



MINUTES

6th IMBER Scientific Steering Committee Meeting

IOC, Paris
2-5 June 2009

Present:

SSC members and IPO

Javier Aristegui
Ken Drinkwater
Jean-Pierre Gattuso
Niki Gruber
Julie Hall (Chair)
Coleen Moloney
Eugene Murphy
Wajih Syed Naqvi
Hiroshi Ogawa
Katja Philippart
Alberto Piola
Mike Roman (Vice-chair)
Sinjae Yoo
Jing Zhang
Lisa Maddison (IPO)
Sophie Beauvais (IPO)
Elena Fily (IPO)

Invited participants

Keith Alverson (GOOS)
Pierre-François Baisnée - EUR-OCEANS Consortium
Patricio Bernal (Director - IOC)
Emily Brévière (SOLAS)
Wendy Broadgate (IGBP)
Dave Checkley (SPACC)
Albert Fischer (GOOS)
Olivier Maury (CLIOTOP)
Kathy Tedesco (IOCCP)
Ed Urban (SCOR)
Luis Valdes (IOC)
Peter Wiebe (BASIN)

APOLOGIES:

SSC members

Mary-Elena Carr
Carol Robinson

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1. INTRODUCTION

1.1 Welcome by the IMBER Chair

Julie Hall welcomed the SSC members and extended a special welcome to Lisa Maddison (the new IMBER IPO Executive Officer) and the new SSC members:

Alberto Piola - Argentina
Sinjae Yoo – South Korea
Eugene Murphy - UK
Ken Drinkwater - Norway
Katja Philippart - The Netherlands
Hiroshi Ogawa – Japan

Julie emphasised IMBER highlights over the past year which included:

- IMBIZO 1 (Miami, November 2008), consisting of three concurrent workshops (End-to-end food webs, mesopelagic and bathypelagic) that synthesised the science to date and considered the way forward. Papers have resulted from all three workshops.
- Development of Science Plans by SIBER and the Continental Margins Task Team.
- Publication of the ICED Science Plan.

She outlined 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
- Develop plans for IMBIZO 2
- Consider the future structure of IMBER in light of the GLOBEC-IMBER Transitional Task Team (TTT) report
- Review the budget and funding

Julie explained that several visitors would join the meeting each day, including individuals from IOC and members from current GLOBEC projects that could potentially come into IMBER.

1.2 International Project Office (IPO) Update

(Report by Lisa Maddison, Sophie Beauvais and Elena Fily)

Lisa gave an overview of the accomplishments of the IPO over the past year. These include: support for the Working Groups, securing funding, organising meetings and activities, attending meetings on behalf of IMBER and producing products.

Since June 2008, the IPO has been involved in the organisation of the following meetings:

- Summer School IMBER/ EUR-OCEANS, Ankara, Turkey (11-16 August 2008)
- IMBER SSC Executive meeting Miami, USA (November 2008)
- BEER Data integration training Miami, USA (November 2008)
- IMBIZO 1 Miami, USA (9-13 November 2008)
- Second TTT meeting Washington, USA (15-17 December 2008)
- IMBER SSC Paris, France (2-5 June 2009)

Since the last SSC meeting, IMBER has sponsored the following activities:

- Eastern Boundary Upwelling Ecosystems Symposium, Canary Islands, Spain (2-6 June 2008)
- SOCAT 2: Surface Ocean CO₂ Atlas Project, Paris, France (16-17 June 2008)
- Coping with global change in marine social-ecological systems: an international symposium, Rome, Italy (8-11 July 2008)
- Analyses of the interactions between end-to-end marine food webs and biogeochemical cycles: E2E EcoModel Summer School, Ankara, Turkey (11-16 August 2008) *In kind not financial contribution*
- 17th PICES Annual Meeting
- Special Session “*End -to-end food webs: Impacts of a changing ocean*”, Dalian, China (24 -31 October 2008)
- Final GODAE Symposium 2008, Nice, France (12-15 November 2008)

- Second IMBER/GLOBEC Transition Task Team meeting, Washington, USA (14-17 December 2008)
- Workshop on Developing Integrated Marine Biogeochemistry and Ecosystem Research (IMBER) in the UK, Plymouth, UK (8-10 January 2009)
- Coastal CO₂ meeting, Kiel, Germany (22-23 January 2009)

The IPO will be involved in following upcoming activities

- IMBER-SOLAS French meeting, Paris, France (22-24 June 2009)
- Decadal variations of the ocean's interior carbon cycle: synthesis and vulnerabilities, Ascona, Switzerland (13-17 July 2009)
- PICES Eighteenth Annual Meeting: "Understanding ecosystem dynamics and pursuing ecosystem approaches to management", Jeju, Korea (23 Oct-1 Nov 2009)

1.2.1 Endorsed projects

Sophie reviewed the IMBER-endorsed projects. In the past year, 11 projects have been endorsed. The MALASPINA project (Spain) has recently secured funding and will seek endorsement soon. She asked for a volunteer to join the endorsement panel and Ken Drinkwater agreed to do it.

Sophie asked for clarification of what constitutes an 'IMBER publication' and how to ensure IMBER is able to track such publications. It was decided that endorsed and contributing projects should be requested to acknowledge IMBER in all publications and also to enter their publications onto a portal on the IMBER website.

Action: Sophie to ask endorsed or supported projects to include the statement 'This study is a contribution to the international IMBER project' in all publications.

Action: Sophie to set up an accessible portal on the IMBER website for projects to enter their publication lists.

Action: Sophie to request all endorsed projects to include an updated list of publications with their annual report.

1.2.2 Contact list

Elena reviewed the mailing list which she manages and uses to send out IMBER announcements and information. The IPO currently has about 1 400 contacts in about 20 countries.

1.2.3 Carbon off-setting

Elena reviewed several carbon emission offsetting possibilities. Other projects (GLOBEC, IGBP, SCOR) have initiated such actions, but with limited success. Individuals are either reluctant to contribute or distrustful of where the money ends up. It was decided that IMBER should be seen to be doing something in this regard. Voluntary contributions initially, while investigating funding sources that can be used for carbon-offsetting of large meetings. Encourage combined meetings or conference calls or email in lieu of meetings.

Action: IPO to investigate funding sources that can be used for carbon-offsetting.

Action: Elena to obtain ratings of Carbon offsetting companies from Niki.

2. **IMBIZO 2008**

Julie provided background on the IMBIZO - IMBER's flagship for international meetings. The aim is to highlight IMBER research, enable synthesis and identify key questions that need to be answered. Feedback from IMBIZO 2008 was very positive. The format of three concurrent workshops and limiting the number of participants to 120 allowed for interaction and discussion. The themes of the workshops were:

1. End-to-end food webs
2. Mesopelagic
3. Bathypelagic

2.1 End-to-end food webs

Coleen gave an account of the End-to-end food webs workshop, which she co-chaired with Mike Roman. Eugene prepared a short report on the workshop for the EOS article reporting on the IMBIZO. A Special Issue is planned and three submissions have been received to date. Although there was considerable interest in this workshop, the discussions following the oral presentations were not always as successful as they might have been. More focus was needed to address the range of ecosystems and diversity of interests of such a group. Cross-fertilisation of ideas and regional comparisons must be enhanced. Issues raised included: synthesis through comparisons, addressing plasticity and combining models. Simone Libralato (Italy) volunteered to sponsor or host a summer school on different approaches possible in comparative studies.

Action: IPO to follow up with Simone Libralato re sponsoring or hosting a summer school.

2.2 Mesopelagic and Bathypelagic

Julie reported jointly on the Mesopelagic (co-chaired by Hiroaki and Debbie) and Bathypelagic (co-chaired by Denis Hansell and Gerhard Herndl) workshops. Both were very productive workshops, and many of the processes discussed were common to both. Thirteen papers have been submitted to a Dark Ocean (DSRII) special issue. Many of the papers resulted from meeting discussions, not previous research

2.3 Outcome

Future IMBIZOs should have more cross-cutting sessions rather than report back sessions from the workshops. Synthesis papers were produced by both the Mesopelagic and Bathypelagic groups because there was the flexibility to allow discussions to take place and cross-linkages to emerge. Workshop Chairs must ensure focus to ensure meaningful discussion. IMBIZO 1 was well received and there was good global representation. It is a very good networking platform, particularly for young scientists.

