pCO₂ variability and vulnerabilities workshop" (UNESCO, Paris, 11-14 April 2007); the goals of the workshop were to:

- (i) review knowledge of the air-sea CO₂ flux variability and uncertainties from seasonal to decadal scales, and to promote global CO₂ data synthesis activities;
- (ii) address new questions regarding the vulnerability of the oceanic carbon cycle;
- (iii) obtain, at national and regional levels, information on recent and future CO₂ VOS lines, time-series stations, and ocean carbon processes studies;
- iv) develop future observing system and data management strategies for ocean carbon sources and sinks.

A report of this workshop is being prepared and a special issue of Deep-Sea Research II will be published as well.

Sub Group 2. Interior ocean carbon storage

During the past year, this Sub-group formed a task team that prepared a white paper proposing incorporation of oxygen on Argo floats (Argo-Oxygen task team). This paper outlines the scientific motivations for adding O₂ sensors to the Argo array, and addresses the numerous scientific and technological challenges associated with this expansion of Argo. The Argo community welcomed the initiative but it became clear that the funding for the addition of the oxygen sensors to the Argo program (US\$7K/unit) would have to be generated by the biogeochemical community. It has been decided that the Argo-Oxygen task team should take the lead to coordinate the development of one or two pilot projects focused at a regional/basin level to evaluate the long-term stability and accuracy of the sensors. This will be presented through a special session at the AGU/ASLO Ocean sciences meeting March 2008.

This sub group will also develop a Synthesis Task team to lead the international synthesis effort. The membership and terms of reference will be established. The Atlantic synthesis is moving

forward within CARBOOCEAN and the U.S. OCB Program. The Atlantic synthesis group has already met twice (Iceland, June 2006 and Kiel, Germany, March 2007). The Pacific effort is going on with a PICES workshop in planning. The Indian Ocean should be included in the SIBER effort and the Arctic in the IPY effort. It is proposed that this task team organize an international meeting that would bring together the separate communities that currently work on the Atlantic and Pacific basins.

At a wider scale, an International Repeat Hydrography Committee (IRHC) Advisory group was formed to oversee an integrated approach on how to move forward the synthesis activities.

Sub Group 3. Carbon cycle climate sensitivities and feedbacks

Sub Group 3 is focused on understanding the climate feedbacks to the ocean. They were charged to identify scientific issues and develop a strategy to move forward. Amongst others, this sub group should play a role in coordination and synthesis of acidification type activity. It is stated that the High CO₂ symposium planned (Monaco in October 2008) will bring the focus on the issue but the role of the sub-group should be to coordinate the research on ocean acidification to provide products. It is recommended to report back to SIC co-chairs and Kitack and suggest to make links with High CO₂ symposium organizers. One goal of the sub group should be to facilitate coordination between Ocean Acidification national activities.

During the SIC meeting in Paris, Ken Johnson noted that sensor workshops rarely lead to increased coordination or funds for research and development. Ken Johnson specifically raised the issue that scientists are slow to incorporate new techniques and instruments into their programs, and that it is often most beneficial to hold sensor workshops targeted at students. The SIC group discussed the possibilities of developing a summer school or a workshop based on new sensor techniques for biogeochemistry to bring students together to introduce them to new technologies and sensors.

Recommendation is to go forward with biogeochemical sensor workshop proposed by Ken Johnson.

Dennis thinks we need to more broadly involve all members of the SIC. Not all are being asked to contribute with new initiatives. It is important to make the link with High CO₂ Meeting. The SIC group could help to pull the national groups together.

Action: Ed Urban and Wendy Broadgate to investigate how the SIC group can become more involved into the High CO₂ world conference.

Action: IPO to contact Ken Johnson and start the development of the workshop on biogeochemical sensors.

Action: Sylvie to contact Kitack and support him to move the activities of sub group 3 forward.

3.4 Capacity Building Working Group

(Report by Wajih Naqvi and Sophie Beauvais)

Wajih reported that he is a member of the SCOR Capacity Building Group and will provide an effective link between IMBER and SCOR capacity building activities. Sophie presented two projects for Capacity Building: a summer school and a floating University.

Summer school

Temel Oguz has offered to lead an IMBER Summer School. He has previous experience in this activity, organizing a Summer School in Ankara in 2006. He proposed the campus of University in Ankara as a venue. He suggested August 2008, preferably second-third weeks, because the

summer term ends in the university, and dormitories and other facilities will be available for students. According to his past experience, an average cost per person is around 1200 Euros including air fare, accommodation and living expenses.

The title could be “end-to-end modelling of marine food webs”, including coupling of higher and lower trophic levels. Once we confirm the title and content we should identify an organising committee and list of potential lecturers.

EUR-OCEANS Summer School Call for 2008 activities will close on 1st of September 2007. Temel thinks he can find 10-15 k€ for local organisation expenses. We have to find further funds for this activity. NATO-ASI and APN should be explored.

The SSC agreed to go forward with this project but they discussed the content and the title. It has been suggested to refine the topic by including more biogeochemistry in order to involve both observationalists and modellers. The end-to-end task team proposed a new title that has been accepted by the SSC: “*Analyses of end to end marine food webs and biogeochemical cycles*”.

Action: IPO to support Temel and the Capacity Building Working Group with the organization of a summer school in Turkey.

Action: IPO to identify funds for Summer School (sources are Eur-Oceans, APN, NATO-ASI, national funds).

Floating University

BONUS-GOOD-HOPE (BGH) has been identified as a relevant project to conduct a floating university on board R/V Marion Dufresne (French Polar Institute). BGH aims at understanding the interactions between the contemporary dynamic, circulation, biogeochemistry and geochemistry in the Southern Ocean in its Atlantic sector and its exchanges with the Indo-Atlantic connection on the wake of the South-Africa continental margin in the Agulhas Current System. BGH is a contribution to IPY GEOTACES, ICED, CASO and CLIVAR-Southern Ocean. Sophie and Caroline Gernez (EUR-OCEANS) have approached the leaders of BGH (M. Boye and S. Speich, IUEM, France) and presented the project at the 1st BGH workshop (March 2007). The first Leg (Feb 2008) from Cape Town to the Polar Front has been identified as a relevant transect. Moreover this activity has been welcomed positively by the scientists involved in the Leg1. There are several uncertainties remaining: BGH is waiting for additional funds and final approval from IPEV authorities is needed (depending on the available berths). The timeline is tight now to find funds by Feb. 2008. South African funds are available for this kind of activities and could be credited to educational aspect of students. START fellowships could also be a possible funding source.

Action: As soon as we have news from BGH and berth availability, Sophie, Coleen and Wajih to make a decision if we go forward with this project and find funding.

Action: Sophie to ask Arne news about the Polarstern transects and possibilities of organizing a Floating University on this regular transect.

Action: Capacity Building Working Group and Sophie to build a “berth availability” bank and post on the web.

Action: Sophie to explore the POGO web site (cruises, available berths).

3.5 Data Management Working Group

(Report by Raymond Pollard)

Raymond reported on the first Data Management Committee Meeting held prior to the SSC meeting in Victoria (10-11 June 2007). The challenge for DMC is to design a data management strategy for IMBER that spans the wide range of multi-disciplinary data that will be collected. It is not possible to plan a data management strategy without defining what IMBER is and what its data legacy will be.

Raymond presented a list of IMBER projects: endorsed, regional, national, contributing. So far, IMBER has almost no information on Data Management or these projects. The key features are multidisciplinary and field studies (but not only).

The DMC proposed the following legacies for IMBER:

- Multidisciplinary, distributed dataset (with good compatibility for each data type)
- Data from each field study kept together
- Data publicised and centrally accessible through an online portal
- A new ethos about DM among scientists
- IMBER products

The DMC recommended promoting a cooperative data management approach. This implies:

- to involve data specialists right from the start,
- to strongly recommend that a person with data management experience be appointed, delegated or hired to serve as the Project Data Specialist
- to train young scientists to conduct this task (useful on their CVs, educate them to do DM better) and
- to promote “carrots” rather than “sticks”.

“Carrots” means that IMBER will facilitate access to data experts (National or Specialist data centres) to help with calibration, validation and back-ups and facilitate to access to other data etc One “carrot” which SCOR is investigating is the possibility of tagging a data set with a Digital Object Identifier (DOI), which would allow the data set to be referenced and credit given to the originator.

The DMC recommended to the SSC that all cruise reports should be accompanied by a digital summary report in the IOC-agreed Cruise Summary Report (CSR) format and that Directory Interchange Format (DIF) record should be created for every IMBER activity. The Data Liaison Officer (DLO; Sophie Beauvais) will manage an IMBER portal (with our own front page) to GCMD (Global Change Master Directory). The DMC will create conversion program from CSR to DIF and will create a template for DIFs. DLO will vet CSR/DIF before loading them on GCMD via IMBER portal.

IMBER endorsed projects will, by definition, be multidisciplinary in nature and originally come from different countries with different data management approaches and rules. As a consequence of this the IMBER data management strategy must be flexible. Because of the variety of data and capability of the National data centres, IMBER will make use and build upon existing data centres from different marine disciplines, but centralise the access to data.

IMBER DMC strongly recommends that IMBER labelled projects train and appoint data scientists (DS) to each activity. The role of DS is to:

- devolve data management to field study (FS) level
- Train & appoint data specialist to each FS
- Help the PI create and submit metadata to DLO
- Help PIs with data clean up and documentation

- Ensure data duplication and backup from the start
- Interact with the Specialist Data Centres & or National data centres
- Create CD/DVD for all FS data (SOIREE is a good example) and/or submit to a long term Data Centre

The IMBER portal will point to data sources similarly to the US GLOBEC portal. To achieve this strategy it is important to provide training which will gradually improve scientific practice. Education of PIs is vital for them to see the benefits and payback on cost of training and salary of Data Specialist/Scientist This strategy is not very different from the OCB-Data Management Office.

The IMBER DMC proposed the same time frames for data as stated in GEOTRACES plan:

- Data submission:
 - Metadata, as soon as created from planning stage on
 - Raw data, within a month of end of cruise/collection
 - CSR/DIF within 6 months of end of cruise/project
 - Final data, within 2 years (although there will be exceptions)
- Data release
 - ICSU principal - free and open data exchange
 - To other participants, right away
 - To public within 2 years (although there will be exceptions)

Raymond reported on the updated DMC Terms of Reference. It has been suggested to remove metadata and replace by data and add a bullet regarding the facilitation of education and training.

Funding issues

- Data Management needs to become a much greater part of Sophie's duties (50%).
- If DMC develop initiatives at Open Science Conference (IMBER IMBIZO) and meet there, DMC will need fund for travels
- Fund DM expert travel to train local Data Specialists and/or training of Data Specialists at a national data centre
- Possible ftp web site at IPO (cost?)

