

**Minutes of the IMBER SSC Meeting
Plymouth Marine Lab, UK
August 9 – 12 2004**

Present:

SSC Members

Julie Hall Dennis Hansell, Patrick Monfray, Ann Bucklin, Arne Körtzinger, Carol Turley, Colleen Maloney, David Hutchins, Jack Middelburg, Jing Zhang, Raymond Pollard, Wajih Naqvi, Wilco Hazeleger, Claire Hamilton.

Invited participants

John Field (SCOR), Gideon Henderson (GEOTRACES), John Parslow (LOICZ), Nick Owen (PML), Paul Tréguer (EuroOceans), Peter Liss (SOLAS), Roger Harris (GLOBEC), Ed Urban (SCOR), Wendy Broadgate (IGBP)

Apologies:

From IMBER SSC members:

Jay Cullen Hiroaki Saito, Carina Lange

From other invited participants:

Eugene Murphy (ICCED),

Francisco Werner (GLOBEC),

Dave Raffaelli (DIVERSITAS),

Liana Talaue-McManus (LOICZ)

Bob Anderson (GEOTRACES),

Karin Lochte (IGBP)

Monday 9th August

Welcome to Plymouth Marine Laboratory – by Professor Nick Owen, Director of Plymouth Marine Laboratory

History of IMBER – Julie Hall

Julie gave an overview of the history of the IMBER project, starting with the first workshop held in Plymouth, the Oceans Futures Committee and the IMBER Transition Team.

SCOR - Ed Urban

Ed gave an overview of the structure SCOR, the SCOR Committee, and countries represented in SCOR. He outlined the SCOR sponsored large research projects and the SCOR working groups and how these interact with the various projects. There are three new working groups proposed for 2004, of which two are relevant to IMBER.

IGBP - Wendy Broadgate

Wendy gave an overview of IGBPII, and an insight into the new structure and focus of IGBP following restructure within IGBP this year.

Overview of SP/IS reviews from IGBP and SCOR compiled by John Field (SCOR) and Karin Lochtre (IGBP) – presented by John Field

John gave an overview of the review process. The document was reviewed by 8 external scientists representing different sub-disciplines, 3 additional reviews were received from SC members or other Project Chairs. These reviews were then summarised by John and Karin Lochte for IGBP and SCOR, respectively. The IMBER SP/IS was accepted in principle by SCOR and IGBP, allowing the creation of the SSC. The task of the SSC is to take IMBER forward; IMBER needs to learn from the mistakes of past projects to be successful, and needs to building on the available knowledge from these projects.

In terms of the goal of the project, was found to be too broad and not achievable. The SSC is urged to try to rephrase goal to address a narrower aim. We must remember that the SSC will be held accountable at the end of the 10 year life of IMBER for not only what they achieved but what they didn't.

Structure of the Document

The overall document was criticised by reviewers as being too broad and to long, but this is due in part to the document being a combined SP and IS. The document needs to be reduced in size, the Executive Summary needs to be made into a short sharp and punchy document that can be used by policy makers and funding authorities.

In terms of the themes, they were seen as being, logical choices. Some reviewers felt that there were too many directions and questions; while others felt that there were some areas that should be emphasized as flagship activities. It was recommended that size of the written text in Theme 1 needs to be reduced and priorities set especially in issue 2 and 3. Theme 2 was seen as overall being a well focussed theme, while it is was questioned if the smaller questions in Theme 3 would carry weight after the 10 year life of IMBER. A personal suggestion from John was that another Open Science Conference be held in 5 years to review the situation at the end of the GLOBEC project and add more questions if and as required.. Theme 4 was seen as being important but underdeveloped. It is recognised that better efforts are needed to understand the interlinking processes between the ocean and human systems. It is suggested that this theme be developed through joint workshops with GLOBEC, LOICZ, IHDP and Social Scientists in Phase 1 of IMBER.