The idea of holding a workshop dealing specifically with modelling was considered, but it was agreed that with the diversity of models that exist, many of the outputs are not comparable.

Action: Eugene to find out about the meeting on higher trophic components by Icarus Allen and to distribute the information to SSC members.

3. ANKARA SUMMER SCHOOL

(Report by Jing Zhang)

Jing reviewed the Summer School: *Analyses of end-to-end food webs and biogeochemical cycles* that was held in Ankara, Turkey in August 2008. He acknowledged EUR-OCEANS' financial support. Lectures and practical modelling training simulations aimed to provide participants (21) with an overview of the methods and models that are available. Outcomes included presentations and articles (IMBER Newsletter editorial and End-to end ecosystem food web model). Web-broadcasting of the procedures proved successful. The possibility of buying a license for such a system was discussed. An interactive system would be best, but are expensive. Many institutions provide this capability, but it is often just video-streaming and not interactive. EUR-OCEANS provided it free for the CLIMECO meeting. Future summer schools must provide the opportunity for participants to discuss their research and receive feedback and to network with lecturers and other scientists.

4. WORKING GROUPS

4.1 Continental Margins Task Team

(Report by Jing Zhang)

Jing outlined the tasks of the joint IMBER-LOICZ team. They were:

1. to hold an OSM (which took place in Shanghai in September 2007);

2. to develop a Science Plan to consider how to take the key questions raised at the OSM forward.

A draft Science Plan has been developed by Jack Middleburg and Nancy Rabalais, the co-chairs of the Task Team. Its objectives were to provide an understanding of the interaction between biogeochemical and physical environments and the human dimensions and to present an accurate predictive capacity of continental margins. Several gaps have been identified in the document, however, such as how to integrate the human dimension. It also requires a lot of editing.

Action: Julie to provide feedback on the document to Jack and Nancy.

Although a great deal of research has been done in the continental margins, it is very broad and needs to be synthesized. IMBER-related work in the continental margins needs to be identified and future work must be more focused and priorities developed. It was suggested that possibly a dedicated 'Continental Margins' IMBIZO could be held. Consideration could be given to whether common methodologies and approaches are being applied to the land and sea components and how to move the continental margins science forward.

A small group (Jing, Katja, Wajih and Javier) was tasked to consider how the Draft Science Plan could be used to stimulate the required science and plan the way forward for the next 18 months. They concluded that there are many shortcomings regarding continental margins and their processes. There are several different ideas as to what constitutes 'continental margins', they are relatively poorly sampled and often stretch across several countries.

4.1.1 Research Topics

The document that came out of the OSM is very broad and gives no indication of what needs to be tackled. The group has identified several 'hot' topics for research including: budgeting (global budgets often give very little information about continental margin budgets), the continental margin pump, physical processes, and apparent differences in continental margin food webs.

Wajih suggested that the OSM document be revised to include a section on useful approaches for going forward, or alternatively Katja suggested it be added as an addendum to the document that this small task team have produced.

4.1.2 Continental Margins Going Forward

Julie asked if the group thought that IMBER should have a dedicated continental margins project. Wajih suggested that as the Regional Programmes all have continental margins components a dedicated programme is not necessary. Ken agreed and suggested that the Continental Margins Task Team focus on a specific aspect and draw other programmes in. As some synthesis would be required, Wajih thought that the IMBIZO could bring the different continental margins together. Organising a workshop at the IMBIZO to compare existing data and determine why the differences exist would show which areas require additional work and would also identify ongoing studies to prevent overlap.

Julie asked the group to commit to building on these discussions and develop ideas for the way forward. Katja suggested that at this stage developing a stimulus paper would be a good start for this Working Group. Julie also asked the team to consider role of the IMBER China office which would take the lead with Continental Margins.

Action: IPO to contact LOICZ regarding the way forward with Continental Margins project.

Action: Katja agreed to be the IMBER lead on the Continental Margins Task Team.

4.2 **End-to-end food webs Task Team** (Report by Coleen Moloney)

Coleen summarised the efforts of this joint IMBER-GLOBEC Task Team, which having completed its mandate and produced the two draft manuscripts, was disbanded in 2008. One paper has been

submitted to the Special Issue and is currently under review. The other requires revisions to be completed.

Action: Julie to follow up with Mike St John about the status of the outstanding E2E paper.

Several issues were raised at the first IMBIZO, but no action has yet been taken. Coleen suggested that a group (different to the previous Task Team) be tasked with E2E activities for IMBIZO 2. She proposed holding a topic-focused mini-workshop a few months prior to the IMBIZO to do a comparative study which would provide a synthesis that could feed into the IMBIZO. The team could include people from the regional programmes.

4.3 Data Management Committee (Report by Sophie Beauvais)

Sophie gave an update of the activities of the Committee, which has been very productive. They organised the "BEER – *Being Efficient and Environmentally Responsible*" workshop at the IMBIZO. A data management portal has been set up on the IMBER website and coordinated the development of a metadata portal hosted by GCMD. People are urged to use the portal and to encourage others to do the same. The endorsement form will be revised to ensure that endorsed projects add their data and metadata to the portals.

Action: Sophie to send revised Data section of the Endorsement Form to SSC for comment.

Sophie asked the SSC to endorse the "Cookbook" or Guide to Good Data Management that the committee has produced, so that it can be officially published. She also asked for comments on the draft Data Management Policy as well as the Benefits of Integrated Data Management document. Julie acknowledged the hard work of the group and said that very positive feedback had been received on the usefulness of the "Cookbook" from attendees at the IMBIZO training workshop.

Action: SSC to provide Sophie with feedback on the Data Management Policy, Benefits of Integrated Data Management document and the "Cookbook" by 30 June 2009.

With the possibility of GLOBEC projects coming into IMBER, there are practical issues relating to data that need to be considered. Sophie outlined the need for cruise data (CSR) to be converted into DIF and that funding is required to develop the software. Ed Urban said that SCOR was considering funding the development of software to facilitate such conversions. He also suggested the possibility of hiring a student to convert all the endorsed projects data to DIF. The amount of work, time and expertise required to achieve this is currently being investigated. Ed suggested that IOC or ICES may be able to provide funding for this.

Membership of the DMC needs to be reviewed. Two members (Raymond Pollard and Wilco Hazeleger) are stepping down and need to be replaced. Alberto will consider taking over as Chair after a discussion with Raymond Pollard. Peter Wiebe from BASIN was proposed as an additional member. It was suggested that someone from BICODMO be included. The Terms of Reference also need reviewing. This can be done via email.

Action: Sophie to facilitate the changes in DMC membership and the review of the TOR.

The DMC would like to conduct a 'dry cruise' training session with the Capacity Building group at the next IMBIZO. The idea was well received and it was suggested that it could also be built into future summer schools.

4.4 Capacity Building (Report by Jing Zhang)

Jing stated that the Capacity Building group was set up at the start of IMBER to ensure that capacity building initiatives were included in all IMBER projects. Its mission is to assist developing countries to develop research initiatives and to improve infrastructure to allow IMBER research to be carried out. Current membership of the group needs to be increased and should include more members from developing countries. Julie asked for names of potential members and for suggestions of future

capacity building activities, as well as mechanisms to ensure such activities are included in projects. Several people were proposed: Juliet Hermes (South Africa), John Morrison (Australia), Samina Kidwai (Pakistan). It was suggested that a South American connection was needed

Cooperation with international and regional projects (e.g. IOC/Westpac-CorReCAP, PICES) should be investigated. Wajih asked if there had been any progress regarding the suggestion made at a previous SSC meeting that all capacity building activities (from all the projects) should fall under the 'SCOR umbrella'. Ed responded that the Chair of any project with a capacity building component should be part of the SCOR committee, but that projects should still be responsible for their own capacity-building activities.