It might be interesting to organize a workshop to compare regional studies. It is important to train the scientist on data management. Embedding data management in educational activities is a good way forward. A strategy to educate people could include developing a guide for idiots for data management as a tool for IMBER projects.

The SSC welcomed the DMC plans very positively. The plan seems realistic. The DMC can go forward with this strategy. Further details on DM strategy are available in the DMC report meeting available on the web site shortly.

Recommendation: to Ed that the SSC would like a strategy to educate people on data management to happen at SCOR level.

The main priorities for this year are:

- complete data policies, and web guides
- contact each IMBER project to encourage development of their DM policy
- develop the IMBER data web pages

- contact the GCMD
- develop
 - CSR to DIF converter
 - IMBER data portal to the GCMD
 - an initial list of agreed terminology for IMBER DIFs
 - template for IMBER DIFs
- to consult SSC on capacity building and training

Action: Raymond to finalize data Policies.

Action: Raymond to write Guidelines for IMBER projects.

Action: Raymond to write encouragements for IMBER scientists.

Action: Roy, Gwen and Raymond to create conversion CSR to DIFs.

Action: Todd to create a template for DIFs.

Action: Sophie to contact GCMD to arrange IMBER portal.

Action: Sophie and Todd to create an IMBER portal with GCMD.

Action: Sophie to develop the IMBER Data portal including all relevant documents (Guidelines, ToR, Policies, Encouragements, reports etc...+ GCMD portal).

Action: Once guidelines are in place, Sophie to contact IMBER projects to encourage development of their DM, to sell our ideas and to foster them to develop good DM practices.

Action: DMC by e-mail, to develop ideas for training and a manual for data management.

Action: DMC to discuss a training add-on to the IMBER IMBIZO.

Action: Sophie to explore if having a ftp site at IPO is feasible (cost?).

Action: Sophie to circulate the last version of terms of reference to the SSC and to post on the web when approved.

3.6 Theme 4

(Report by Julie Hall)

Developing the theme 4 is difficult because of the complexity to bring social and natural sciences together. Julie talked to IHDP Chair Oran Young about links with IHDP in the matter of developing human dimensions activities in IMBER. There seem to be no interest from IHDP at this point.

Session 8 “Sustainable Use of Continental Shelf Resources” at IMBER/LOICZ OSC could be a place to discuss possible ways forward for theme 4. CLIOTOP has a strong Human Dimension component that could be inserted to addendum in science plan. The workshop “GLOBEC/EUROCEANS Coping with global change in marine socio-ecological systems’ (FAO, Rome, Italy, July 2008) is another venue to move Human Dimension forward. GLOBEC could bring this expertise.

It was suggested to consider adding a SSC member from social science.

Action: Julie to explore the two opportunities for Human Dimension issue: IMBER/LOICZ OSC (2007) and GLOBEC/EUR-OCEANS workshop (2008).

Action: All to identify people from social science to be part of SSC.

4 Update on Regional activities

4.1 ICED

(Report by Eugene Murphy)

Eugene Murphy highlighted ICED goals, linkages with other projects and activities. The new web address is www.iced.ac.uk.

ICED-IPY coordinate 9 closely-related projects within a consortium entitled "*Ecosystems and Biogeochemistry of the Southern Ocean*." During the IPY there will be a number of ICED-IPY cruises with the aim of providing new insights into some of the mechanisms controlling biogeochemical cycles and ecosystem structure in the Southern Ocean. An ocean database with interactive fieldwork maps is available on the web (<http://www.iced.ac.uk/science/ipy.htm>).

ICED has proposed to organise a session on High Latitudes in the next 2008 IGBP Congress and will organise a workshop on modelling at the end 2007 or early 2008.

The Science Plan and Implementation strategy (SPIS) is ready to be reviewed by GLOBEC and IMBER (July 2007). This will be followed by formal adoption and publication. Eugene suggested a list of reviewers. IMBER and GLOBEC should jointly appoint a set of reviewers. Mary Elena Carr has been appointed to represent IMBER as reviewer. It is suggested that Mary-Elena links with a representative from the GLOBEC SSC (identified by GLOBEC) to form a review group, coordinate the review, and report recommendation to the SSC. The reviewer report should be summarized at the next joint Executive meeting in October.

The next priority is to formally establish an active Steering Committee (8-9 people). ICED should provide both GLOBEC and IMBER SSCs with a list of proposed membership including name, short expertise for approval. Once approved, the SSC will have to meet. Eugene proposes to hold the first SSC meeting with the modelling workshop. No funds are requested for the workshop but for the SSC to meet.

Action: Mary-Elena to coordinate the ICED SPIS review for IMBER and make recommendations to the SSC.

Action: Eugene to propose a list of ICED SSC membership including short expertise to IMBER and GLOBEC for approval.

4.2 SIBER

(Report by Wajih Naqvi)

Wajih reviewed the framework of the "Sustained Indian Ocean Biogeochemical and Ecological Research (SIBER)" international Conference held at NIO, (3-6 Oct 06). The goals of the conference were to:

1. Review the state of our knowledge of the biogeochemical and ecological dynamics of the Indian Ocean;
2. Identify prominent gaps;
3. Formulate a plan for future international research;
4. Implement parallel program to CLIVAR/GOOS and CO₂ surveys focused on biogeochemistry and ecology.

About 200 participants from 16 countries (75 from outside India) attended this workshop. Reports have been published in IMBER *Update* and EOS, a monograph will be published by AGU and a Special issue of Indian Journal of Marine Sciences will be published soon.

A writing workshop of approximately 20 people is planned in Goa in late November to prepare the Science Plan for an Indian Ocean research activity with IMBER science themes. The list of people is still being discussed and funding has yet to be secured. Council of Scientific & Industrial Research (CSIR) has, in principle, agreed to provide partial support (exact level to be negotiated), IOC's Perth Office has showed interest, and NIO will provide partial support. SIBER requests financial support from IMBER. Other sources must be explored such as national agencies (Royal Society, DFG). NSF could provide funds for US participants.

The SSC questioned Wajih about the scientific direction for SIBER. It is important to focus on scientific themes relevant to IMBER science. For example to determine how biogeochemistry is impacted by global change, long term series of data are needed. The list of people must be finalized. Indian Ocean CLIVAR panel and members of JGOFS work on Arabian Sea should be involved.

Action: Sylvie and Wajih to identify a list of potential funding sources to support the workshop (local, national sources eg. Japan).

Action: Mike to identify US scientists working in ecosystem area to join the group.

Action: Jack to identify scientists working in coastal domain to join the group.

4.3 EUR-OCEANS

(Report by Eugene Murphy)

Eugene Murphy reviewed the joint IMBER/EUR-OCEANS actions as well as the actions that may be of interest to IMBER. IMBER is co-located at Institut Universitaire Européen de la Mer in Brest (France) with EUR-OCEANS. Close proximity of the two offices presented significant opportunities for collaboration along topics of mutual interest. Over the past year a number of activities were undertaken by EUR-OCEANS in conjunctions with IMBER such as "Parameterisation of Trophic Interactions in Ecosystem Modelling" workshop (Cadiz, March 2007) and "Humboldt Current System International Conference" (Nov/Dec 2006). Two other workshops co-sponsored by IMBER and EUR-OCEANS are "Climate Impacts on oceanic Top Predators" (Dec 2007) and "Climate driving of ecosystem changes" (April 2008). In past funding calls EUR-OCEANS supported activities of interest to IMBER including "Macronutrient balance in the EUR-OCEANS systems" (Sept/Oct 2007 workshop) and "BASIN: European workshop on the synthesis and integration of pan-Atlantic climate-related ecosystem research" (Jan 2007). Other planned joint IMBER/EUR-OCEANS activities for 2008 include a planned Floating University and a summer school.

Another workshop and meeting call is currently open and closes Oct 2nd, 2007. This will provide additional 29 K€ funding for workshops and opportunity to endorse meetings that will occur in 2007/2008.

EUR-OCEANS is actually developing a plan for a multi-site institute. Final EUR-OCEANS meeting will take place in late 2008 at a date convenient for participation of IMBER. It is primary that IMBER ensures collaborations will continue after EUR-OCEANS ends.

Action: Sylvie and Caroline to communicate to find a date for final EUR-OCEANS meeting convenient for IMBER participation.

Action: IPO to explore the last call for workshop.

4.4 CARBOOCEAN

(Report by Jack Middelburg)

Jack reviewed CARBOOCEAN core themes, presented major scientific results and highlighted current and potential interactions between CARBOOCEAN and IMBER.

The 5 CARBOOCEAN core themes are as follows:

1. North Atlantic and Southern Ocean CO₂ air-sea exchange on a seasonal-to-interannual scale.
2. Detection of decadal-to-centennial Atlantic and Southern Ocean carbon inventory changes.
3. Carbon uptake and release at European regional scale.
4. Biogeochemical feedbacks on the oceanic carbon sink.
5. Future scenarios for marine carbon sources and sinks.

The link between CARBOOCEAN and EUR-OCEANS is quite simple as PIs are common with EUR-OCEANS at 90%. CARBOOCEAN is linked to IMBER through SIC group (Arne). Examples of scientific links between both projects are:

4. Marine carbon data (surface CO₂ partial pressure, deep measurements)
5. Changes in marine CO₂ sink
6. Interactions climate+CO₂ ↔ marine ecosystems
7. Carbon and O₂

Jack noted that there is considerable funding for networking and training through EU FP7. EPOCA, an EU FP7 project on Ocean Acidification could start around April next year if funded. There will be a next FP7 call on ecosystem modelling in October 2007. It is important to keep informed of next FP7 calls, timelines, and workshops. EU FP7 could be a source of funding for outreach activities.

Action: IPO to explore the FP7 calls and timelines for workshops and conferences.

5 IMBER Science highlight

Four scientific presentations (25 minutes each) were given. The session was chaired by Dennis Hansell.

- *Frank Whitney* (UVic) “Persistently declining oxygen levels in the interior waters of the eastern subarctic Pacific.”
- *Mary-Elena Carr* (NSF) “A comparison study of marine primary productivity models using ocean color, mostly the Primary Productiity Round-Robins (PPARR3 and PPARR4).”
- *Angelica Peña* (IOS) “Phytoplankton dynamics and biogeochemical cycles in the British Columbia coast.”
- *Mike Roman* (Univ. of Maryland) “Zooplankton aggregations in coastal waters as related to hydrography and hypoxia.”