General Recommendations:

- The document should be shorter!
- Testable hypotheses are developed for each issue.
- Modelling is a central task in the plan, this needs to be highlighted and more thought of how to develop it must be given.
- End to End food webs must also be highlighted
- Extrapolation from point measurements to basin scale should be included

- Measurement protocols and suitability of long-term observatories need to be addressed.
- Review the justification for the domains, are they needed?
- Provide plan(s) for capacity building.
- Supplementary implementation plan will be needed for phase 2
- Justify choice of specific target sites
- Include sediment-water interface exchanges in coastal and deep oceans
- Distinguish clearly between two phases:

Phase 1: First 5 years (joint Exec meetings with GLOBEC)

-For joint activities, planning implementation of phase 2

Phase 2: Second Five Years

- Synthesis and integration plans (cf. “strategy”) need to be planned from day 1 (work backwards from year 10, include AIMES modelling)

Congratulations to the Task Team on an excellent document. Stick to exciting science – this will hook scientists and funding authorities alike.

SSC Comments regarding reviews and the way forward

Structure of the Document:

General overall comment on the document is that it is very broad, but the problem we faced was what to leave out – everything is important! The SP/IS was seen as having too much detail, the volume is not the problem rather the readability of the document. Revising the format of the document may solve some issues, perhaps using better figures, text boxes etc to reduce the volume of text. If the Science Plan and the Implementation Strategy are separated and then partitioned into sections it may make it more user friendly. Guidance can be given as to which section of the document as a whole is going to be most relevant for different audiences.

For example, Programme Managers are unlikely to read the entire document; at most they will read the Executive Summary. So provide them with a prospectus - 5 concise pages in the form of an extended Executive Summary which can be used as a pull out to be given to funding agencies etc. Aim the rest of the document at the Scientists. IMBER needs to sell the document to funding agencies and to the scientists in order to motivate them to get the science done.

Maybe more detailed planning is needed for specific areas such as carbon, i.e. maybe IMBER needs an Implementation plan for specific parts of the document not an implementation plan for the whole of IMBER’s 10 years. Patrick suggested that after the first phase of IMBER (first 5 years) we update the Implementation Plan. If we have a separate Implementation Plan for each phase of IMBER, it gives us the flexibility to develop and change the plan as we need too.

It is important in drawing up the final document that the SSC are collectively held responsible for the document. The document will be measured against what we have achieved with what is in the document.

Domains:

It was pointed out that some history behind the domains IMBER has chosen is needed, perhaps one or two sentences explaining why these domains have been highlighted.

The domains identified were chosen to fill gaps left by previous projects i.e. continental margins fell outside the focus of JGOFS creating a knowledge gap for IMBER to tackle. The subtropics on the other hand have been omitted because studies such as HOTS and BATS are already working in these areas.

The explanations given in the draft SPIS as to why these domains were chosen was not explicit enough for the reviewers, what was written and how it is read maybe the problem. Dennis suggested that someone who was not on the TT write this as it needs fresh eyes to look at it the text and rewrite or fix it.

History behind IMBER:

Some reviewers felt that there was not enough reference to what had been concluded by previous research projects such as JGOFS and WOCE. Some suggested a separate section be put into the document to explain what has been done in the past and what we know needs to be done in the future. A paragraph on history behind IMBER could go into the introduction. State what we have learnt from the past – do we need to refer to past work in a few important places to make reference to JGOFS.

We don't want extensive historical detail but could included a brief comment on the success or what the major findings were of previous projects, illustrating the gaps that have been identified from previous projects.

Suggest that a paragraph is produced with a string of sentences that explain the outcomes and reference various documents and a paragraph on what has been missed out. Perhaps this needs to be a punchy 1 page blurb saying that IMBER builds upon IGBP and SCOR programmes. There are more important reference synthesis documents available, don't the SP weighed down with summaries of what have come before.

One solution to illustrating the history behind IMBER rather than creating more text could be the use of clever diagrams. A few big pictures could show the inputs and gaps and which programmes these came from.

Discussion of Theme 4 (2.00pm conference call to Karin Lochte IGBP SC)

Suggestion that Theme 4 be could be developed as a joint project with all marine core projects, does not seem to be a good way forward, needs real research which needs to be embedded within the programme in its own right.

IMBER needs to make the Human Dimensions topic alive and exciting to have IGBP accept the plan. Theme 4 just stated that we would be bringing together Natural and social scientists; the importance of bringing together these two groups wasn't explained well enough. Need to show why it is so important to bring the Natural and Social sciences together.