Summer Schools have proved to be a good capacity building exercise and plans are underway to hold the next one in 2010 in Brest. Wajih reported that the APN funding proposal submitted for this had not been successful, principally because it is not being held in Asia. He suggested that consideration should be given to holding a summer school in the Asian-Pacific region. Julie suggested that a follow-up at the ClimECO meeting could be a possibility. Ken Drinkwater mentioned that the LME project could be a possible source of funding for capacity building activities.

Action: SSC members to send membership proposals and potential capacity building activity suggestions to the IPO or Jing before 30 June 2009.

Action: IPO to investigate LME as a funding source (contact Ken Sherman).

Action: IPO to contact Corinne Le Quere and Laura Faure for South American suggestions.

Action: Alberto to consider potential South American members.

4.4.1 Brest Summer School

(Report by Sophie Beauvais)

Sophie gave an overview of plans for the Summer School to be held in Brest in August 2010 (preliminary title: 'Ocean and Marine Ecosystems in the context of climate change: dynamics and impacts'). Wendy commented that the proposed topics were too climate change-orientated to attract social scientists and Ken Drinkwater thought that they needed to be more focused to be of benefit to the participants. Sophie pointed out that these were just preliminary topics and that the course committee would revise them to ensure that they were informative and multi-disciplinary. The title also needs revision as the difference between 'Ocean' and 'Marine' is unclear (Javier). Katja asked about the approach that would be used and suggested that perhaps a cruise, allowing a hands-on experience, could be included.

So far the only funding that has been secured is €20k from GIS Europé Mer. The APN funding proposal was unfortunately not successful (see above). Application will be made to CNRS for the 'Thematic Schools' funding. Sophie asked SSC members for other funding suggestions.

Sinjae Yoo mentioned that PICES hold a summer school each year. As no plans had yet been made for next year, perhaps PICES could consider joining IMBER's activity. Julie Hall mentioned that ICES might also want to be involved.

Action: Sophie to report back to the summer school committee.

Action: SSC members to send potential funding sources to Sophie by 30 June 2009.

Action: Sinjae Yoo to explore the possibility of PICES being part of the Brest Summer School.

4.5 **SOLAS-IMBER Carbon Research Working Group**

Julie suggested that the SIC! group needs to be restructured.

Recommendation is to dissolve the umbrella group and for the Chairs of the three working groups to report directly to the SOLAS and IMBER SSCs. The three chairs will also represent SIC! at IOCCP meetings.

This recommendation has been approved by the SOLAS SSC. The IMBER SSC also approved this recommendation.

Action: Lisa to submit reports on Sub-groups 2 and 3 for inclusion the IOCCP meeting. SOLAS to report on Sub-group 1 by 28 August 2009.

4.5.1 Sub-group 1: Surface ocean systems

(Report by Emily Brévière on behalf of Nicolas Metzl)

Are Olsen is taking over from Nicolas Metzl as Chair of SG1.

The need for a surface CO₂ database was recognised at the SOLAS Open Science Conference in Xiamen, China in 2007. The SOCAT database will be released in late 2009. SOLAS are revising the Terms of Reference of Sub-group 1.

4.5.2 Sub-group 2: Interior ocean carbon storage

(Report by Niki Gruber)

SG2's objective is to determine the uptake, transport and storage of anthropogenic CO₂ in decadal timescales. The CO₂-CLIVAR Repeat Hydrology data source is used. Progress has been made in the North Atlantic, Arctic, Mediterranean Sea and Southern Ocean. The second quality control has been completed and the manuscript will be submitted to ESSP soon. PICES regional working groups cover the Pacific and Southern Oceans, and the Indian Ocean should be included in the SIBER effort.

As part of the global synthesis, SG2 are organising the *Decadal variations of the ocean's interior carbon cycle: synthesis and vulnerabilities* workshop at the Centro Stefano Franscini at Monte Verita, Ascona, Switzerland on 13-17 July 2009. The goals of the workshop are to:

1. synthesise ocean observations to estimate oceanic uptake of anthropogenic CO₂ since the WOCE period;
2. identify changes in observation strategies.

Argo-Oxygen Program

Following the rationale that oxygen is very sensitive to global change, a pilot program focusing on oxygen, rather than carbon is being developed - Oxywatch O₂ (putting oxygen sensors on ARGO floats). A White Paper, finalised in 2007, has been approved by the ARGO SSC. An FP7 proposal was submitted, but as yet the program is not funded.

The ad hoc group "Friends of O₂ on Argo" are interested in becoming an official IMBER task team, as this would give the program a higher profile. Potential challenges could arise when current monitoring activities are stepped up to operational activities. There was no objection to endorsement of the program.

Niki will give the keynote address at OceanObs 09.

Action: Niki to investigate the possibility of incorporating IMBER into the CO₂-CLIVAR Repeat Hydrology data source.

Action: IPO to revise the Terms of Reference of Sub-group 2 in conjunction with SOLAS and the SG2 Chair, Niki Gruber.

4.5.3 Sub-group 3: Ocean Acidification

(Report by Jean-Pierre Gattuso)

This group has yet to be formed but as ocean acidification is a 'hot topic' Jean-Pierre considers that it is important to establish the group to coordinate and synthesise the work being done. The Executive Board of EPOCA is happy for EPOCA to be used as a basis, once Terms of Reference have been developed and a level of commitment shown. Jean-Pierre agreed to Chair this group once funding for activities has been secured.

Julie Hall commented that SOLAS and IMBER would jointly apply for funding to take the group forward. Ed Urban suggested that NOAA might be a source of funding.

Action: IPO, in collaboration with SOLAS, to revise the Terms of Reference of Sub-group 3 together with the sub-group Chair, Jean-Pierre and send to the SSC for comment.

Action: IPO to budget for the first meeting of the group early in 2010.

5. CONTRIBUTING AND REGIONAL PROGRAMMES

5.1 EUR-OCEANS Consortium: Continuing the collaboration

(Report by Pierre-François Baisnée)

Pierre-François described the new “tools” that the Consortium has adopted for its funding strategy. These include: *Flagships* (awarded competitively to institutions to lead the advancement of a ‘hot’ topic in marine science), *Foresight* workshops (focusing on new topics) and Gordon-like conferences. EUR-OCEANS has pledged €10K for the IMBER IMBIZO.

Julie acknowledged EUR-OCEANS contribution to IMBER and hopes that the collaboration with EUR-OCEANS will continue.

Action: Summer School committee to consider if this could be a potential source of funding.

5.2 CARBOOCEAN

No representative from CARBOOCEAN was present and no points for discussion were raised from the report sent in by Christoph Heinze.

5.3 IOCCP

(Report by Kathy Tedesco)

Kathy gave an overview of the project which focuses on carbon observations. It includes GO-SHIP - the two year advisory panel, and various SOCAT activities. IOCCP has formed partnerships with both IMBER and SOLAS. Javier and Niki both raised the issue of the need for standardisation to ensure that not only inorganic, but also organic carbon is measured on long cruise transects. Kathy questioned if there should be a representative from the SIC working groups on the IOCCP committee. Niki agreed that each Sub-group should be represented.

5.4 IGBP report

(Report by Wendy Broadgate)

Wendy reported that IGBP has a new Executive Director (Sybil Seitzinger) and a new Director of Communications. The programme has recently been reviewed by its sponsor, ICSU. IGBP is currently developing a strategic vision and priority actions. The next phase of the programme (2009 – 2013) will include a synthesis of the core projects (initial synthesis topics were presented). An OSC is planned for 2012: Planet under Pressure: New knowledge, New solutions. Fast Track initiatives include one on Upper ocean nutrient limitation which links to IMBER.

Mike asked whether IMBER would need to write a proposal requesting the funds that IGBP currently provides to GLOBEC, but Wendy explained that money was only provided for SSC meetings. Niki asked if during the visioning process the global environmental change programmes could be merged. Wendy agreed that it was a possibility if, on examination, the science warranted such a structure. This is currently under examination by ICSU.

Action: IPO to give feedback on newsletter distribution preference (hard copy or electronic).