6 Interactions with other projects and programs and joint activities

6.1 SOLAS

(Report by Ken Denman)

Ken presented an overview of SOLAS national activities, network activities, and meetings. SOLAS is organised around 3 foci. Focus 3 “Air-Sea Flux of CO₂ and Other Long-Lived Radiatively-Active Gases” is joint with IMBER. Three new SSC members have been appointed: Véronique Garçon (France), Cliff Law (New Zealand) and Dave Kieber (USA).

SOPRAN (Surface Ocean Processes in the ANthropocene) is a major new SOLAS funded program in Germany, coordinated by Douglas Wallace (IFM-GEOMAR). SOLAS Japan leads a project on “Linkages in Biogeochemical Cycles Between the Surface Ocean and Lower Atmosphere” for 5 years. There is now a US SOLAS Plan. SOLAS has 23 networks and is developing an African Network involving Cape Verde, Egypt, Ghana, Kenya, Morocco, Nigeria, South Africa and Zimbabwe. Future plans include an African-SOLAS Workshop.

Ken presented a series of meetings co-sponsored by SOLAS such as:

- “Joint SOLAS/International Nitrogen Initiative (INI) Review of Anthropogenic Nitrogen Impacts on the Open Ocean” workshop (University of East Anglia on 17-20 November 2006) convened by Robert Duce and Julie La Roche.
- “Ocean Surface pCO₂ and Vulnerabilities Workshop (Paris, 11-14 April 2007).
- IMBER / SOLAS Special Session at EGU General Assembly 2007 (Vienna, April 20th 2007)
- “International Symposium on Eastern Boundary Upwelling Ecosystems” (Gran Canaria, Spain, 2-6 June 2008), co-sponsored by IMBER.

SOLAS held its Open Science Conference in March 2007 in Xiamen (China). SOLAS leads a Summer School in Corsica (Nov 2007) and is looking at other venue for future Summer School (Slovenia or Cape Verde).

SOLAS has a “Project Integrator” (Dr. Tom Bell) to bring together SOLAS data in order to produce data products, largely in terms of quantitative estimates of air-sea fluxes of the gases and particles. These data products can then be used by policy makers and the scientific community to assess the role of ocean-atmosphere interaction in climate, air quality and ocean biogeochemistry. This project is partially funded by COST Action 735. John Ingram is the chair of the COST Committee. He encourages IGBP projects to be involved in cost activities. COST is one of the longest-running instruments supporting co-operation among scientists and researchers across Europe. COST is a possible source of funding for IMBER.

Action: Sylvie to explore the funding possibilities with COST (ex: for working group activities).

Action: All SSC, to consider what IMBER activities could apply for COST funding.

6.2 GEOTRACES

(Report by Kristin Orians)

GEOTRACES is a new international program to study trace elements and isotopes in the world oceans. Kristin reviewed the objectives and the scientific themes of GEOTRACES.

GEOTRACES is holding a series of planning workshops this year, one each for the Atlantic, Pacific and Indian oceans, as well as one that will focus on model/data synergy.

- Pacific (26-29 June, 2007 – Hawaii, USA)
- Atlantic (10-13 Sept., 2007 – Oxford, UK)

- Indian (23-26 October – Goa, India)
- Data-model synergy (6-8 September, 2007 – Delmenhorst, Germany)

The purpose of the basin planning workshops is to refine the scientific objectives, and place them into a framework of specific sections, and to identify nations that are prepared to take the lead on carrying out those sections. The SSC will use the output from the workshops when it meets in November to draft a coherent global plan for the GEOTRACES program, to be implemented over the next decade.

Some of GEOTRACES recommendations regarding Data Management are as follows (from SCOR London Meeting, Dec 06):

- Appoint a full time Data Liaison Officer (DLO) at the IPO
- Appoint a Data Specialist on each Project to be responsible for data
- Agree on time frames for data submission and release
- Use CCDHO for CTD and bottle data
- Involve data management professionals in all GEOTRACES data activities from the start

An intercalibration effort is going on. The Intercalibration Planning Document is available on website (www.geotraces.org). The goals are to test different sampling systems and procedures; conduct thorough intercalibration for key GEOTRACES TEIs (with international TEI community); establish GEOTRACES Baseline Stations; and create “US GEOTRACES Users Manuals and Procedures”. US will put data in OCB-DMO.

Data from cruises that have not gained GEOTRACES endorsement, but which use GEOTRACES Standardization and Intercalibration procedures, will be termed “GEOTRACES-compliant data” and investigators will be encouraged to submit to the GEOTRACES data management system. These projects will not be considered “GEOTRACES” process studies, however. The balance between process studies and sections will be planned at national level.

Scientists of 19 nations are involved in IPY GEOTRACES 2007-2008(+).

6.3 PAGES

(Report by Carina Lange)

PAGES (Past Global Changes) supports research aimed at understanding the Earth's past environment in order to make predictions for the future. Carina mentioned that she has not been able to link IMBER to PAGES. We need to explore a way forward. IMBER IPO should contact PAGES IPO to explore the possible links between both projects. The marine part of PAGES is IMAGES (International Marine Past Global Change Study). IMAGES is involved in IGBP-SCOR FTI on “Ocean acidification”. It could be a link to IMBER SIC sub-group 3 and a way of starting to work with paleo community. Moreover, the new PAGES Working Group 3 focusing on the variability of the East Asian Monsoon (SEAMONS) may be of interest for IMBER. This WG, led by Pinxian Wang will meet at the “Third Alexander von Humboldt International Conference: East Asian Summer Monsoon, past, present and future” (27 - 31 August 2007, Beijing, China).

IMBER IPO could contact Ralph Schneider (Kiel) from IMAGES Scientific Committee directly.

PAGES meets on 25-27 July 2007 (PAGES SSC/EXCOM meetings) in Cairn, Australia.

Ed mentioned that SCOR/IMAGES WG 123 on “Reconstruction of Past Ocean Circulation (PACE)” and SCOR/IMAGES WG 124 on “Analysing the Links between Present Oceanic Processes and Paleo-Records (LINKS)” could be relevant to IMBER.

Action: Sylvie to contact PAGES IPO to identify a contact that could work with IMBER SSC to develop a way forward between IMBER and PAGES/IMAGES

Action: Sylvie to contact Kitack to inform him that links between IMBER and PAGES could be improved through FTI on Ocean acidification.

6.4 CLIVAR

(Report by Wilco Hazeleger)

Wilco introduced CLIVAR program and activities. He focused on the organisation of the CLIVAR/IMBER/GLOBEC workshop that will be held in Brest (April 2008). The motivation comes from the need for making the connection between climate and ocean scientists to better understand the Sensitivity of Ocean to Climate change. For example, how does upwelling change? Is that related to climate patterns? How good are climate models? The goals are to bring together young marine scientists on biogeochemistry and ecosystems research (grad students, postdocs) with climate scientists and to inform on climate driving of ocean processes that are relevant for impact on the marine environment Themes are as follows:

- Changes in atmospheric forcing (wind stress, heat and fresh water fluxes) of the ocean in the 20th century and projections for the future.
- Changes in water mass properties in the 20th century and projections for the future.

The organising committee is composed of: Wilco Hazeleger, Martin Visbeck, Geir Ottersen, Richard Sanders, Sylvie Roy, Olivier Aumont, Ivo Grigorov. Thirty participants are expected for a 3 day workshop. A call will be organised for the selection of 30 participants including students from biogeochemistry and ecosystems. Teachers will come primarily from the climate domain. Science talks around defined themes will occur the morning with hands-on workshops and discussions in the afternoons. Hands-on workshops will tackle the following issues:

- Data archives (what and where are relevant data? E.g. pcmdi IPCC coupled model archive, flux data sets, reanalysis data sets, hydrography)
- Hands-on tools (e.g. the web-based Climate Explorer for statistical analysis; Hydrobase; Ocean Data View)
- Explanation of reanalysis data sets, there applications and limitations
- Explanation on climate model set ups, there applications and limitations

Secured funding: EUR-OCEANS (15 K€).

Possible funding: IMBER funds (7.5 K€), applied to ESF (15 K), will apply to the region of Brittany (3 K)

The Products arising from this workshop need to be identified. It could comprise atmosphere and ocean reanalysis (optimal combinations of observations and models), State-of-the art climate models, Analysis and visualization tools.

Action: IMBER IPO to take the lead of the organisation of CLIVAR-IMBER-GLOBEC workshop.

Action: Wilco and Sylvie to find further funds for this workshop.

6.5 GLOBEC

(Report by Ian Perry)

Ian presented an overview of GLOBEC programs and science. He focused on the regional program CLIOTOP (Climate Impacts on Oceanic Top Predators). CLIOTOP is a worldwide comparative effort to understand the key processes of oceanic ecosystems and their top

predator species and determine the impact of climate variability. Further information is available in GLOBEC report n°18. Internal discussions on how to relate to IMBER already started. CLIOTOP has a strong human dimension component that may be of interest for IMBER. CLIOTOP will hold a symposium in December 2007 (La Paz, Mexico), co-sponsored by IMBER.

The regional program “Ecosystem Studies of Sub-Arctic Seas” (ESSAS) aims at comparing, quantify and predict the impact of climate variability and global change on the productivity and sustainability of Sub-Arctic marine ecosystems. There has not been internal discussion about the potential links with IMBER yet.

CCCEIR (Connecting Communities: Climate and Ecosystem Impact Research; <http://www.cgd.ucar.edu/div/ccceir>) aims are:

- integrating modelling of climate variability, coupled climate-ecosystem modelling, and climate impact studies,
- exploring desire/possibility of embedding high-resolution regional (ROMS) ocean + marine ecosystem and food web models within CCSM and
- building NCAR collaboration with national and international programs, especially GLOBEC.

This activity will continue after the integration of GLOBEC and IMBER. There is a rising interest in the US science in this activity

GLOBEC has entered in its synthesis and integration phase. There are two major synthesis activities: the edition of a synthesis book and the preparation of the 2009 OSC.

GLOBEC is editing a synthesis book and organising several synthesis symposia. Among them, the GLOBEC Focus 4 Symposium on “Coping with global change in marine social-ecological systems” will be held in Rome (8-11 July 2008). GLOBEC requests IMBER co-sponsorship for this meeting. IMBER SSC agreed to provide 2K sponsorship of this meeting.

Regarding post-2009 phase:

It was agreed that a joint session of GLOBEC-IMBER SSCs will be held at the IGBP Congress (2008) to prepare post-2009 phase. The Transition Task Team (TTT) will develop the scientific content of the addendum to the IMBER science plan. The TTT will be 6-8 people from GLOBEC, IMBER (biogeochemistry and lower food web), CLIOTOP, ESSAS and ICED. Mike Roman is volunteering to be part of the TTT. Jim Harrel is proposed as a climate person. We need to find a “Human Dimension” person. The TTT will be in charge of writing the addendum to the Science. Addendum will layout science and implementation issues to include

- Outstanding questions identified during the GLOBEC synthesis
- Ongoing research in GLOBEC’s regional programs
- Results of the first phase of IMBER

The TTT membership and draft of ToR must be approved by both programs and by IGBP and SCOR.