There are a number of issues that need to be tackled in terms of theme 4, at present its focus is too narrow, it needs to be a lot broader than it presently is. This theme is a

valuable step forward but we need to define the problems and issues specific to IMBER. In the short term we need to work out how we involve the Human dimensions in the first phase. Using a workshop as a tool to develop IMBER this theme of IMBER is a good idea; Wendy feels that GLOBEC and LOICZ should be involved in some way to help broaden the discussion and place it in context of what these projects are doing.

By starting with a broad workshop IMBER can start to identify issues/topics - possible issues could include: carbon sequestration, nutrient supply, pollution, waste disposal, legal issues, fisheries, sustainable development, cf global carbon project. Some urgent issues have already identified and if it is possible then IMBER should try and push these issues forward. One of the problems is that we have only had natural scientists thinking what could and should be included in the theme. We need a good link between Social and natural science and social/political sectors. It is suggested that a number of people such as ecologists, social scientists, political and law specialist get together and have a workshop to work out good topics of relevance to the Oceans and human society. Funds are needed to host a meeting of these people – the meeting doesn't need to be large, more important is that mix of people is right. One of the most important things which will also be one of the biggest problems is getting the right partners on human dimensions side. IHDP may not be able to provide the right names. We will need to approach people for a list of names people who might be interested and willing to serve on 1 or 2 workshops.

Dave Hutchins suggested that we look at the list of people who Reviewer 7 said should have been referenced in theme 4. Perhaps these names could be used as a starting point of who to involve in discussions along with using other programme networks for suggested participants. We need Biogeochemists, Ecologists and Social scientists to get together and to come up with a summary or a bulleted list of issues to be included, otherwise the social science will get lost in the document. Although getting two different communities to speak and understand the same language could be a mission.

In summary:

1. Remove issues from theme 4
 - Provide a statement that Theme 4 will be developed over next few years and although issues have been taken out this doesn't indicate that these are not seen as being important, rather that these issues have not been developed due to the time taken in needing to get the right people together. Use this theme as a kind of bait to get social scientists interested and involved
2. Find funding for an IMBER/Human Dimensions workshop
 - seek urgent topics
3. Draw on wider IGBP community for names of appropriate people to be involved
 - this is where LOICZ has offered to help identify appropriate people to approach.

Discussion of actions to be taken to revise the SP/IS

It was decided that the SSC members at the meeting would be split into 3 groups with each group having the responsibility of developing the statement of the theme, issues and key questions.

Theme 1: **Coleen**, Ann, Jing, Jack, Raymond

Theme 2: **Carol**, Dave, Dennis, Arne

Theme 3: **Wilco**, Patrick, Wajih

Discussion on Theme 1 – Redistribute the first two issues of Theme 1 amongst the other themes so that focuses on interactions and end to end questions. Elevate some of the bullet points under theme 1 to issues.

1 Biogeochemical Cycles

2 Transfers of matter across ocean interfaces

3 Foodwebs –combining these makes the theme more in tune to IMBER Science

Discussion on Theme 2 –logical Global Carbon drivers are physical drivers, CO₂ and nutrients, SSC believe another was Issue 4. The overall issues stay the same but a 4th issue could be added - relating to the impact harvesting/fishing has on food webs and Biogeochemical cycles.

Discussion on Theme 3 – Discussions indicated that there was very little change needed for Theme 3. Suggested that the wording of Issue 3 be changed from: heat control to heat budget; climate variability rather than large scale climate change; and the use of carbon instead of Anthropogenic CO₂

Discussion on Theme 4 – active decision to remove issues and instead list things that we think need to be studied. Need more discussion with social scientists. LOICZ has offered to assist IMBER in identifying Social Scientists who can assist in the further development of theme 4.

Suggested approach for revision of the document structure: Some themes have long introductions; perhaps put questions in text boxes. Suggest that the introduction to each issue is called a background and put in a text box. Need to be consistent between themes i.e. Question/Text, Question/text or all questions followed by all the text.

Theme Structure

Introduction - (What we know) perhaps remove/reduce draw on current introduction for information what we know

Issues – (what is important, what we know, key gaps) no introduction for each issue, for background information use text boxes.

Question:/hypothesis (What we need to know)

Promising approaches Remove Collaborations for each theme from the Science Plan and include in the Implementation Strategy instead.