5.5 SCOR

(Report by Ed Urban)

Ed mentioned the possibility of IMBER interacting with some of the SCOR Working Groups such as ‘OceanScope’ and ‘Microbial Carbon Pump in the Ocean’, as well as the potential for interaction on planned GEOTRACES cruises (see <http://costaction.earth.ox.ac.uk>).

A proposal requesting funding for IMBER (US\$50K per annum) for the next three years has been submitted. US\$7.5K for developing country travel was also available in 2009.

Action: Carol Robinson to represent IMBER at GEOTRACES meeting to discuss bringing biogeochemistry onto cruises.

5.6 CAMEO

(Report by Mike Roman)

Mike described the Ocean Carbon and Biogeochemistry OCB of this programme as the USA's contribution to IMBER (www.us.ocb.org) and encouraged people to attend IMBER-related workshops. Although this is a US-based programme, the projects are often basin-based and hence could be of relevance to IMBER scientists not based in the USA. Julie Hall believes that it will be good to increase IMBER's collaboration with CAMEO. They are already working with ICED and have supported some SIBER work. The OCB could also provide support for the IMBIZO. Mike Roman and Mary-Elena Carr will represent IMBER at the OCB.

6. IMBIZO II

It was hoped that IMBIZOs would be held annually. Unfortunately, we are too late for this year, but we hope to hold the next one in September or October 2010. Discussions on the topics for IMBIZO II are ongoing but it is hoped that consensus will be reached by the close of the meeting.

7. THE WAY FORWARD FOR IMBER

Julie introduced the topic by suggesting that consideration be given to whether IMBER's approach should be a broad one on a range of issues, or more focused on only a few issues. Consideration also needed to be given to the Regional Programmes currently under GLOBEC that could potentially join IMBER – whether to invite them to join or not. Decisions would also need to be taken on how to manage the process of incorporating them (e.g. funding, timelines, approval of science plans, data management).

The Transition Task Team (TTT) commissioned by SCOR and IGBP to consider the second phase of IMBER, has recently completed its report. Mike (who together with Ken represented IMBER on the TTT) outlined its recommendations. These include: using a comparative approach, emphasis of integration and synthesis, and support for the Regional Programmes. Some areas, such as the 'human dimension', require more emphasis. It was suggested that IMBER would need to extend beyond its originally planned 10-year lifespan to accommodate the Regional Programmes that will continue post-2014. Wendy commented that IGBP could not consider an extension at this stage until IGBP knows more about the future of global environmental change programmes within ICSU and hence the future of IGBP. This is being defined in the next 18 months in a series of visioning meetings led by ICSU.

8. REGIONAL PROGRAMMES (EXISTING AND POTENTIAL)

8.1 Climate Impact on Top Oceanic Predators (CLIOTOP)

(Report by Olivier Maury)

CLIOTOP (2005-2015) aims to provide a global comparison of oceanic ecosystems functioning to develop reliable predictive capacity. Its Science Plan has been approved by GLOBEC. It has five Working Groups. The CLIOTOP SSC has taken the decision to join IMBER when GLOBEC ends.

GLOBEC currently provides funding (\$35K in 2009) for workshops, publications and secretariat tasks. Olivier said that a request for preliminary funding (totalling \$42K) would be made to IMBER for activities in 2010. This would include funding for four workshops for the Working Groups (approximate \$8K each), and \$10K for a mid-term workshop. Mike asked if other funding sources had been investigated. Olivier said that the FAO was a possibility, but that no approach had yet been made.

Niki asked about the coupling between high and low trophic levels and if linkages with biogeochemistry have been explored. Olivier replied that the focus has been on fisheries, with CLIOTOP bringing people working in different regions together. An ecosystems workshop for regional fisheries organisations was organised to encourage a global approach.

Eugene suggested that not all Regional Programmes can approach IMBER goals in the same way and suggested that each needs to be considered individually.

8.2 Ecosystems Studies of Sub-Arctic Seas (ESSAS)

(Report by Ken Drinkwater)

ESSAS (2005 – 2014) focuses on comparative studies of the impacts of climate variability and change in high latitude ecosystems. Science and Implementation Plans were published in 2005. It has four Working Groups and several national and multi-national projects. Although biogeochemistry is included in some projects, Ken acknowledged that this needed to be increased.

Julie will make a presentation at the next ESSAS SSC meeting, following which they will decide whether or not to accept the invitation to join IMBER.

8.3 Integrating Climate and Ecosystem Dynamics in the Southern Ocean (ICED)

(Report by Eugene Murphy)

ICED is currently a project of both IMBER and GLOBEC and has partnership with EUR-OCEANS. It aims to determine the main control of Southern Ocean ecosystem dynamics and potential for feedbacks as part of the Earth system. Its Science Plan was published in 2008. The mid-term review workshop is planned for 2013.

Action: Elena to send Nadine the new IMBER logo as they appear to still have the old one.

8.4 Sustained Indian Ocean Biogeochemistry and Ecosystem Research (SIBER)

(Report by Wajih Naqvi)

SIBER is a regional initiative under IMBER and GOOS and focuses on observation and modelling studies in the Indian Ocean. The second draft of the Science Plan and Implementation Strategy has been sent to Julie for review.

Alberto pointed out that the marginal seas could have a dramatic impact on the biogeochemistry of the Indian Ocean and asked how those countries that do not have observational programmes are integrated. Currently Oman is the only other country doing time-series observations, but Wajih hopes that other countries will follow suit. Ed suggested that national contacts in these other countries should be identified and also that links with GEOTRACES cruises later this year should be forged.

Olivier raised the question of piracy which is having a significant impact on the fisheries in this region, but Wajih confirmed that no Indian research vessels had ever come under attack.

8.5 Basin scale Analysis, Synthesis and Integration (BASIN)

(Report by Peter Wiebe)

BASIN aims to integrate and synthesise existing basin-wide datasets and to improve biophysical modelling to simulate and understand population structure. The focus is on shelf seas and the open ocean. GLOBEC discussions regarding the programme started in 2000 with an EU-funded meeting. The Science Plan and Implementation Strategy were published in January 2009. It is a two-phase programme – the first, collecting and synthesising the datasets and modelling in a more holistic manner, and the second phase will involve data acquisition and management applications.

The interim committee is jointly funded by the EU and NSF and will continue thus until the programme secures funding. Peter described the funding constraints facing BASIN. An MOU signed between the NSF and the EU to provide international projects with umbrella funding has proved to be an impediment rather than a help. European proposals require the inclusion of USA and Canadian investigators but there is no coordination between NSF and NOAA and it has not been possible to get NOAA scientists involved. Calls are not phased in the USA and Europe and don't have the same requirements. There is a need to solve this difficulty.

Julie asked how the interim committee feels about BASIN becoming part of IMBER. Peter replied that it had not been discussed, but he suggested that a connection with IMBER could assist BASIN with NSF which had previously criticised them for not being part of JGOFS or GLOBEC.

Action: IPO to try and assist BASIN by putting in a joint proposal for funding.

8.6 Small Pelagic Fish and Climate (SPACC)

(Report by Dave Checkley)

SPACC was started as a GLOBEC project in 1994 and its Science and Implementation Plans were produced in 1997. It deals with small pelagic fish using comparative methods and retrospective and process studies. Dave believes that SPACC could play a role directly in IMBER's Themes 1 and 2 or alternatively it could interact via ICES and PICES. Another option would be to introduce a new biogeochemistry theme into the SPACC Plan. Julie questioned how realistic this was. Although the SPACC SSC had not discussed it, Dave felt that there was a willingness to be adopted by IMBER and that as the structure was already there it would be fairly easy to revamp the Terms of Reference and include a biogeochemistry component.

8.7 Forecasting and Understanding Trends, Uncertainties and Responses of North Pacific ecosystems (FUTURE) – a New PICES Project

(Report by Sinjae Yoo)

FUTURE (2009 – 2019), a project of PICES does not have plans to come into IMBER, but it does have strategic links with IMBER and IMBER was involved in its development. Its Science and Implementation Plans were published in May 2009. Future builds on the CCCC project and includes global change and incorporates the human dimension as it extends into the coastal areas. It is planning to hold a science symposium early in 2010. Julie asked the SSC members whether or not it should be considered as a contributing project of IMBER.