GLOBEC will hold its final 3rd Open Science Meeting in Paris (late May 2009). This conference will feature a session on the transition to IMBER rather than final closure of GLOBEC. GLOBEC invites the IMBER SSC to contribute actively to the organisation of the conference.

Action: Coleen to attend the CLIOTOP Meeting in La Paz.

Action: Julie to open discussion with SPACC, ESSAS and other active programs to develop links with IMBER.

Action: Sylvie to interact with GLOBEC IPO for the sponsorship of GLOBEC Focus 4 Symposium on “Coping with global change in marine social-ecological systems” will be held in Rome (8-11 July 2008).

Action: IMBER and GLOBEC to propose membership of TTT at the next IGBP Congress

Action: IPOs to circulate ToR of the TTT to SSCs

Action: Julie to explore how to contribute to the final GLOBEC 3rd Open Science Meeting (late May 2009).

6.6 OOPC

(Report by Wilco Hazeleger)

OOPC (Ocean Observations Panel for Climate) is a scientific expert advisory group charged with making recommendations for a sustained global ocean observing system for climate in support of the goals of its sponsors. This includes recommendations for phased implementation. The Panel also aids in the development of strategies for evaluation and evolution of the system and of its recommendations, and supports global ocean observing activities by interested parties through liaison and advocacy for the agreed observing plans. OOPC asks if IMBER is ready to discuss biogeochemical and ecosystem sustained observation on a basin scale. OOPC would like to work with IMBER to foster, as rapidly as is feasible, inclusion of ocean biogeochemistry variables in an agreed global ocean observing system plan. OOPC would like to ensure that IMBER is able to make best use possible of ongoing observing, analysis and reanalysis activities.

The core elements of the initial ocean plan were developed out of the community-wide conference at Saint-Raphael in October 1999 (Ocean Obs99). The initial plan hypothesised that the time series ocean reference moorings site would be the focus of sensor development and pilot projected for all sensors. OOPC wants to ensure that IMBER scientists and technologists are aware of the opportunity to approach OceanSites PIs for access to moorings. IMBER must determine what variables are needed to measure on a sustained base. The ocean pCO₂ community has been working hard to increase sampling via Ships of Opportunity for global coverage. An infrequent repeat global survey hydrography, tracer and carbon program is underway. It is coordinated via the IOCCP at IOC (Maria Hood). If access to repeat surveys could be helpful to IMBER, IOCCP should be contacted.

There is intense interest in developing observing system components for marine ecosystems and biogeochemistry as part of a more comprehensive integrated observing system. A decade-follow-on symposium to OceanObs99 is being considered for late 2009. OOPC suggests collaboration with IMBER following the OceanObs99 example.

OOPC suggests the following recommendations:

- Identify priority variables for IMBER
- Identify sensors ready for basin scale or OceanSites use, including standards and best practices
- Set up standards and best practices workshop if needed
- Take sensor development needs to ocean sensors workshop (Ralf Prien)
- Identify sampling strategy and needed resources
- Develop white paper for sustained IMBER obs (for symposium or as stand-alone)

It was suggested that carbon and oxygen measurements are relevant to IMBER through the SIC group.

Sensors development in biology field has not keep the pace with physics sensors development. Optical sensor development is also of interest to IMBER and could be an interesting IMBER contribution. The SCAR/SCOR Southern Ocean Observing System (SOOS) workshop Planning Meeting (1-3rd Oct. 2007, Bremen, Germany) could be a good place to discuss this further.

IMBER could also propose a SCOR WG on new technology to look at what parameters could be important to measure.

Action: Sylvie to contact SIC to work with OOPC on the white paper on inclusion of oxygen and potentially carbon measurements in a white paper for OceanObs 2009.

Action: Julie to attend (SOOS) workshop Planning Meeting (1-3rd Oct. 2007, Bremen, Germany)

Action: All to suggest a leader to develop a SCOR WG (January 2008).

6.7 IGBP

(Report by Wendy Broadgate)

IGBP studies the interactions between biological, chemical and physical processes and human systems. IGBP collaborates with other programs to develop and impart the understanding necessary to respond to global change.

IGBP is organising its 4th Congress “Sustainable Livelihoods in a Changing Earth System” to be held in Cape Town (5-9 May 2008) www.igbp2008.co.za.

The objectives are:

- To develop ways for IGBP to apply Earth System science and improve IGBP relevance to civil society, the private sector and the policy community;
- To provide a forum for cross-project interaction and integration across the breadth of the program;
- To identify where IGBP work is contributing to addressing mitigation and adaptation, large-scale pilot projects on sustainability science and institutional networking;
- To suggest pathways to sustainable solutions, including mitigation, innovation and adaptation;
- To address the challenges of Global Environmental Change and development in Africa (climate change as a stress factor to African development, water systems, etc)

The two first days (May 5-6) are devoted to core projects SSC meetings. Those meetings will be held at a different venue (Biodiversity Institute). Day 3 is a plenary symposium on “Sustainable African Pathways in a Changing Earth System”. Day 4 is organised around scientific sessions (30 abstracts were submitted, there is 24 slots available). There is a possibility to have parallel sessions. Day 5 is structures around plenary sessions. The two last days (May 10, 11) are dedicated to IGBP SC Meetings. Twenty-seven working groups have been proposed, 10 of them are related to marine science:

- Climate Influences and Biological Controls in High Latitude Marine Ecosystems
- Vulnerability of coastal livelihoods and response strategies to changing earth system
- Interface between biogeochemistry and ecosystems
- Oceanic Oxygen Minimum Zones
- Biogeochemistry and Food Interaction at Continental Margin: Toward the Feed-back of Carbon Cycle to Atmosphere and Open Ocean.
- End-to-end food webs in marine ecosystems

- Nitrogen in the Earth System: from fundamental research to application
- Regional knowledge systems for sustainable development
- Global Change in the Arctic
- Sea level change, ice sheet stability, and vulnerable coastlines

Emphasis will be placed on integration across traditional boundaries and disciplines, on on integration with the Joint Projects of ESSP. Integration should be done through session of global aspects. IMBER should identify outcomes that could be useful for the project to profit. Maybe we plan a transition team meeting to cover those issues. This could be possible on Day 5 afternoon.

Julie raised the high cost of this SSC meeting for IMBER. She raised the idea of having the SSC the two first days and to leave earlier. The idea is to favour interactions between core projects but IGBP understands the problem. South Africa has been chosen to improve IGBPs research and networking on development issues, such as risk and vulnerability, important to Africa. Full block grant to core projects will be restored as soon as the financial situation gets better.

National committee involvement is critical for funding to IGBP. Money for science comes from ICSU, non governmental contributions. 40 countries contribute. The first priority as contributions come in is to restore support to the projects

Will Steffen, Peter Lemke were commissioned to write white paper on the possibility of merger (pros & cons) at the IGBP-SC in Brazil. Further analysis on how this could be done will be prepared at the Congress in Cape Town.

Two members are rotating off: Mary Scholes (Vice-Chair) (terr. ecol.), Takashi Kohyama (plant ecology), Sandra Lavorel (terr. ecol.).

Three members are at renewal point: Bob Duce (Treasurer) (oceans), Lynn Russell (atmosphere), Taroh Matsuno (ES modeling)
Nominations are welcomed.

IGBP is co-organising the “Second Symposium on The Ocean in a High-CO₂ World” to be held in Monaco (6-8 October 2008).

6.8 SCOR

(Report by Ed Urban)

SCOR Office is moving to University of Delaware in October 2007.

GEOHAB is an international activity aimed at fostering and promoting cooperative research directed toward improving the prediction of harmful algal bloom events. Core research focused on 4 comparative ecosystems: upwelling, fjords and bays, eutrophied and stratified systems. Small OSC has been devoted to each system (max 50 people):

- Open Science Meeting on HABs in Upwelling Systems
Lisbon, Portugal; 17-20 November 2003
- Open Science Meeting on HABs in Fjords and Coastal Embayments
Valparaiso, Chile; 26-30 April 2004
- Open Science Meeting on HABs and Eutrophication
Baltimore, Maryland, USA; 7-11 March 2005

- Open Science Meeting on HABs and Stratification
Paris, France; 5-8 December 2005

Working groups are usually formed of not more than 10 members to consider a narrowly focused topic and develop a publication for the primary scientific literature. Their work is intended to be completed in 4 years or less. SCOR has sponsored—alone or with other organisations—130 working groups. Ed presented WG related to IMBER interest such as:

- WG 116: Sediment Trap and 234Th Methods for Carbon Export Flux Determination (Ken Buesseler)
- WG126: Role of Viruses in Marine Ecosystems (Markus Weinbauer)
- WG128: Natural and Human-Induced Hypoxia and Consequences for Coastal Areas (co chaired by Jing Zhang)

The full list is available at: <http://www.scor-int.org/wkgroups.htm>

SCOR approved 2 new WG last year

- WG129 on Deep Ocean Exchanges with the Shelf. Wajih is a full member of this group which will meet in Perugia, Italy in July 2007.
- WG 130 on Automatic Visual Plankton Identification. Members met in Hiroshima, Japan in May 2007.

SCOR usually considers proposal each year in January-February. SCOR contributes \$45 K over 3 years to run three meetings.

SCOR, IOC, IAEA and IGBP held a planning meeting in late February for the Second Symposium on Ocean in a High-CO₂ World. The symposium will be held in Monaco 6-8 October 2008. This is the first major meeting in the area of acidification. Jim Orr, JP Gattuso, Patrick Lehodey ... are members of the organising committee.

Half of the speakers will be selected from contributed abstracts. There is two speakers missing for “economic consequences” and for “fisheries, food web and ecosystem impacts”. SIC group must be involved in this symposium. Ed will contact SIC, PAGES and IMAGES and work with them on way to involve them in the meeting.

The overarching purpose of this group is to bring together ocean scientists from different disciplines who work in the Southern Ocean, to encourage an inter-disciplinary approach to Southern Ocean observations, modelling and research, recognizing the inter- dependence of physical, chemical and biological processes in the ocean at present and in the past. Julie is a member of this group of experts.

Southern Ocean Observing System (SOOS) planning workshop will be held in Bremen, Oct. 1-3, 2007. The objective is to write a plan and to present it at a meeting of the SCAR/SCOR Oceanography Group, and as part of the SCAR Ocean Science Conference (St Petersburg, Russia) to obtain further feedback (2008).