Tuesday 10th August

IMBER International Project Office Discussions:

Julie Hall - Have in the past had a good level of support in terms of having an Interim IPO funded part time. Julie thanked IGBP, SCOR and NIWA for there previous support of the Interim IPO Office in New Zealand and also thanked PML for taking up the funding for the next 9 months of the IMBER IPO in Plymouth

Nick Owens - UK

PML have secured funded for a part time post for IMBER IPO officer for the next 9 months. PML is exploring further possibilities for funding the IMBER IPO. Have approached NERC, but premature for IMBER IPO at present, as NERC has been confirming funding for the GLOBEC IPO, which is also based at PML. GLOBEC has been funded as of last week, NERC are in the process of sorting out a formalised procedure for applying for funding for IPO's. PML is also seeking funding from regional development agency.

Julie Hall –Chinese IPO proposal

Summary of the meeting between the Integrated Marine Biogeochemistry and Ecosystem Research project and the First Institute of Oceanography, in Quindao, regarding the establishment of an IMBER International Project Office.

1. The First Institute of Oceanography (FIO) and Integrated Marine Biogeochemistry and Ecosystem Research Project (IMBER) are both positive about establishing an IMBER IPO at FIO.
2. The FIO have offered to provide
 - Office accommodation
 - Computers and Computer support
 - Web site hosting
 - Salary support for
 - i. Deputy Executive officer
 - ii. Data Management/Communications
 - iii. Secretarial and administrative staff (1 or 2)All of the above positions would be Chinese staff.
 - Operational funding for the office up to a value of \$5,000 US to be used at the discretion of the Executive Officer

The current barrier to the development of an IMBER IPO at the FIO is the salary for an International advertised (International Salary) Executive Officer. Professor Yeli Yuan, Director of FIO has agreed to explore options within China for funding to support an Executive Officer. Julie Hall the Chair of IMBER has undertaken to explore other funding outside of China for this position.

3. The possibility of the FIO hosting a GEOHAB IPO was also discussed. The preference of FIO is to host an IMBER Office as the nature of the science in

the IMBER project is more in keeping with the interdisciplinary nature of the research conducted at FIO. FIO would however consider supporting a regional office for both the IMBER and GEOHAB if funding can not be found for an Executive Officer for IMBER either within or outside China.

Patrick – French IPO possibilities

Patrick has looked in France to fund 3 positions, including executive director. CNRS and IRD have shown interest. CNRS might be in the position fund an IPO as they have secured 10 PDRA positions for 2005.

2 positions will be used for AMMA,

2 could be used for IMBER?

Need to look at the feasibility of funding, funding available from April 2005.

IRD might fund be able to provide some support, but won't fund an International Executive Director. Villefranche sur Mer, SED and Brest are possible sites, Space is a problem in VF. It may be possible to get some regional support, Paul Treguer is based at Brest and there is possibility European Institute of Marine Research could have a room that could be put aside for the IMBER office. Patrick will continue to explore options for supporting the IMBER IPO in France.

Links to other projects

Roger Harris - GLOBEC

Roger gave an overview of GLOBEC research and presented a series of suggestions from the GLOBEC SSC as a way forward for IMBER and GLOBEC to work together in the next five years. These suggestions were:

- the GLOBEC and IMBER SSC Executive Committees meet back-to-back or in parallel at same venues. Interaction between IMBER and GLOBEC is needed to plan joint activities such:
- as end-to-end foodweb studies,
- joint regional studies (e.g. Southern Ocean)
- some joint modelling activities -
- plans for integration into earth system studies,
- investigate human dimensions issues
- write addendum to Science Plan for IMBER Phase II
- prepare annual progress report to sponsors on joint activities

John Parslow – LOICZ Opinion

John gave an overview of LOICZ II and also discussed the science approach of LOICZ II. LOICZ I was primarily focussed on synthesis of previously collected data. In Phase II of LOICZ there will be a major hands on approach at regional level. LOICZ II will focus more attention on not just the Bio-physical but Human Dimensions and will be jointly developed with IHDP and IGBP.