9. FUTURE OF IMBER

Following the presentations by the Regional Programmes, Julie asked each SSC member for their opinions on incorporating the Regional Programmes into IMBER and suggestions on the way forward for IMBER.

Eugene was in favour of including the GLOBEC Regional Programmes and that in each instance forecasting and prediction were essential components. He suggested that cross-cutting areas should be increased. He recognised that most of the new programmes need to include or increase biogeochemical aspects. Funding could be an issue as some will require seed funding that GLOBEC has provided.

Javier emphasised the need to integrate the new projects into IMBER, not by prescribing the type of science that they do, but ensuring that it fits into the programme.

Wajih is in favour of the comparative approach and considered the Regional Programmes as a good way of tackling large issues in manageable pieces.

Ken supports incorporating the Regional Programmes as they will increase IMBER's geographical coverage. However, he stressed the need for IMBER to consider the time available and to decide what can be done within the limited timeframe. Funding is also important as, for example, ESSAS received \$30K from GLOBEC annually. This will put a lot of demand on IMBER. Using a comparative approach will allow IMBER to compare between systems (GLOBEC did a lot of within system comparisons).

Katja favours the Regional Programmes but is concerned about the criteria that will be used to decide whether or not to include them. Not every programme needs to aim to achieve all aspects of the IMBER goal. IMBER's role is to facilitate integration at all events – IMBIZOs, cruises, field experiments, meetings. The synthesis should be overarching for all Regional Programmes.

Olivier agreed with Ken and Eugene but considers that the human dimension cannot be excluded. He considers Earth System modelling as the way forward. Feedbacks are of great importance and hence

he suggests a joint working group with CLIVAR, CARBOOCEAN and IMBER. Links with DIVERSITAS should also be strengthened. Such linkages will help to fill gaps.

Jing thought perhaps that the IMBER Vision needs to be restructured to take into account the new programme structure. IMBER's core projects are important, but it could benefit by incorporating GLOBEC's programmes. A Working Group dealing with the human dimension component would improve the Implementation Plan and assist with the synthesis of basin or regional studies. It will be important for the IPO to develop collaboration between the programmes.

Alberto considers the goal to be very ambitious. Although he acknowledges that the Regional Programmes are an essential part of IMBER, there are many gaps that are not covered and IMBER needs to identify these ecosystems and regions.

Niki agreed that strategically IMBER probably should take on the new Regional Programmes, but cautioned that the ongoing science should not 'suffer' as a result of the large operational costs that IMBER will be faced with. He does not believe that it is realistic to expect CLIO TOP to include a biogeochemical component.

Although Sinjae acknowledged the importance of Regional Programmes to achieve geographic coverage, he is concerned that integration and comparison of results will be difficult due to different regions, different scientific foci, different scales, etc. IMBER will therefore have to coordinate and establish comparable methodologies.

IMBER's role, according to Coleen is integration and synthesis. Consequently, it needs to focus some of the key questions and guide the programmes towards these. The TT report mentioned the need to continue holding IMBIZOs regularly. This could be a way to bring regional and national programmes together.

Hirochi was concerned about the balance between biogeochemistry and ecosystems and comparative analysis of regional differences of the biological pump, as well as the vertical transfer of organic matter.

Mike sees the value of the Regional Programmes but is concerned that the IMBER goal might not be achieved. If programmes leave out some of the IMBER themes it will be very difficult to integrate them at a later stage. Science Plans need to be amended to have a conceptual framework and Terms of Reference must be developed between IMBER and the Regional Programmes. The IMBER SSC could work with the SSCs from the programmes to develop cross-cutting themes.

GLOBEC is in a Pan-Regional comparative phase and consequently, Peter suggested that IMBER needs to put in considerable effort at the integration stage to ensure the modelling, synthesis and comparison will be possible.

Dave stated that the comparative method proved its worth with GLOBEC and so he encouraged IMBER to adopt it. However, as existing programmes will come with a certain amount of 'baggage', he suggested that only mutually beneficial programmes should be considered for inclusion.

Julie summarised by saying that there appeared to be consensus regarding acceptance of the Regional Programmes, although there was some hesitation about accepting programmes that do not include biogeochemical and ecosystem aspects. There was also some hesitancy because of the increased financial pressure on IMBER. There are some possibilities to alleviate this, however. The consortium of French agencies that fund IMBER made allowances for a second phase to coincide with the end of GLOBEC. This will provide a salary for an additional person at the IPO. There will be discussions with GLOBEC to determine how funding for its programmes can be transferred should they join IMBER. Mike has already had a meeting with NSF in this regard. Ed said that currently GLOBEC receives \$85K from NSF which is probably the maximum amount that IMBER could expect to receive. Working on the next round of the COST-Action proposal could also help to support a European component. There is also the possibility of establishing a sub-office at Jing's institute in China, supported by the Normal University. The China office will coordinate the continental margins initiative.

Decision: The IMBER SSC decided that it would be appropriate to invite all the IMBER- related GLOBEC regional programmes to join IMBER.

Action: Lisa and Jean-Pierre to confirm with the French consortium that the addition salary will be forthcoming.

Action: Lisa and Carol Robinson to work on submitting a COST-Action proposal.

Action: Julie to draft a letter regarding the expectations and relationship between the Chinese sub-office and the IPO.

Action: Julie to go to Shanghai to sign the contract with the Normal University for the IMBER China office.

9.1 Way forward for IMBER

Julie summarised that IMBER's legacy is based on integration, synthesis and comparative analysis. She listed numerous ways of achieving this and asked what the best approach would be. If it includes accepting the GLOBEC programmes, what is expected of them, how will it be funded, what is the most appropriate structure for IMBER? Katja thought that it was important for criteria to be established against which the programmes could be gauged. Niki agreed that each programme should be reviewed and accepted only if it fits into IMBER.

10. REGIONAL PROGRAMMES

10.1 Criteria

Julie brought the discussion back to the Regional Programmes and criteria for gauging their suitability to become IMBER programmes. Suggested criteria:

- basin - to subsystem-scale;
- multinational;
- preferably have Science and Implementation Plans that can be approved by IMBER;
- some form of scientific integration;
- interdisciplinary;
- fills an existing gap.

The benefits that IMBER offers to Regional Programmes were also discussed.

Action: Lisa to circulate the Criteria for and Benefits to Regional Programmes before the GLOBEC meeting.

10.2 Examination of Potential Programmes

Each potential Programme was then considered.

ICED AND SIBER

ICED and SIBER have already been accepted by IMBER. The second draft of the SIBER Science Plan was available for review.

Action: SSC to give Wajih and Raleigh Hood feedback on the themes of the SIBER Science Plan by 30 June 2009.

CLIOTOP AND ESSAS

CLIOTOP and ESSAS are both existing programmes with Science Plans approved by GLOBEC. There was general agreement that both would bring value to IMBER. Niki was impressed with CLIOTOP which is a global programme and very focused. It will soon undergo a mid-term review and have requested IMBER input. They have committed to come into IMBER.

Niki pointed out that ESSAS needs more biogeochemistry and to extend further into the Arctic in order to meet IMBER's objectives. Ken was not sure that this was feasible, but suggested that perhaps some of its ice and phytoplankton work could be expanded to meet this need.

BASIN

BASIN is not funded and its Science Plan has not yet been reviewed. Although it could potentially be beneficial to IMBER at this stage it was decided that Julie would start discussions with them but that no further action would be taken until the project was funded.

SPACC

This is a mature project that is due to end with GLOBEC. If it were to come into IMBER it would need to redevelop its Science Plan. There is willingness among the group and they will discuss this with Julie at the GLOBEC SSC meeting.

11. TIMELINE

IMBER is due to end in 2014. CLIOTOP also ends in 2014, and ICED and SIBER will finish in 2020. It was agreed that IMBER would therefore need to be extended until 2020. Ed said that a rationale needs to be sent to the sponsors stating why IMBER cannot achieve its goals by 2014. If they approve the extension, the new end date will be final. Wendy stated that any extension would depend on the outcome of the ICSU visioning process.