SCOR held its second Summit in London (7-9 Dec 2006) to bring together representatives of the major international ocean research and observation projects and programs to discuss common opportunities, issues and problems (time series, bathymetry, satellites, capacity Building (CB). An article in EOS has been published. It was agreed that the projects and their IPOs should feed information into and interact with the new SCOR Committee on Capacity Building. The Capacity Building group has now 8 members but may increase in size. Wajih Naqvi, as chair of the IMBER capacity-building activity, was nominated as ex-officio member to represent IMBER and other projects. Murray Brown is developing a web-based catalog of ocean capacity-building activities. Prototype pages have been developed by Brown and will be sent to individual projects

and organisations for review before making it public. This group will work with the projects and collaborate with POGO on fellowship for developing country oceanography study. One other outcome of this meeting is the creation of a panel to explore the use of Data Object Identifier (DOI) for data management. The Terms of reference for this panel are being written.

SCOR will provide IMBER with 50 K USD per year until August 2009. Support for developing country scientist travel and Conference Manager system subscription are paid by SCOR.

Action: Ed to contact SIC group to find a way to integrate SIC to the High CO2 Meeting (Monaco, Oct 2008).

Action: IPO to interact with SCOR and IGBP to develop capacity building products.

Action: Sophie and Wajih to interact with Murray Brown in order to be sure that IMBER is well represented in the web-based catalog of ocean capacity-building activities.

7 Update on country activities for IMBER project

7.1 Canada

(Report by Jay Cullen)

There will not have an IMBER research program. Research will be done under multiple names. This year the government announced that 150 M CAD (20% of which is for icebreaker activity) will be available for research in the Arctic for IPY (2007-2008). A total of 44 science and research projects were awarded. Some of those projects have significant overlap with IMBER scientific goals. Examples are C30-Canada's Three Oceans, the Carbon Cycle in the Canadian arctic and Sub-Arctic Continental Margin, The Circumpolar Flaw Lead System Study. Jay is in contact with Project Leaders to solicit their application for IMBER endorsement. PIs showed interest and applications are forthcoming.

There will have sustained observation too with VENUS (cables in Strait of Georgia, test of sensors) and NEPTUNE. NEPTUNE is a very large infrastructure program, cabling 800 km loop on west coast of Canada and collecting multiple terra bites of data per year. The first distribution of arrays will be in 2009. It is a unique opportunity as data are available in real time and downloadable.

The Canadian GEOTRACES initiative has been funded under IPY to pursue studies of trace elements and isotopes in the Arctic in 2008. A single cruise is planned for Northern Summer 2008 on the CCGS Henry Larsen to study the effect of climate change on nutrient and carbon cycles in the Arctic Ocean.

Action: Sophie to get IPY project names from Jay for endorsement.

7.2 Chile

(Report by Carina Lange)

Austral Summer Institute VII (ASI VII) (January 2007)

Theme: METHANE BIOGEOCHEMISTRY AND GEOPHYSICS

Methane: Microbes, biomarkers & carbon cycle, January 2 – 5

Methane hydrates, January 8 –12

Sediment diagenesis & biology, January 15 –19

Methane turnover & seeps, January 22 –26

Forty nine graduate and advanced undergraduate students from Scotland, Germany, Mexico, Brazil, Peru, Argentina and Chile participated in the Austral Summer Institute VII organized by the Department of Oceanography and the FONDAP-COPAS Center of the University of Concepción. This graduate activity is supported by the Graduate School at UDEC, UNESCO-IOC, Fundación Andes-Chile, Woods Hole Oceanographic Institution (WHOI) the Partnership for Observation of the Global Oceans (POGO), Integrated Marine Biogeochemistry and Ecosystem Research (IMBER), Centro de Investigación en Ecosistemas de la Patagonia (CIEP) and the Ministry of Education of Chile (MECESUP Program).

SSC agreed to provide 2K USD to ASI VIII. Later, Carina will write an article for IMBER and COPAS Newsletter.

ASI IX focusing on “Applied oceanography for the coastal ocean - a joint venture with the public and private sectors” is planned for January 2009.

Next Austral Summer Institute VIII (ASI VIII) University of Concepción during January 2008

Theme: OCEANOGRAPHY AND CLIMATE CHANGE: PAST, PRESENT AND FUTURE SCENARIOS

For ASI VIII, we are planning on having five lecturers to cover the topics of Climate Modeling, Biogeochemical cycling and Climatology, and Paleoclimatology & Paleoceanography, including model outputs from simulations of the past, present and projected future climate, and the effects of anthropogenic perturbations. The general approach for ASI VIII will include analysis of a large set of observations from the ocean and the atmosphere, learn about the processes involved in ocean-atmosphere interactions, and examine the suite of existing models incorporated in global general circulation models. A total of 18-20 graduate students is expected. The official language of the course is English.

GALATHEA 3 expedition

Among the projects selected for the expedition, legs 13 and 14 were devoted to the study of the oxygen minimum zone off northern Chile (Valparaiso - Arica) and the Peruvian upwelling with emphasis on the study of low oxygen conditions on microbial communities and metabolic pathways related to the N and C cycles.

The specific objectives achieved during the cruise are:

1. To determine the vertical distribution of N₂O, CH₄, nutrients, pigments, POC and cell abundances of several functional groups of microorganisms as well as several oceanographic variables through the transects.
2. To quantify the fixation rate of molecular nitrogen (N₂) and nitrous oxide (N₂O) with variable conditions of light and oxygen between the surface and the core of the oxygen minimum zone.
3. To determine the rates of nitrogen recycling through nitrification under variable conditions of oxygen and light.
4. To determine metabolic pathway of Cyanobacteria in the secondary fluorescent peak.
5. To study the functional and phylogenetic diversity of microorganisms associated with the OMZ.

From the molecular/ecogenomical point of view, a significant amount of samples were collected in order to perform RNA extractions for the first time in Chilean and Peruvian waters. This will provide new information about the microorganisms associated with the OMZ and the expression of genes involved in biogeochemical cycles of nitrogen and carbon.

Participants Chile: Gadiel ALARCÓN (Technician COPAS), Mauricio GALLEGOS (Technician COPAS), Laura FARÍAS (Assistant Professor UdeC and Associate Investigator COPAS), Camila FERNÁNDEZ (Postdoc fellow PROFC), Osvaldo ULLOA (Professor UdeC and Principal Investigator COPAS)

PACHIDERME

RV Marion Dufresne Cruise PACHIDERME MD 159, February 6-28, 2007. On February 6, the RV Marion Dufresne left Punta Arenas on the collaborative cruise PACHIDERME (Pacifique-CHili-Dynamique des Eaux intermediaries), including scientists from France, Germany, Norway and Chile. The purpose of the cruise was to recover long piston cores along a latitudinal transect from 48° to 55°S, including both the inland waterways of the Chilean Fjord region and off the bounding islands along the Chilean outer continental shelf and slope. Thirty-eight stations were visited, and a total of 55 cores were recovered (including CALYPSO and CASQ cores). The fast accumulating sediments of the fjord region and adjacent oceanic areas allow the study of ocean and land variability off southern Chile at decadal to millennial scales. Because the fjord region and adjacent oceanic areas lie under the influence of the Southern Westerlies and associated precipitation patterns, the new cores will contribute to the understanding of land-ocean interactions, and address questions related to present and past fluctuations in the fresh water input and its impact on productivity changes and geochemical cycling of biogeochemically relevant elements.

Outreach activities on Pachiderme cruise

For the first time, middle- and high school teachers participated on board the Marion Dufresne Cruise PACHIDERME MD 159, February 6-28, 2007, as part of a new educational program at sea, lead by Carlo Laj, Chairman of the Committee on Education of EGU. In a "Classroom at sea" fashion, one American teacher of Chatman HS and two Chilean teachers of Talcahuano schools, and COPAS Outreach coordinator Luis Pinto, participated in the scientific activities on board, kept in contact with their schools, sent regular reports on the cruise and answered questions from the student.

Participants Chile: Alejandro Avila (Technician COPAS), Magaly Caniupan (Graduate student UDEC), Tania León (Graduate student UDEC), Luis Pinto (Outreach Coordinator COPAS), Lorena Rebolledo (Graduate Student UDEC), Carina Lange (Professor UDEC and Director COPAS)

ARGO

Argo educational program in South America

Outreach program with two local public schools using data from the Argo Program to understand basic concepts in oceanography along the Pacific eastern coastal margins. The program entitled "Drifting within the ocean depths" is using data produced by floats WMO ID# 4900512 & 513 deployed by the Chilean Navy Oceanographic Service. During the last two months they have been downloading statistics about the floats and presenting their results to the rest of the students. Currently, an Argo poster is being translated into Spanish by both teams.

Carina reviewed the Capacity Building activities conducted by COPAS. This encompasses:

- Austral Summer Institutes (ASI)
- Student Exchanges
- Faculty Exchanges
- Faculty hiring at UDEC Oceanography
- Participation in international cruises
- Postdoctoral fellowships at WHOI

- Scientific instrumentation
- Infrastructure

Action: IPO to arrange the sponsorship of ASI VIII.

Action: Carina to write an article on ASI VIII in IMBER and COPAS Newsletters.

7.3 China

(Report by Jing Wang)

Meetings and Conferences

National Xiangshan Conference No. 305: This is one of meeting series for “Xiangshan Forum”, and will be held at Qingdao in 4-6 July, 2007. The idea is to bring together about 50 scientists nation-wide to discuss on the marine ecosystem health in relation to the activities of IMBER, GLOBEC and GEOHAB, toward the ecosystem based management. This will be an opportunity to summarize the research results of GLOBEC and GEOHAB in China and to figure out the strategy of marine research in China.

Second Global Conference on Large Marine Ecosystems: This meeting will be held at Qingdao in 11-13 September, 2007 with about 200 participants.

IMBER/LOICZ OSM: This meeting will be held at Shanghai in 17-21 September, 2007 with about 150 participants. The LOC has received the support from East China Normal University, and Natural Science Foundation of China has recently agreed to support this meeting with a funding of RMB 40k.

Sea-going Cruises

Two cruises on the East China Sea Shelf were organized in November 2006 and February 2007 to understand the exchange of Kuroshio and shelf waters on the biogeochemistry of East China Sea Shelf.

Two cruises were organized in the Yellow Sea in March and May 2007 to understand the structure of ecosystem and role of zooplankton on the ecosystem function.

One cruise was organized in April 2007 to understand the dynamic processes of spring phytoplankton blooms and its impact on the food-web of the Yellow Sea.

Workshops

Workshop on the food-web structure was organized at Zhejiang Province in March 24-26 2007 with total about 20 participants within China-BLOBEC/IMBER Project.