LOICZ Themes:

Theme 1 vulnerability of coastal systems

Theme 2 implications of global change and land and sea use on coastal development
Theme 3 anthropogenic influences on the river basin and coastal zone interactions
Theme 4 is fate and transformation of materials in coastal and shelf waters
Theme 5 towards coastal system sustainability by managing land ocean interactions

Theme 4 is relevant to IMBER – Fate and transformation of materials in coastal and shelf waters. LOICZ II Theme 4 Activities (with IMBER):

- Biogeochemical exchanges and processes across the coastal-ocean interface.
- Biogeochemical – ecological interactions in coastal ecosystems.
- Use of global satellite data to support coastal monitoring and prediction.
- Regional Studies – Regional IPO Nodes.

Propose that a joint workshop be held to help identify key processes for IMBER/LOICZ studies, bringing together Biogeochemists, biologists and physicists. LOICZ would like more interaction between IMBER and LOICZ II than LOICZ I had with JGOFS.

LOICZ tends to focus inshore close to coast – IMBER will have strength in upscaling, on the shelf, therefore it is important that there is no gap in the middle.

Comments from Liana Talaue-McManus (LOICZ)

LOICZ has offered to assist in the identification of Human Dimension scientists whose skills are critical in the further development of Theme 4 of IMBER.

SOLAS - Peter Liss

Peter gave an overview of SOLAS and identified key linkages that SOLAS had identified with IMBER. These linkages were:

- Carbon cycling and transformation in the ocean – waiting to have a joint working group with IMBER on this.
- Carbon research coordination
- Dust inputs/trace metal cycles
- N₂O – only a handful of practitioners worldwide

Marine carbon co-ordination – OCPSCG – to be set up will be a combination of IMBER/SOLAS and LOICZ.

SOLAS plan simply encourages collaboration, comparing results etc
Ocean carbon process study coordination group OCPSCG– mix of SOLAS and IMBER SSC's.

GEOTRACES - Gideon Henderson

Gideon presented an overview of the development of the GEOTRACES project and identified. It is 30 years since last Marine Chemistry programme - GEOSECS. Sampling ability has improved over the last 30 years, High resolution distributions allow us to identify sources sinks and internal cycling not evident in a small number of profiles.

We have a full understanding of the cycles of the TEI's (Source, sink, transport, internal cycling) and has been best achieved through integrated global studies.

GEOTRACES is in the process of writing their Science Plan now, and hope to have the first GEOTRACES cruises underway in 2006.

The following were identified by GEOTRACES as potential interactions with IMBER. Interaction with IMBER:

GEOTRACES interacts quite naturally with Theme 1, Issue 1 (and perhaps Theme 2, Issue 3) in reviewed version of Science Plan

- cycling of micronutrients clearly of interest to both
- cycling of macronutrients also of interest to both, but particularly IMBER
- carbon cycling interesting to both for different reasons
- ecosystem study not primary interest of GEOTRACES
- study of TEIs (apart from micronutrients) not primary interest of IMBER

Positive relationship and dialogue between the two programmes is clearly mutually beneficial. Would like to see collaboration with IMBER in:

- process studies areas;
- Joint Group workshops, meetings between IMBER and GEOTRACES; and
- GEOTRACES and IMBER scientists involved in joint cruises.

Gideon also proposed that a special session of GEOTRACES and IMBER is held at the TOS meeting in 2005.

DIVERSITAS - Ann Bucklin on behalf of Dave Raffaelli

The present level of activities on marine biodiversity in DIVERSITAS is very low but planning for activities is now under way. There is an urgent need therefore to raise the profile of marine biodiversity research within DIVERSITAS. The common area of interest between DIVERSITAS and IMBER is covered in 2 of the 3 core projects of DIVERSITAS:

C2: ecoSERVICES - Biodiversity and climate regulation, and Microbial systems

C3: bioSUSTAINABILITY - responses to society

In relation to the core project 3 Bio-Sustainability - DIVERSITAS has built a community of like-minded researchers from the fields of Ecology, Environmental science, Economics and Politics. IMBER should take advantage of this inter-disciplinary resource for development of the IMBER SP/IS Theme 4.

Suggestions for a way forward for biodiversity issues within IMBER and DIVERSITAS

- Embed IMBER science on biodiversity and ecosystem functioning within a broader framework of mainstream ecology
 - Share expertise and experience of microbial systems, with respect to ecosystem functioning
 - Take advantage of the already assembled network of trans-disciplinary researchers committed to understanding the feedbacks between society and biodiversity change
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GOOS - Julie Hall

GOOS is a sustained, coordinated international system for gathering and processing data about the oceans, generating useful products and services including accurate descriptions of present conditions and forecasts of future conditions and creating long term consistent data sets. The identification of sustained observations is important and there is a need to build upon these. Sustained observations are a key to the success of IMBER; therefore IMBER must have appropriate interactions with GOOS.