Action: Mike to send a document outlining when programme products are expected.

Action: Julie to work with others on the rationale for extending IMBER's end date for SCOR and IGBP to consider.

12. WAY FORWARD CONTINUED

12.1 Structure of IMBER

Julie asked for ideas on the structure of IMBER to ensure that integration, synthesis and comparative analysis are indeed achieved. Coleen said that it needs to link into predictive capability. Niki suggested that IMBER could initiate a global effort to consider this, perhaps developing a Future Ecosystem Assessment group with links to CLIVAR's modelling development team and PICES-ICES and EUR-OCEANS that also have this as a major theme.

Eugene identified two major elements for driving the programme forward:

- Integration and analysis;
- Projection and forecasting.

Dave agreed that these will be valuable to the Regional Programmes as it will force them to consider the information required to be able to make projections. The notion of projections will also unify the programmes within IMBER. Katja stated that comparison parameter values will focus what needs to be compared to achieve projections, and that the basis of the forecast will be comparative analysis. Julie was concerned that this would be limited to lower trophic levels and biogeochemistry, but Coleen pointed out that this would not be the case if scenarios are also considered. She also suggested that this should not be limited to modelling approaches only. Niki suggested that a task team be formed to develop Terms of Reference to consider the impact of global change on ecosystems. Consensus was reached and Julie asked the Task Team members (Niki, Coleen, Eugene and Ken) to consider very specific questions and outcomes.

Action: Task Team to meet and consider details of how to incorporate integration, synthesis and comparative analysis into IMBER science and report back to the SSC on Friday.

13. COUNTRY REPORTS

13.1 China (Report by Jing Zhang)

The five-year IMBER-GLOBEC Marine Dynamics project is now in its third phase. Results include identification of the different microbial species of the region, understanding the phytoplankton blooms as organic resources, as well as the division of the fish into functional groups. A sustainable multi-trophic aquaculture model based on seasonal field investigations has also been developed. There are also several national projects. There is an active IMBER-GLOBEC community and it is hoped that IMBER-China will start next year.

13.2 Japan (Report by Hiroshi Ogawa)

The Population Outbreak in Marine Life (POMAL) project is an IMBER project. The focus is on cruises that consider the integration of biogeochemical cycles. There are two more planned during the next three years. There are two other IMBER-related projects: SUPRFISH AND STOPJELLY.

13.3 South Africa (Report by Coleen Moloney)

There are currently no formal IMBER projects in South Africa. The science is ecosystem focussed with several transdisciplinary projects bringing in the human dimension.

13.4 Korea (Report by Sinjae Yoo)

There are no formal IMBER projects although about ten current projects could be IMBER-related. There is a GLOBEC committee comprised of members from China, Korea and Japan. The next symposium of the group will be held in Korea and they will consider transforming it into an IMBER-related group and establishing a Korean IMBER research project. Sinjae invited Julie to attend the symposium.

13.5 France (Report by Jean-Pierre Gattuso)

There is no French IMBER committee but there are several small-scale IMBER-related projects. CYBER has submitted several proposals for IMBER-related projects. The SOLAS-IMBER meeting for the French community is scheduled for 22–24 June 2009 in Paris.

13.6 New Zealand (Report by Julie Hall)

There is an IMBER endorsed project involving a fisheries cruise looking at end-to-end food webs.

13.7 Argentina (Report by Alberto Piola)

There is no organised IMBER group in Argentina but much of the science being carried out in the south-west Atlantic, mostly at the fisheries level, is IMBER-related. There are several regional projects being undertaken with Brazil and Uruguay. Brazil is doing work on CO₂ and several continental margins projects are underway in Chile.

13.8 The Netherlands (Report by Katja Philippart)

There are no IMBER projects in The Netherlands, although there are numerous marine and estuary projects.

13.9 Norway (Report by Ken Drinkwater)

There are no official IMBER approved projects. ESSAS is involved in several climate projects. Ken believes that there are possibilities for IMBER as there is a lot of regional and European funded work happening, including biogeochemistry.

13.10 India (Report by Wajih Naqvi)

SIBER recently organised a national workshop where a national committee was established. This could become a national IMBER committee. There are plans to submit regional programme proposals to the ministry.

13.11 Spain (Report by Javier Arístegui)

There are no specific IMBER projects, but there are many related activities. The most relevant include: MALASPINA – a five-year global circumnavigation exploration of global change and biodiversity of the oceans, FAMOSO, SUMMER – a surface mixing modulation, and LUCIFER. Two symposia were held

recently: the *International Symposium on the Effects of Climate Change on the Worlds Oceans* and the *Eastern Boundary Upwelling Ecosystems Symposium*.

13.12 **UK** (Report by Carol Robinson)

Carol is encouraging the development of IMBER science in the UK and recently held a meeting as a precursor to getting IMBER-UK going (see www.imber-uk.org). Several session reports relate to the IMBER themes. There has been an 11 million GBP call for proposals on Ocean Acidification. IMBER science in the Arctic is developing and several aspects in the Southern Ocean are linked through ICED.

The endorsement of the Oceans 2025 project will bring lots of IMBER science. Julie acknowledged the increase in the number of IMBER-related activities and encouraged SSC members to utilise the endorsement process for projects.

14. OTHER PROJECTS

14.1 **CLIVAR** (Report by Ereno and Cattle presented by Niki Gruber)

CLIVAR is a WCRP project for predicting changes in climate to benefit society. It considers anthropogenic change and decadal variations and links to IMBER mainly through model development.

There have been numerous joint activities (e.g. ClimeCO in 2008) and several more are planned, e.g. CLIVAR Scientific Conference in 2011/12 and the IMBER-sponsored GSOP OceanObs. The Southern Panel is interested in establishing links on issues such as carbon cycle changes, ocean acidification and ecosystem changes (ICED)

Action: Eugene and Niki to establish links between ICED and the Southern Ocean Panel.

14.2 **GODAE** (Report by Niki Gruber)

GODAE deals with bridging models and observations. Planning for next phase of the project (GODAE-OceanView) is currently underway and the group is keen to link with IMBER and would appreciate feedback from IMBER modellers on the quality of their products. The previous IMBER-GODAE Working Group has been dissolved and will be absorbed into the new MEAP Task Team which will focus on short-term predictions. Julie questioned how practical this will be for IMBER considering the narrow focus on observations modelling.

Action: IPO to facilitate communication between IMBER and GODAE.

15. LINKS WITH OTHER ORGANISATIONS

15.1 **IOC** (Report by Luis Valdes)

Luis described the IOC's medium-term (2008-2011) strategy and suggested that the strongest link with IMBER is the HLO₃ project that deals with the mitigation of impacts of, and adaptations to, climate change and variability. He anticipates that there will be several areas for collaboration (e.g. ocean acidification) and will seek IMBER input where appropriate.

15.2 **GOOS** (Report by Keith Alverson)

GOOS coordinates sustained ocean observations and currently has a coastal and a climate module. There have been several pilot projects, including the successful ARGO. A Southern Ocean observing system is planned. However, it is difficult to sustain the system. So far, the focus has been on climate and adapting to climate change, but climate is not the only factor causing global change and other factors considered by programmes such as CLIVAR and IMBER need to be incorporated. There have been problems in implementing global GOOS.

Julie asked how IMBER could assist GOOS. Keith suggested by helping to bridge the divide and getting the community involved.

15.3 OceanObs *(Report by Albert Fisher)*

The Ocean Observing System for Climate systematically observes the upper 1500m of ice-free regions for temperature and salinity.

The first international conference was held in 1999. OceanObs conferences are based on community contributions via White Papers and many of the views expressed in these relate to biogeochemistry and ecosystems. That said, there are gaps in the IMBER community White Papers and Albert requested additional contributions (e.g. biogeochemistry and ecosystems posters) before 1 July 2009. This is an important link for IMBER as it presents a platform for three related community fora: biodiversity, biogeochemistry and ecosystems. Niki Gruber would lead the biogeochemistry session and Julie is on the planning committee.