Workshops on the spring blooms and coastal hypoxia, respectively, were organized at Shanghai in 23-25 May, 2007 with total of 42 participants nation-wide. On the meeting spring blooms, 8 oral presentations were made; 22 oral presentations were arranged for the workshop of coastal hypoxia off the Changjiang. This workshop is to help scientists from China-BLOBEC/IMBER Project to prepare for their presentations (i.e. oral and poster presentations) for the LMEs (Qingdao) and IMBER/LOICZ (Shanghai) OSMs in September, 2007.

7.4 France

(Report by Hervé Claustre)

The French program **CYBER** (CYcles Biogéochimiques, Ecosystèmes et Ressources, french acronym for “Biogeochemical Cycles, Ecosystems and Resources”) was launched in 2006. Scientific activity within CYBER is structured around four major themes, each of them being the French counterpart of international initiatives (see 2006 report). Theme 1, which is IMBER relevant, focuses on ecosystem structure, functional diversity and biogeochemical cycles and is based on synergetic approaches combining observations and models. During 2007, two multidisciplinary in situ projects were in the process of interpretation and valorisation.

KEOPS (KErguelen: compared study of the Ocean and the Plateau in Surface water) is largely focused on the publication of the results. This has started with the Nature's paper and will continue with the publication of 25 papers in a [special issue of Deep Sea Research II](#). This volume will contain detailed reports of the findings in physics and biogeochemistry including modelling. Papers on molecular biology, bio-optic modelling are also in preparation. The KEOPS data have also been included in a synthesis on the role of dust deposition in the oceans of the southern hemisphere. Additional modelling studies and the comparison of the results of KEOPS with other iron fertilisation, especially CROZEX are also on the agenda.

The **BIOSOPE** (Biogeochemistry and Optics South Pacific Experiment) group is preparing a [special issue for the journal Biogeosciences](#) that should be completed by the end of 2007. The volume will be mainly organized around three main topics (biology/biodiversity, biogeochemistry and optics / bio-optics), but many questions relevant to this project have benefited from a multidisciplinary investigation so that most of the paper scopes are often multidisciplinary too. Submissions have started two months ago and around 35 contributions are announced for this special issue that will complement the [already 17 published papers](#).

In 2007, the **TWISTED** (ToWard Integration of Subgrid Turbulence in Ecosystem Dynamics) has also been launched for the next three years. This project is devoted to the understanding of the large scale impacts of mesoscale turbulence on ecosystem dynamics. The expected outcome is to improve the representation of these impacts in global Ocean General Circulation Models (OGCMs) thanks to the development of parameterizations. Such parameterizations represent a big challenge for climate studies, and to take up this challenge requires the strengthening of the community around interdisciplinary approaches.

7.5 Germany

(Report by Jürgen Allheit)

In the past, the German Federal Ministry for Education and Research has funded research projects associated with IGBP core projects such as JGOFS and GLOBEC. There are plans to support a German IMBER initiative in a similar way. At present, four German consortia are preparing respective proposals which will be submitted for funding under the umbrella of IMBER. Three of these proposals aim for regional projects in the North Sea, the Baltic Sea and the Northern Benguela Current. The fourth one will focus on acidification of the ocean. The proposals will be submitted within the next months.

7.6 India

(Report by Wajih Naqvi)

Several IMBER-related projects are presently being implemented in India largely by the National Institute of Oceanography (NIO) at its headquarters in Goa and its regional centres in Cochin and Visakhapatnam. In addition to the open-ocean studies carried out on cruises of the research vessels *Sagar Kanya* and *Sagar Sampada*, two coastal time-series stations are being monitored, one each along the west coast (in the Arabian Sea off Goa) and the east coast (in the Bay of Bengal off Visakhapatnam).

Some important recent findings are summarized below:

1. A detailed analysis of time series observations along the west coast revealed recurrence of anoxic conditions including sulphate reduction and unusual nitrous oxide build-up in the water column during late summer – early autumn for the last 10 years. Comparison with an earlier data set collected in the 1970s points to recent intensification of coastal oxygen deficiency presumably in response to increased nutrient loading from land. This appears to have impacted demersal fish catch. Marked changes in phytoplankton production and composition are found to be associated with those in the physico-chemical environment. Examination of sediment cores from the region suggests that the upwelling-related productivity is dominantly controlled by solar irradiance on decadal to centennial time scales, and the present day productivity is indeed the highest ever recorded in the last ~700 years. Proxies (biomarker sterols) of terrestrial organic matter also suggest marked increases in terrestrial inputs over the past few decades, reflecting changes in land use.
2. Upwelling and primary production in the Arabian Sea have been reported to have intensified in recent years due to a decline in winter/spring Eurasian snow cover. Repeat observations along the US JGOFS southern line carried out during the late Southwest Monsoon of 2004, however, indicated a somewhat subdued upwelling and much lower primary production and chlorophyll concentrations. Iron concentrations in surface waters off the southern Omani coast were as low as 0.25 nM and this in conjunction with the lowest free copper (Cu^{2+}) levels observed anywhere in the ocean ($<10^{-15}$ M) appear to limit primary production. The inferred iron limitation is proposed to contribute to the anomalous offshore occurrence of the most severe oxygen depletion in the region.
3. Denitrification rates have been measured directly for the first time in the Arabian Sea and indeed for any oxygen deficient zone through incubation of samples spiked with $^{15}\text{NO}_3^-$. The overall denitrification rate is similar to previous estimates. However, concurrent measurements of the N_2/Ar ratio, which exhibits a prominent maximum coinciding with the nitrite maximum, yield “excess” N_2 values that are almost twice the Redfield stoichiometry-based nitrate deficits. The process responsible for this anomaly is not known, but anammox and degradation of non-Redfieldian organic matter (e.g. that produced by the diazotrophs) are two likely candidates. Analyses of enzymes mediating various redox transformations suggest a fractured nitrogen cycle. These results along with some other recent reports suggest that our current understanding of the nitrogen cycle and fluxes is far from satisfactory.

Other than NIO, the Centre for Marine Living Resources & Ecology (CMLRE), Cochin, under the Ministry of Earth Sciences is also involved in research that is relevant to IBER. The CMLRE’s mandate includes (1) Evaluation of existing information on marine living resources, correlating it with the influence of physico-chemical parameters on the biota, identifying the gaps and formulating future strategies for sustainable exploitation of marine living resources; (b) Evolving, coordinating and implementing time targeted national/regional research programs in the field of marine living resources and ecology, through effective utilization of *Sagar Sampada*; and (c) Coordinating the national programs relating to Southern Ocean Living Resources (Antarctic Marine Living Resources). One of the main foci of CMLRE’s activities is the composition and population dynamics of the organisms constituting the deep scattering layer and how it relates to the physico-chemical environment. Specifically, a huge biomass of myctophids resides within the core of the oxygen minimum zone for most part of the day. The effect of large-scale diurnal migration of these organisms on biogeochemical cycles and budgets remains to be assessed.

Other projects supported by CMLRE include the study of harmful algal blooms within the Indian exclusive economic zone.

A collaborative project between NIO and the Space Application Centre (SAC), Ahmedabad (a constituent laboratory of the Indian Space Research Organization), utilizes the data generated by the IRS P4/OCM and validated by a shipboard sampling program. The extensive data sets generated under this project have been used to understand the spatial and temporal variability of biological productivity in the Arabian Sea.

Projects approved for the XI Plan period

Federal funding of scientific research programs in India is based on 5-year planning. The projects for the XI Plan (2007-2012) have just been approved. With the formation of the Ministry of Earth Sciences that also covers ocean sciences there has been a substantial increase in funds earmarked for oceanographic research including biogeochemistry and ecosystems. As a result, several new projects that will have relevance to IMBER are expected to be initiated within the next few months. In order to avail this opportunity NIO has submitted an ambitious proposal on "Bay of Bengal Carbon Flux Study". Among the various problems this project aims to tackle are (1) variability of gross and net community production and community respiration and factors that control them; (2) effect of immense river runoff on production, export and mineralization of organic matter and on air-sea gas exchange; (3) impact of extreme events (tropical cyclones) on biogeochemical processes; and (4) remarkable stability of the Bay of Bengal OMZ in spite of it being tantalizing close to being suboxic.

The following projects have already been approved by the Council of Scientific & Industrial Research (CSIR) for NIO for the XI Plan period (started April 1, 2007):

1. Biogeochemical and ecosystem responses to global climate change and anthropogenic perturbations, and transfers across interfaces in the North Indian Ocean
2. Understanding coastal upwelling: A system biology approach to delineate web-dynamics from primary to tertiary levels
3. Eco-biogeography of the estuarine and coastal waters of the southwest coast of India
4. Physical and biogeochemical dynamics of estuarine and coastal ecosystems along the east coast of India
5. Indian Climate and Phytoplankton Variability

Additionally, a proposal for an iron fertilization experiment to be implemented as a CSIR Network Project "Atmosphere carbon dioxide sequestration through fertilization of a high nutrients - low chlorophyll (HNLC) oceanic region with iron" has been approved by CSIR. NIO is the nodal laboratory for this project; the other CSIR institutions involved are National Environmental Engineering Research Institute, Nagpur, Centre for Cellular and Molecular Biology, Hyderabad, and CSIR Centre for Mathematical Modelling and Computer Simulation, Bangalore. This experiment will also have significant international participation with Prof. Victor Smetacek of Alfred-Wegener Institute for Polar and Marine Research, Bremerhaven, being a major partner. The experiment will be conducted in the Scotia Sea (around 58°S, 45°W) in the austral summer 2008.

Forthcoming cruises

The summer/autumn of 2007 (August-October) will be a time of fairly intense field studies in the Arabian Sea. NIO is organizing an international cruise on board the R/V *Roger Revelle* to investigate possible iron limitation of primary production in the western Arabian Sea; the alternative hypothesis of zooplankton grazing controlling the phytoplankton biomass will also be tested on this cruise. Several groups from the US are expected to take part in this cruise which

will be followed by another cruise led by Bess Ward/Allan Devol that will focus on nitrogen cycling in the Arabian Sea (relative importance of denitrification and anammox and measurements of N₂-fixation, natural N,O-isotope abundance in oxidized N species). A cruise of R/V *Meteor* will also be undertaken at the same time led by Kai Emeis/Birgit Gaye-Haake. In addition to water column biogeochemical measurements, including anammox activity, this cruise will facilitate resumption of the particle flux program. Three sets of moorings – two German and one Indian – will be deployed. While the German moorings will be at the earlier Western Arabian Sea (WAST) and Central Arabian Sea (CAST) trap sites, the Indian mooring will be at a site within the heart of the OMZ (17°N, 68°E). The latter site has also been chosen by NIO for long-term time-series monitoring for water column biogeochemistry and ecology.