EuroOceans – Paul Treguer

The European Network of Excellence (NoE) EUR-OCEANS aims to achieve lasting integration of European research organisations on global change and pelagic marine ecosystems, and to develop models for assessing and forecasting the impacts of climate and anthropogenic forcing on food-web dynamics (structure, functioning, diversity and stability) of pelagic ecosystems in the open ocean.

Major initiatives

A suite of workshops and specific studies will be conducted, in close connection with GLOBEC and IMBER international research communities, such as:

- The new initiative on Climate Impacts on Oceanic Top Predators (CLIOTOP).
- Reykjavik (Iceland) March 2005: The meeting will address “the impact of basin-scale oceanographic and climate-related processes on the dynamics of plankton and fish populations in the North Atlantic”. The meeting has already been endorsed by GLOBEC and EUR-OCEANS, and it should also be endorsed by IMBER
- Plymouth (PML, UK) 27-29 June 2005: Conference on “Advances in Marine Ecosystem Modelling Research”. This meeting has already been endorsed by GLOBEC, and should be endorsed by IMBER.
- June 2006: EUR-OCEANS summer school on Ecosystem Modelling and Resources. Proposed that the summer school be co-endorsed by EUR-OCEANS, GLOBEC, IMBER and the FAO.

EUR-OCEANS propose that a general Agreement is prepared between IMBER and EUR-OCEANS that includes specific commitments of EUR-OCEANS for the implementation of IMBER.

Among these commitments are:

1. Organisation of workshops relevant to IMBER Themes 1 to 4.
2. EUR-OCEANS contributions to the modelling effort relevant to IMBER Themes 1 to 3; e.g. we could start with a basin scale food web prototype of north Atlantic, according to de Young’s recommendation (challenges of modelling ocean basin ecosystems). This includes approaches to coupling across trophic levels and the inclusion of uncertainty.

3. specific contributions of EUR-OCEANS for coordination of regional projects, including:
 - a. the North Atlantic and Arctic Seas (Reykjavik meeting),
 - b. the polar seas (IPY: 2007-2008).
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ICCED - Julie Hall on behalf of Eugene Murphy

The ICCED initiative proposes a coordinated circumpolar approach to understanding climate interactions in the Southern Ocean and implications for ecosystems and the impacts on biogeochemical cycles. The need for Southern ICCED is based on the Southern Ocean being a key system in the Global Ocean. ICCED will develop regional to circumpolar scale analyses of the operation of Southern Ocean ecosystems focusing on: climate-ocean interactions and impacts on regional ecosystems; and ecosystem controls on biogeochemical cycles.

The objectives of the ICCED initiative are to:

- **Extend and further develop existing circulation and biological models** and facilitate the development of integrated circumpolar coupled biogeochemistry-ecosystem models
- **Stimulate capacity building** through focused training courses, workshops, and personal exchange
- **Collaborate with international programmes and organizations**, such as CLIVAR, IMAGES, GLOBEC, GOOS, CCAMLR, IWC, and SCAR. (There are strong biogeochemistry links between ICCED and IMBER as proposed in IMBER T2I1).

To take ICCED forward there is a need to:

- Draft an initial science document for circulation to act as a call to the community during the autumn 2004 –IMBER associated call.
 - Link the call to developing IPY initiatives for the Southern Ocean as the starting point for ICCED
 - Hold a full international workshop during late spring (~May) 2005 to develop the science plan. This will link to developing IPY plans
 - ICCED have initial very provisional offers of support for the workshop from the US and EUR-OCEANS. Support from IMBER will help reinforce the importance of this effort, make the workshop truly international and ensure IMBER interests have a strong influence on the development of the initiative.
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Reports by SSC members on IMBER developments in their own countries

UK

Carol, Roger and Raymond– UK scientists are in process of writing NERC research funding proposals. The recent PML research proposal has an IMBER flavour.