15.4 PICES *(Report by Sinjae Yoo)*

PICES has requested funding for a joint IMBER-PICES session (Climate Change on Fisheries) at the next annual meeting which will be held in the USA in April 2010. Papers will be published in a Special Issue in ICES Journal of Marine Science. There is a joint ICES-PICES Working Group and a joint PICES-ICES-FAO Symposium is planned.

16. IOC Overview

(Report by Patricio Bernal)

Patricio Bernal, the Director of the IOC gave a brief presentation describing the regular assessments that are undertaken on the state of oceans, including the human dimension and provides considerable socio-economic information. See: www.unga-regular-process.org/. The scientific community needs to be aware of this process. It is meant to be a cooperative effort. IOC translates the best science available for policy makers. Julie commented that IMBER needs to consider how best to contribute to the assessments.

17. WAY FORWARD FOR IMBER CONTINUED

(Report by Coleen Moloney on behalf of Task Team)

Following on from the previous discussions, Coleen summarised that the main activities of IMBER going forward need to be:

- Global synthesis involving regional comparisons to provide a greater understanding of the oceans
- Projections and forecasts

The research framework shows the complexity of questions that need to be answered. These will need to be prioritised as it is impossible to do everything.

17.1 Regional comparisons

Activities are needed that will give answers to global issues through ongoing synthesis amongst the Regional Programmes and other IMBER (and non-IMBER) projects. Coleen suggested forming a SSC sub-group to lead the integrated synthesis effort.

Action: IPO to work with SSC to establish a task team to lead the synthesis effort.

17.2 Forecasts and projections

A SSC Task Team should be formed to plan and coordinate projections for ocean ecosystems. Two aspects need to be developed in parallel: an AIMES-IMBER "OCMIP" (Ocean Carbon Model Intercomparison Experiment) type exercise and regional analyses based on AR4/5 projections. As there are so many issues and questions, the Task Team needs to provide focus and identify upfront activities that are already underway to avoid duplication. A two-year timeframe is anticipated.

Agreement: The SSC approved the idea of establishing a Task Team to identify existing activities working on projections for ocean ecosystems.

Action: IPO to work with SSC to establish a task team to investigate existing projection projects.

Julie mentioned the AIMES OSC that will be held in Edinburgh on 10-13 May 2010 and suggested that IMBER consider holding a joint session. Niki had previously offered to make contact with AIMES and will investigate this possibility.

Action: IPO to work with Niki to identify prospective Task Team members and to develop Terms of Reference.

Action: Niki to contact AIMES regarding the possibility of a joint session on Theme 1 of their OSC in 2010.

Julie asked for definitions of the terms 'integration' and 'synthesis' and suggestions of how they fit into 'comparative analysis'. Various people suggested that:

- *Integration* is drawing all the information together, undertaking integrated science and producing a product such as a database to represent it.
- *Synthesis* involves extracting the relevant information, incorporating new insights and generalisations, intellectual value and law of nature, followed by an assessment and interpretation to produce, for example, a review paper.
- *Comparative analysis* is the methodology used to achieve synthesis.

This generated considerable debate. Eventually, three suggestions were made for getting from Integration to Synthesis;

1. comparative analyses
2. modelling
3. global integration

Ken suggested that as several SSC members and representatives from the Regional Programmes would be attending the GLOBEC OSC later in the month that this could be a starting point to discuss the issues and possible topics for synthesis.

Action: IPO to distribute definitions of 'integration', 'synthesis' and 'comparative analysis' for comment.

Action: SSC to send suggestions of integration and synthesis topics to Julie by 18 June 2009

18. IMBIZO II THEMES

Julie referred to the topics suggested for the next IMBIZO that were presented in the meeting documentation, and following discussions held during the meeting, she suggested: '*Integration of biogeochemistry and ecosystems in changing oceans: Regional comparisons*' as the overarching topic of the IMBIZO.

As with the previous IMBIZO there will be three concurrent workshops and products will include scientific papers, synthesis papers (IPCC) and outreach products. Coleen reiterated the need to keep the workshop themes very focused or they will attract a diverse group and it will be difficult to develop products.

Julie suggested the following themes for the workshops:

1. Comparison and integration of biogeochemical cycling and food webs across oligotrophic ecosystems – coupling microbial diversity and metabolism to nutrient ratios and organic matter composition.
2. Regional comparisons in ocean stratification, nutrient dynamics and ocean acidification that will derive from climate impacts.
3. Comparison and integration across IMBER Regional Programmes

Javier raised the possibility of including a human dimensions theme. However, following a discussion that Julie has had with Ian Perry, Rosemary Ommer and Astrid Jarre from GLOBEC, she considered that it would be more appropriate to hold a separate scoping workshop (not associated with the IMBIZO). Wendy suggested holding a special session with IHDP as there had been a lot of interest from social scientists at the Stockholm meeting and also at the one in France where Martin Rice (ESSP) made a presentation. The SSC agreed that Julie should set up a Task Team to discuss this possibility with Ian and Rosemary at the GLOBEC meeting. Coleen suggested that Kathleen Miller and John Keesink also be included in the discussion as the existing group was very fisheries-orientated.

Action: Julie to meet with Ian Perry, Rosemary Ommer, Astrid Jarre, Kathleen Miller and John Keesink at the GLOBEC meeting to consider holding a special session with IHDP at IMBIZO II.

Action: Julie to discuss with the GLOBEC Human Dimensions leaders at the GLOBEC SSC meeting about doing a scoping exercise.

19. OCEAN ACIDIFICATION

Jean-Pierre Gattuso gave presentation on Ocean Acidification, which he described as the 'other climate change problem'. One of the gaps that he identified was the effect of Ocean Acidification on fisheries and he suggested that this could be an area for IMBER to investigate.

He pointed out that the open review process of EPOCA's Guide to Best Practice from the workshop which was held in Kiel in November 2008 is open until 15 July 2009. He referred people to the EPOCA Blog on Ocean Acidification (<http://oceanacidification.wordpress.com>) and also to the Special Issue: The Ocean in a High CO₂ World II (http://www.biogeosciences.net/special_issue44.html). A training course on Ocean Acidification Best Practice will be held in Europe later this year.

Action: IPO to put a call for comments on EPOCA's Best Practice Guide into the June edition of eNews.

Action: Jean-Pierre to submit an article on Ocean Acidification for the next Newsletter.

20. CONTINENTAL MARGINS – SUGGESTIONS ON THE WAY FORWARD

(Report by Jing Zhang on behalf of the CM group)

The group recommends that a Task Team be formed and that a stepwise approach is followed.

STEP 1 Preparation of review papers or white papers;

STEP 2 Organisation of a workshop, symposium or IMBIZO to discuss the synthesis results and the way forward.

The Task Team will explore or initiate IMBER Regional Programmes on Continental Margins that focus on integrative and comparative analysis. Ken stated that preparing white papers is a huge task. Jean-Pierre mentioned a series of review articles relating to carbon and nutrient fluxes that have not yet been put into white papers e.g. by Jack Middleburg. Javier responded that most of these papers are based on mass-carbon balance and that there is very little information on fluxes, continental slope transport, how much continental margins contribute to the global carbon budget, etc. Jean-Pierre suggested that Alberto Borges from SIC SG1 should be contacted as he is compiling CO₂ data from continental margins.

Wajih pointed out that there are lots of gaps in the data from many crucial areas and these need to be identified. He also noted that the focus is on physical processes. Julie replied that this would provide a focus for food web structures. Ed mentioned the SCOR working group "Deep Ocean Exchanges on the Shelf" that might link into this activity. (Wajih is a member of this group). The work being done by SPACC and others on upwelling should also be considered.

Julie then summarised the process to be followed. Firstly, a Continental Margins Task Team, which Katja has agreed to lead, will be formed. Both LOICZ and SOLAS (for carbon fluxes) should be involved. A discussion regarding the document produced by Jack and Nancy following from the 2007 OSC followed. It was decided that it should be completed by the Task Team and used as a basis to produce a white paper.

Action: IPO to assist with gathering data and identifying relevant international, national and regional research papers.

Action: IPO to develop Terms of Reference for the Continental Margins Task Team and send them to LOICZ before 20 June 2009.