Hiroshi Kitazato from JAMSTEC proposes to bring the Japanese R/V *Yokosuka* along with the submersible *Shinkai 6500* to the Arabian Sea for a diving cruise along the Indian margin in the autumn of 2008. The project entitled “Biogeochemical and sedimentary processes at sediment-water interface under oxygen depleted environments: Dive cruise at Indian Margin of the Arabian Sea” will also involve investigators from several countries (India, Denmark and UK) other than Japan.

Data from Indian projects will go to Indian Oceanographic Data Centre.

Action: Sophie to contact Wajih to discuss about cruises and data.

7.7 Japan

(Report by Hiroaki Saito)

IMBER-Japan got a funding for the project “Population Outbreak of Marine Life (POMAL)” from the Agriculture, Forestry and Fisheries Research Council (AFFRC) in May 2007. POMAL has two targets which are pelagic fish species alternation (e.g., sardine to anchovy) caused by natural climate forcing and the jellyfish bloom which is induced by anthropogenic forcing. The acronym of the later sub-project is STOPJELLY (Studies on prediction and control of jellyfish outbreaks). The goal of the POMAL is understanding the processes and mechanisms of the population outbreak of marine life such as sardine and jellyfish and developing the forecasting ability of the outbreak for the sustainable use of marine resources. The target area is the Kuroshio Extension region east of Japan for the fish species alternation study and there are 4 themes related to 1) changes in atmospheric and marine physical oceanographic status related to fish species alternation, 2) responses of lower marine trophic levels responded to the change in physical oceanographic status, 3) physiological and ecological changes in pelagic fish related to fish species alternation, 4) integrated modelling and application for fish resources management. Multi-RVs field campaigns are planned in 2008 and 2009. Project leader is Hiroaki Saito and the number of PIs are 21.

Project leader of STOPJELLY is Shin-ichi Uye, Hiroshima University. The target species of STOPJELLY is moon jelly (*Aurelia aurita*). STOPJELLY includes not only biological and ecological studies but also studies of controlling the outbreak. POMAL is 5-years project (2007-2011) and the funding for the 1st year is 206 million yen.

BLOSSOM (BLOoming Plankton Succession Study in the Oyashio Marine ecosystem) is a series of field studies in the Oyashio region, western subarctic pacific, by scientists in Fisheries Research Agency, Hokkaido University, Hokkaido Tokai University, and the University of Tokyo. BLOSSOM carries out 5 cruises every month from March to July 2007 to understand the biological and biogeochemical processes along the diatom bloom in the Oyashio region. Investigations are on temporal variation/succession in macro and micronutrients, silicon

production and dissolution, species composition and production of diatoms, microbial components, copepods, euphausiids, and also for nitrogen and silicon budgets through the spring bloom. Project leader is Hiroaki Saito.

7.8 Netherlands

(Report by Jack Middelburg)

In the Netherlands, there is no separate program for GLOBEC, SOLAS, IMBER or GEOTRACES and LOICZ is ending. The SOLAS, IMBER and GEOTRACES programmes involved the same people. There is pressure from the funding agencies to focus research on Dutch coastal waters and additional resources will be provided. However, there are sparse resources for ocean going research the coming years. There are plans and proposals for the Indian Ocean for the year 2009, but this has not been consolidated yet. The Indian Ocean program will involve integrated ecosystems studies and paleoclimatological components.

7.9 New Zealand

(Report by Julie Hall)

There are a number of research projects in New Zealand that are well aligned with the IMBER project. These include the recent 2 research voyage project on Nitrogen cycling in the seasonally and permanently oligotrophic ocean region to the north west of New Zealand. These voyages were conducted in 2005 and 2006 and a data synthesis workshop was held recently to assess the data from these voyages and initiate the development of a nitrogen budget for the surface waters. The initial data analysis has highlighted the importance of the physical drives in this budget with the potential of the internal tides to be a significant driver of nitrogen into the surface waters. A second project which is currently being developed is going to be investigating end 2 end food webs in the Chatham Rise area to the east of the South Island of New Zealand. A research voyage is planned for late 2007 or early 2008. We also have a continental margins project focused on the Hauraki Gulf area which is assessing the sources of nutrients into the surface waters and the role of changing climate as a drive for nutrient supplies. This project involves long term monitoring of the region with moorings and regular voyages in the region.

7.10 South Africa

(Report by Coleen Moloney)

South African marine research funding and resources do not allow for a dedicated IMBER project, and contributions to IMBER will be made through existing research projects that are nationally and regionally funded. This report includes some of the regional research activities under the BCLME and BENEFIT projects.

On the west coast of southern Africa, there is a current focus on research that supports the ecosystem approach to fisheries management. At present, shifts in distribution of major pelagic stocks are occurring off South Africa, with knock-on effects to other species, especially seabirds. Off Namibia, there has been a sustained collapse of pelagic fish stocks since the 1970s, and the role of low oxygen water and gelatinous zooplankton in maintaining this status are currently being studied. In both countries there are projects that aim to include the human dimension into fisheries management, through the development of decision support tools, and critical examination of management objectives under an ecosystem approach.

For marine biogeochemistry, the focus of much of the research in South Africa over the past five years has been hypoxia variability. Of particular interest has been the importance of coupling between the eastern equatorial South Atlantic oxygen minimum zone and the Benguela, and how this affects the complex dynamics of the seasonal and interannual variability in the central

Benguela. Much of the new thinking is now directed by the coupling between biogeochemical fluxes (carbon export fluxes) and the physical dynamics that drive the supply of electron acceptors (oxygen), which has allowed the scales of variability and extreme events to be understood. The ecosystem relevance has been in understanding how hypoxia variability shapes habitat scales and explains past observed responses by certain indicators of the ecosystem (hake in Namibia and rock lobster in South Africa) (SCOR WGs 128 - Hypoxia and 129 - Ocean - Shelf Exchange).

In the future, there will be a greater climate-scale focus in the biogeochemical research. There are plans to examine southern ocean carbon fluxes. This will include process studies (part of IPY - BONUS - Good Hope), as well as a long term observational program between Cape Town and Antarctica (CO₂, phytoplankton, temperature, salinity, etc). Also included will be modelling of regional scale processes (ROMS / D3D / PISCES) in the SE Atlantic/Benguela as well as in the sub-Antarctic south of Africa. Linked to this is a planned Benguela component in the proposed EU-MEECE project.

Finally, there has been some recent progress in setting up a SOLAS network for southern Africa. Chris Reason and Carl Palmer hope to hold a planning workshop in October 2007, following a meeting that was held on 24 January 2007 at the University of Cape Town. At the January meeting, several presentations were given demonstrating the wide range of SOLAS relevant science going on in the region.

A biogeochemistry workshop is planned in August initiated by students. The presentations will be downloadable from the web. John Field coordinates this activity.

Action: Sylvie to send updated IMBER presentation to John Field.

7.11 United Kingdom

(Report by Carol Turley)

UK Strategic Marine Science Program – Oceans 2025

Oceans 2025 is a new research program funded by the UK Natural Environment Research Council to deliver key strategic scientific goals. It is designed by and implemented through seven leading UK marine centres addressing at a national scale, the challenges of a changing marine environment. We live on a rapidly changing planet. By 2025 - just one generation away - our activities are expected to have a major impact on our oceans, which could cause changes affecting millions of people across the world. Oceans 2025 will increase our understanding of the size, nature and impacts of these changes and address some of the most fundamental issues in marine science. The coordinated approach from the marine centres, with cooperation and input from other government agencies and departments, will improve our knowledge of how our seas behave and how they are changing, and what that might mean not just for our oceans, but for society. Oceans 2025 is a 5 year program and will be critical to developing sustainable solutions for the management of marine resources for future generations. Many of these issues are relevant to IMBER and you can download an overview of Oceans 2025 and participating marine centres on <http://www.oceans2025.org/>

Advances in Marine Ecosystem Modelling Research (AMEMR)

AMEMR seeks to promote the advancement of marine ecosystem modelling science by facilitating discussion and debate about all aspects of model based research through symposia and workshops. Each Workshop will be devoted to one topic, some very relevant to IMBER. The aim is to bring together modellers and experimentalists, established and younger researchers /

students. For further information or to apply to attend a future workshop: <http://www.amemr.info/default.asp>

NERC Thematic and Consortium Programs

Other targeted NERC programs of interest to IMBER are M&FMB, Marine Metagenomics, UKSOLAS, AMT and QUEST.

European Union Seventh Framework Program (FP7)

Scientists in the UK, in collaboration with colleagues in other EU member countries, are busy preparing proposals for the new 5 year funding round. For further information on FP7: http://cordis.europa.eu/fp7/home_en.html. Most of UK marine centres and universities are members of the EU Networks EUROCEANS and Carboceans.

7.12 United States of America

(Report by Mark Ohman and Mary-Elena Carr)

There are no explicit IMBER projects in the US. Ocean Carbon and Biogeochemistry (OCB) has been tasked by NSF, NASA, and NOAA to represent IMBER interests as they relate to ocean biogeochemistry and related ecology. Scientific field and model studies in these areas, and in more general IMBER related areas, are funded by NSF, NASA and NOAA in topics including nitrogen fixation, air sea gas exchange, micro- and macro-nutrient dynamics, and ecosystem function at community, organismal, and molecular levels. NSF recently awarded 19 projects in response to the solicitation for Carbon and Water in the Earth System. The Southern Ocean GasEx experiment (SOLAS) is now being planned for a March experiment with funds from the three agencies. GEOTRACES, a parallel project on trace elements in the global ocean is also being planned, with an initial calibration cruise already funded by NSF.

Mark and Mary-Elena introduced the fundamentals of OCB (mission, goals, implementation and program structure) and they reviewed the US IMBER related activities.

The mission of OCB is to “establish the evolving role of the ocean in the global carbon cycle in the face of environmental change – through studies of marine biogeochemistry and associated ecosystems. It means that OCB includes not only biogeochemical processes, but opens up more widely than earlier programs to include more of the marine ecosystem research community. OCB promotes, plans and coordinates collaborative multidisciplinary research opportunities within the US community and with international partners (OCCC, NACP, SOLAS and IMBER). The scientific goals are to improve understanding and prediction of:

1. oceanic uptake and release of atmospheric CO₂ and other greenhouse gases and
2. climate-sensitivities of biogeochemical cycles and interactions with ecosystem structure.

OCB has identified priorities which are Ocean acidification, Terrestrial/coastal carbon fluxes and exchanges, Climate sensitivity of changes in ecosystem structure and associated impacts on biogeochemical cycles, Ecological-biogeochemical interactions in the mesopelagic zone, Benthic-pelagic feedbacks on biogeochemical cycles and Ocean carbon uptake and storage.