Julie – At a small meeting in the UK that Julie attended the possibility of holding an IMBER meeting in the UK was suggested. Obviously the interest in IMBER is growing in the UK, but need discussions to see if there is a need for a UK wide IMBER proposal or proposals from smaller individual UK groups.

South Africa

Coleen – most work is focussed on implications to fisheries, ground truthing and GIS work.

France

Patrick – The PROOF programme will be the French contribution to IMBER. Focus on responses of ecosystem and biogeochemical cycles.

Germany

Arne - IMBER is in its early stages, there was a meeting last summer but was dominated by the GLOBEC community as this community is well established in Germany. At the end of June there was a second meeting which Arne was unable to attend, the report from this meeting has not been circulated yet.

German funding is not well prepared to pick up funding for large international projects, and many projects that would contribute as IMBER projects are well underway.

New Zealand

Julie – As NZ is a small country there is no separately funded IMBER programme. Thematic voyages are being developed in 3-4 year time frame, and will include research that will contribute to IMBER

Chile – Carina Lange

The COPAS centre is dealing with the Physics, biology, biogeochemistry and sediments of the Eastern South Pacific off Chile and Peru (mainly continental margin), all these themes relate directly to IMBER (see www.copas.cl for more info)

Carina would like to call the attention of IMBER to the Eastern South Pacific, a remote area that we know very little in all aspects that concerns IMBER. I would like to propose the continental margin off Chile as one of the study areas for IMBER.

For Palaeoceanography, the emphasis on calibration of the palaeo-proxies, working towards new proxies and especially the focus on isotopes and biomarkers is essential. The lack of these or understatement of these items has always been an open door to the criticisms from various evaluators in my experience. Therefore, we have put a lot of emphasis on the calibration of proxies and thus our strong ties with the water column community. We are also developing new proxies, especially in the biomarkers arena.

Proposal that the Astral Summer Institutes at the University of Concepcion (which are directed to the educational training of students in underdeveloped and developing countries), are used as a working platform for holding courses in relation to IMBER. Successfully Summer Schools have been run for 5 years now with funding from WHOI, Fundacion Andes, University of Concepcion, POGO, PAGES etc.

Japan - Hiroaki Saito

TT activities and the writing process of the IMBER SP/IS have been announced through e-mail letters of the Oceanographic Society of Japan. Concept of IMBER is positively received in Japan and many scientists show their interests to IMBER. Some of them showed specific research plan, on-going projects possibly to be IMBER-related activities. Although most scientists are positive to IMBER, I *still* receive complains about unbalance of IMBER between BGC and Biology, e.g., “no biology” from marine biologists, “IMBER is a project for biologists” from geochemists. We may need more efforts to explain that IMBER is a comprehensive project of marine BGC and ecosystem and their interaction.

The IMBER subcommittee is about to establish under the Global Environmental Research Liaison Committee of the Science Council of Japan (SCJ). Under the SCJ, subcommittees of GLOBEC, SOLAS, LOICZ has been worked. The members of the IMBER subcommittee are 5 from biology and ecology, 6 from biogeochemistry, and 3 from physics and model, chaired by HS. Four members of this committee are also members of the SOLAS subcommittee and one is from the GLOBEC subcommittee. The task of the IMBER subcommittee is developing IMBER related activities and pushing marine biogeochemical and ecosystem studies ahead cooperated with the other core projects of IGBP II. The first meeting will held at the end of this year or early in 2005 in Nagoya, discussing funding and research proposal.

Netherlands

Wilco handed over to Jack – IMBER has been mentioned in the Netherlands and at the international SCOR meeting IMBER was on the agenda. There are a lot of projects that relate to IMBER but no specific funding allocated.

India

Wajih – IGBP activities in India are looked after by a committee, the latest meeting was held in Delhi where a presentation on a IMBER/SOLAS committee was given. The committee recommended that IMBER and SOLAS be implemented together due to the lack of staff. A proposal on this has been submitted and will be forwarded for funding approval after peer review.