Action: SSC to send suggestions of members for the Continental Margins Task Team to the IPO.

21. SSC MEMBERSHIP

Julie, Coleen, Jing and Wajih are coming to the end of their second term of office and will be rotating off at the end of the year. Mike and Mary-Elena are both coming to the end of their first term.

Wendy, on behalf of IGBP, requested that the nominations for new SSC members be submitted at the beginning of July, but Julie responded that it would not be possible by then. The search for a new Chair has been going on for more than a year and although many SSC members had been approached, they had all declined. Following discussions with IGBP, the possibility of two Co-Chairs was now being considered. Eileen Hofmann had agreed to be Co-Chair if nominated. Discussions with a co-chair were underway. There was support for both candidates.

Julie asked for suggestions of other nominees, taking into consideration the geographic, gender and developing country balance that needs to be retained. Coleen asked if the Regional Programmes will have representatives on the SSC. Julie preferred to have them as *ex officio* members. However, Jean-Pierre disagreed, saying that the independent view of the Regional Programmes could be lost this way. He also suggested that someone from Germany should be included as they are doing a lot of important work there – he suggested Anja Engel. Javier put forward Pierre Fréon from Peru who would bring both modelling and human dimensions expertise. Wendy agreed that it was important to include a human dimensions person at this stage, but Julie thought that it would be better to allow the Task Team to do the scoping first.

Action: SSC nominee suggestions to be sent to Lisa by 30 June 2009.

22. IMBIZO – FINALISATION OF POTENTIAL TOPICS

Julie summarised the five potential themes that were developed during the previous discussion. As recommendations from the last IMBIZO included having more direct interaction between the workshops, she proposed having cross-cutting themes. Coleen discouraged having a geographic focus, preferring a more general topic with workshops dealing with regions to provide integration.

There was some discussion about the format of the IMBIZO and whether or not to change it. Coleen stated that it offered something unique and it was successful last time, she suggested that it remained the same – plenary with keynote addresses from each topic, three independent workshops and report backs.

The previous structure included an organising committee for each workshop comprising 6-8 people and a co-Chair for each workshop. A small group from the SSC formed the overarching committee. Eugene suggested that the members who were rotating off could perhaps be involved. Julie suggested that Coleen, Jing, Wajih and herself could form the IMBIZO overview group.

Elena gave a comparative overview of several potential locations and the Crete a

quarium and Hellenic Centre for Marine Research in Crete was suggested as a possible venue for the IMBIZO during September or October 2010. No objections were raised.

Action: Julie to develop the proposed topics and membership for each workshop and approach key people to develop the teams to run the workshops.

Action: IPO to ascertain when the ICES and PICES meetings are being held with regard to dates for holding the IMBIZO.

23. COMMUNICATION STRATEGY

Lisa gave a presentation of a new communication strategy for IMBER outlining several suggestions of ways to keep people informed and enthused about IMBER, and to extend our reach to the broader community. She asked the SSC members for suggestions they may have in this regard.

Action: Julie to discuss with the GLOBEC Human Dimensions leaders at the GLOBEC SSC meeting about doing a scoping exercise.

Action: IPO to develop an update sheet with a timeline on IMBER activities at the beginning of the website.

Julie asked that the presentation available to SSC members be updated and improved.

Lisa asked that the IPO be informed of any upcoming events so that promotional material can be sent.

Action: IPO to update the PowerPoint presentation by 19 June 2009.

SOLAS met with funders following their SSC meeting. This proved to be a good process with good interactions, e.g. with the National Academy of Science in Delaware. Mike offered to host the next SSC meeting in the USA to do a similar exercise for IMBER.

Eugene asked about the link between the EU and NSF to do big multinational projects. Ed confirmed that the EU and NSF periodically jointly fund specific projects.

Action: Ed to send list of EU/NSF joint-funded projects to IPO for distribution.

24. BUDGET REPORT

24.1 IMBER support

Lisa reviewed the budget. SCOR is waiting for information from NSF about the grant renewal. The SCOR funds for IMBER should be US\$50K per annum. IGBP funding supports the SSC meeting. The IPO will also receive 40K from the French Consortium.

Jean-Pierre suggested that IGBP should match the support provided by SCOR. However, Wendy explained that IGBP only supports the SSC meeting expenses of all its programmes. It provides more 'in kind' support and scientific steerage. Julie acknowledged the support that IMBER receives from the French Consortium.

Julie acknowledged that it is apparent from the budget report that additional funding has to be found. The funding (25K) allocated to the Regional Programmes is the minimum level of support for regional activities. A concerted fund-raising effort is required.

Eugene asked about the process during the transition phase. IMBER will undoubtedly have additional financial demands and would the funds that IGBP currently give to GLOBEC be available to IMBER. Wendy reiterated that IGBP only supports SSC meetings and that it would be difficult to secure GLOBEC's share. However, she acknowledged that IMBER needs to expand and will have additional expenses and offered to help communicate this to the broader funders. Julie suggested that IGBP fund the SSC during the transition year, until IMBER has managed to secure additional funds. Wendy

will request this from IGBP. Ed acknowledged that there will be transition costs and he will request discretionary SCOR money for this purpose. Jean-Pierre mentioned that the French consortium understood that the IPO will need to increase in size and they are committed to two-phased funding – before and after GLOBEC.

Action: Julie to write to IGBP to request additional SSC funding for IMBER-GLOBEC transition.

24.2 Expense decisions

- Co-funding with SOLAS of IOCCP activities – 10K allocated in 2008 for a non-specific SIC meeting. Transfer 5K for SOCAT meeting.
- Use 10K allocated in 2008 for Continental Margins small writing workshop for Continental Margins Task Team meeting in 2009.
- No more E2E activities planned – remaining 5K is available.
- SIBER request for SSC meeting support. 10K approved.
- Allocate 25K to each Regional Programme for SSC meeting and activities.

The priority for using IMBER funds in 2009-2010 will be as follows:

- IOCCP for SOCAT meeting (5K)
- Co-fund with LOICZ first meeting of the Continental Margins Task Team (10K)
- IMBER representation at meetings (6K)
- Forecasting and Prediction group meeting with approval from Exec. (15K)
- SIC Subgroup 2 Interior Ocean Carbon (10K)
- Co-fund with SOLAS SIC Subgroup 3 Ocean Acidification (7,5K)
- SSC meeting and activities of Regional Programmes each (25K)
- Scoping workshop for Theme 4 Task Team (15K)
- Summer School in Brest (3K)
- Upfront commitment to IMBIZO II (10K)
- ICED Biogeochemistry workshop (10K)
- SIBER SSC meeting co-funded with GOOS (10K)
- PICES 2009 annual meeting co-sponsorship (2K)

There were requests from several organisations (e.g. Austral Summer Institute) for support. Although many of the topics were related to IMBER, Ed questioned the justification for co-sponsoring some of these efforts. Jing stated that IMBER would get far more out of funding its own activities. Others agreed that with the limited resources available funding of IMBER activities and Regional Programmes should take preference.

Policy Decision: Financial support only for IMBER activities.

Action: Lisa to review all available funding sources and develop a funding strategy.

25. NEXT EXECUTIVE MEETING

The next meeting of the Executive Committee will hopefully be held just prior or after the final GLOBEC SSC meeting in November 2009 in Plymouth UK, to reduce the travelling costs and time of Exec. members.

Action: IPO to investigate when the GLOBEC SSC meeting will be held and liaise with the new Co-Chairs of IMBER to find a suitable time and place for the meeting.

26. NEXT SSC MEETING

Mike Roman offered to host the next SSC meeting in Maryland in USA.

Action: IPO to investigate feasibility of holding the meeting in the USA.

CLOSURE

Julie thanked everyone for their participation. She also thanked the IOC for hosting the meeting and in particular Veronique for all her help with the meeting organisation. She also thanked Coleen, Wajih and Jing, who are rotating off the SSC, for their support and contribution to IMBER.

Coleen presented Julie with a gift from IMBER to thank her for her dedication during her two terms as Chair. Wendy thanked Julie for her six years as Chair of IMBER on behalf of the sponsors.

Julie closed the meeting.