OCB organises workshops and meetings to bring together researchers across disciplines and enhance communication and outreach. The next one will be held in July 2007 in Woods Hole (OCB Summer Workshop, 23-26 July, Woods Hole, MA). Targeted scoping meetings directed toward implementing critical science are planned (Ocean Acidification, Fall 2007, location/dates tbd).

OCB provides data support including submission, management, access and training.

Last OCB is developing a catalog of OCB-related Project Profiles to make people aware of similar science happening.

OCB is implemented through a SSC chaired by Scott Doney, an office and a Data Management Office. The office is headed by Scott Doney. Dr. Heather Benway has recently been hired as Program Coordinator. The Biological and Chemical Ocean Data Management Office is currently accessible through OCB home page, but will eventually have its own address www.bco-dmo.org. It is coordinated by Peter Wiebe and David Glover.

There are two main aspects to the research component – the first involves existing efforts in Ocean Carbon Observing Systems (Repeat Hydrography/CO₂, HOT, BATS, CARIACO, U.S. efforts in CARBOOCEAN, ORION...), the second involves newly-funded and future projects funded by NASA, NOAA and NSF. PI's are encouraged to submit OCB-related proposals to NSF-core and special programs and related NASA & NOAA opportunities. Examples of on going projects are VERTIGO, CARIACO, EDDIES, MedFlux, SOFeX. There is no IMBER project in US. OCB acts as an umbrella entity.

There are number of research projects that are well aligned with IMBER science:

- NOAA: Harmful Algal Blooms, ecosystem forecasting, coral reef monitoring, coastal impacts (hurricanes), C dynamics and inventories, air-sea exchange
- NASA: coupled physical biological modelling, climate modelling, seasonal to interannual variability, air-sea exchange, functional groups
- NSF Carbon and Water in the Earth System: 19 projects were funded, \$38M. The list of program NSF funded program is available online.
- U.S. GLOBEC upcoming Announcement of Opportunity for Pan-regional Synthesis (3 years)

Funding for carbon cycle & biogeochemistry research from NOAA, NASA, NSF (BIO and CHEM OCE)

CAMEO is a project relevant to IMBER. Money will be available in 2008. CAMEO could be an opportunity for IMBER and GLOBEC and could be an IMBER US activity. The leader is Jeff Runge.

Action: Sylvie to inform IMBER SIC Group (SG3) about the Ocean Acidification Meeting (Chris Sabine, Dick Feely)

Action: IPO to find further information on CAMEO and contact the leader Jeff Runge to explore the potential links with IMBER.

Action: Sophie to interact with OCB Data Management office for future US IMBER projects.

8 IMBER Implementation activities

8.1 IMBER Conference 2008

(Report by Julie and Sylvie)

Sylvie proposed a draft programme for the next IMBER OSC Conference possibly held in Rimouski, September 2008. The local organisers would be ISMER (Contact: Serge Demers), Maurice Lamontagne and Institute and University of Quebec in Rimouski. The next steps to take are to identify the conveners, appoint scientific organising committee, Identify themes for the conference, goals and objectives of the conference, develop a budget and develop a conference website.

The SSC was concerned about the difficulty to reach Rimouski which is far from international airports. Moreover, it appeared difficult to define themes for the conference that were not already the center of other events in 2008. It was decided to have an innovative format for this meeting. It would consist of a cluster of three concurrent, co-located workshops. These workshops will focus on specific issues relating to End to End food webs, the Mesopelagic Zone and the Bathypelagic Zone, with a unifying central theme of biogeochemical and ecosystem interactions in a changing ocean. The central theme will underpin short daily plenary activities for all IMBIZO participants. The format has been designed to facilitate integration of marine disciplines.

This meeting will be called the IMBER IMBIZO (Zulu word for gathering or meeting). The structure of the IMBIZO will include the Deep Ocean meeting proposed by Dennis. Output will be special issues, synthesis paper, and rough plans for implementation. IMBER will ask for support from EUR-OCEANS to fund the workshops. Richard Lampitt has been suggested as the Chair of the mesopelagic workshop. Raymond suggested including Data Management issue in this meeting. The aims of this OSC will be as follows:

- showcase IMBER Science
- foster multi disciplinary approaches
- entrain new scientists into IMBER
- provide Data Management training
- develop outreach products

Potential organizers: Coleen, Jing, Wajih, Dennis, Mike, Julie

8.2 Endorsement of projects

(Report by Sylvie Roy)

The SSC discussed how to encourage people to ask for endorsement by IMBER. IMBER should send a letter to the programs to invite them to join us. In this letter, IMBER must explain the benefits of IMBER endorsement and the added-values to being an IMBER project. The existing text must be re-written in a more attractive way and made public. We should include that IMBER will provide advice on Data Management. The two major positive points are: the value for getting financial support, the value to be part of international activity and to gain international visibility.

Wajih and Jay are happy to stay on the endorsement committee.

Action: Sylvie to rewrite the “Benefits of Recognition of IMBER Research” in an attractive way.

Action: Sophie to post the list of Benefits on the web site.

Action: IPO to add the benefit to the endorsement form.

Action: Sophie to make “National activities” / “National contacts” page on the website more attractive and comprehensive (to check with Elena for Oman national contact.).

Action: All to add a slide on “Benefits” on IMBER presentations.

Action: SSC members to actively encourage projects to get endorsed.

Action: All to promote IMBER through national contacts.

Action: All to extend national contacts and keep strong relation with those contacts.

8.3 IMBER Products

Julie asked the SSC to start thinking about IMBER products for the future. The SSC brushed a first list of possible products:

- Major scientific advances
- Data Management for Dummies (guide)
- Role as integrator (legacy: multi/interdisciplinary science)

- Scientific synthesis of long line data
- Scientific papers (searchable under IMBER)
- IMBER special issues
- Synthesis book, synthesis papers, special issues
- Long lasting data portal to data sets
- Scientific training in BGC/Ecosystem integration
- Outreach products (Pub. Articles, educational material, facts sheets, poster, brochures, IMBER update)
- New technology development BGC/ecosystems observations
- Contributions to UNFCCC & IPCC reviews
- Active scientific community in many countries

8.4 Deep Oceans / Mesopelagic workshop proposal

(Report by Dennis Hansell)

Dennis proposed the organisation of an IMBER workshop on the Deep Ocean focusing on deep sea biogeochemical processes. This would include microbiology, genomics, biology, pelagic and benthos, etc. Jack, Gerhard Herndl, Craig Carlson, Ellen Druffel, Javier Aristegui, Roger Francois, Nelson Hogg, Carol Turley were proposed as potential organising committee members. The output would be symposium that would be a special issue and an implementation plan.

It has been agreed that this workshop will be organised in the framework of "IMBER IMBIZO". IMBIZO will be structured around a cluster of 3 workshops, two of which will be focused on "Mesopelagic zone" and "Bathypelagic zone".

Action: Dennis to send Sylvie and Julie further information on Bathypelagic workshop.

8.5 Activities to support and budget

- Continental Margins OSC Sept 07, China
- SIBER writing Workshop Nov 07, India
- CLIOTOP Symposium Dec 07, Mexico
- ICED Workshop late 07, USA
- SIC meeting March 08, USA
- Climate Sensitivity Workshop April 08 France
- Climate Change Conference May 08 Spain
- Upwelling Conference June 08 Spain
- AMEAR conference ? UK
- Human dimensions workshop July 08 Italy
- E2E summer school September 08 Turkey
- OSC September 08 Canada
- High CO₂ conference October 08, Monaco
- SIC WG 2 Synthesis workshop ? 08
- GLOBEC OSC May 09, France

8.6 Budget review

IPO funding

Sylvie reviewed the budget for 2007 and 2008. The IPO has secured funds from CNRS, IRD, Brittany region and UBO until August-September 2008. Funding for the IPO is up for renewal in 2008. This important issue will be discussed at the next Exec Meeting. A meeting of French

funders (Brittany Region, CNRS, IRD, IFREMER) will be organised in conjunction with the Executive Meeting.

IMBER support

IMBER benefits from a SCOR/NSF support off 50K for 2007 and 2008. IGBP is facing financing problem and reduced our block grant of 7% this year. SCOR did allocate IMBER 10K for Developing country travel for the organization of the Continental Margins conference in Shanghai.

Other Funding sources

There are more activities to support in 2007. There is a clear need to find funds for the IMBER activities over the next years. Julie presented a list of the activity to support. In parallel, Sylvie presented a list of potential funding sources and asks the help from the SCC to extend this list. Additional sources were proposed: Sloan foundation and Moore foundation, NSF while being careful not to interfere with our main grant, FP7 for cooperation and collaboration, funds specific for data management (Jay), ESF COST initiative for working group activities.

Expenses decisions

Sponsorship was approved for 2007 is:

- ASI VIII in support for Latin Americans that will be required to write an article in the Newsletter and COPAS. (2K)
- ICED SSC meeting (5K)
- SIBER writing meeting (5K)

Further decisions for funding that were discussed include:

- It is decided to support the Social-ecological symposium (Rome) but revisit the budget to set an amount later.
- It is suggested to approach IGBP and SCOR for support for the writing of the addendum.
- The capacity building committee could review the request for sponsorship. It is proposed that the CB develops a budget to support this kind of activities.

It is suggested to revisit the discretionary budget at the Executive meeting in October. Because of the tight budget we are facing for 2008, it is recommended to support mainly the IMBER WG activities and revisit the budget. The priorities for next months:

1. to support working groups activities (E2E, data management etc..)
2. to support ICED and SIBER Meetings
3. to increase visibility

Action: Jay to forward Sylvie information regarding DM training funds available.

Action: Sylvie to explore further the COST action option.

Action: Capacity Building WG and IPO to develop a budget for CB (including training for Data Management).

8.7 SSC Rotation & New Members

The question of having a member from ICED in the SSC have been raised; this would avoid increasing the IMBER budget for the future SSC meetings. However the status of this member has to be discussed. The suggestion of SSC membership will be sent to SCOR and IGBP by the end of August for approval.

Action: All to send Julie a list of names with country and expertise.

Action: Sylvie to send IGBP and SCOR the suggestions by the end of August.

8.8 Next Executive Meeting

The next executive Meeting will be held in Brest (7-9 October 2007). Chair, vice-chairs, IMBER IMBIZO conveners will be invited to attend this meeting.

Action: IPO and Julie to set up the next Exec meeting agenda and to circulate to SSC for suggestions.

Action: IPO to organise the next Exec meeting.

8.9 Next SSC Meeting

The next SSC Meeting will be held in Cape Town in parallel to the IGBP Congress (5-6 May 2008).

Action: IPO to make block booking in hotel in Cape Town and arrange meeting rooms with the IGBP Congress organizers.