USA – Dennis

IMBER has not made its mark in the US yet, though the marine scientific community have heard about it. There are perceptions and misperceptions of what IMBER is about. There are a lot of ocean carbon studies going on with US funding, but none are coordinated under international umbrellas. Funding is carried out through core programmes at the National Science Foundation and NOAA. There is a strong interest in the US for research into carbon biogeochemistry and budgets. Some of these are:

- Repeat Hydrographic Lines (although this has had more association with CLIVAR, the carbon measurements could have a home inside IMBER);
- Time series programs BATS and HOT.
- Reference materials for DIC, total alkalinity, and DOC;
- Meso-scale eddy studies in the North Atlantic and North Pacific
- Shelf-basin interaction project in the Arctic.
- Numerous modelling exercises and intercomparisons

Dennis Hansell, Dave Hutchins and Ann Bucklin will work to introduce the US community to IMBER by hosting an evening informational session at the February 2005 ASLO meeting in Salt Lake City, Utah, USA.

***Norway**

As a result of the electronic email bullet giving an update on the development of IMBER and asking for comments or issues to be taken to the SSC meeting we were contacted by Stig Skreslet, of Bodoe Regional University, Norway. A joint Norwegian and Polish International Science Observational Research project is proposed for Jan Mayen Island (North Atlantic). As a co-director of the project Stig Skreslet, asked that the IMBER SSC to consider endorsing the proposal.

Action: Claire to draft a letter to Stig Skreslet, explaining that IMBER will be putting in place an endorsement process, once this is finalised we will contact them regarding endorsement of the Jan Mayen Island research programme.

Report from Liverpool Data Management Meeting (Dec 2003) – Ed Urban

The goal of the Liverpool meeting was to produce a common strategy for managing and sharing marine data within and among IGBP and SCOR projects, learning from the experiences in WOCE, JGOFS, and other projects. The resulting suggestions from the Liverpool meeting can be used as a basis for setting up data management policies for each IGBP and SCOR project.

It was recommended that each project should:

- Establish a data management subcommittee, and a web site to collate project data management information.
- Oversee compilation of data from PIs and national projects into a long term integrated data set that is submitted to an appropriate data archive. This information may be published in CDROM or DVD format.
- It is essential that projects identify and universally adopt appropriate data and metadata standards at the start of the project.

The full report and recommendations resulting from the Liverpool meeting can be viewed at the following web links:

www.jhu.edu/scor/DataMgmt.htm
www.jhu.edu/~scor/DMReport.pdf

Carbon research implementation – Dennis Hansell

In May 2004 approximately 120 scientists gathered at the IOC in Paris, France, to discuss the likely consequences of increasing oceanic CO₂ concentrations on marine biogeochemistry and ecosystems, and the potential consequences of purposeful ocean carbon sequestration activities. Cicerone et al. (2004) outlined the findings from the meeting, which include:

2 billion tons of carbon enters the ocean each year, with around 5.5 million tons per day. So sequestration of anthropogenic CO₂ is taking place whether planned or not.

Predictions given at the meeting for the year 2050:

- 500 ppm CO₂ in the atmosphere
- surface ocean pCO₂ levels doubled
- pH decrease of 0.2-0.4
- up to 25% reduction of ocean CO₂ sink due to increased stratification
- 30% increase in size of hypoxic anoxic zones

From a policy point of view what should the target concentration of atmospheric CO₂ be?

Need improved knowledge of:

- Effects on key ecosystems (reefs, mesopelagic etc)
- Rate of evolutionary change in ocean species (adaptation to CO₂)
- Sensitivity of organism and community structure to increased CO₂.
- SOLAS/IMBER need joint implementation plan for carbon studies, we need to work through primary approaches for Implementation in the Implementation Strategy and deal with all of these.

Urgent needs:

- Establish task teams for the following issues – high CO₂, polar research (IPY 2007), margins, carbon/ecosystems interactions
- Planning for high CO₂ open ocean experiment (start at SOLAS open science conference in Halifax)
- National survey of who is doing what (IOCCP for long lines and VOS)
- Synthesis of iron results; internationally coordinated large experiments (including export coverage)
- Proposed group to meet in Miami in November 2004 to establish a joint IMBER/SOLAS implementation plan for carbon, and then establish OCPSCG.

Reference:

Cicerone, R., J. Orr, P. Brewer, P. Haugan, L. Merlivat, T. Ohsumi, S. Pantoja, and H.-O. Poertner. 2004. The ocean in a high CO₂ world. EOS 85 (37): 351, 353.

Wednesday 11th August

SP/IS Structure and writing tasks

Science Plan

Introduction SP

Theme 1 Ann (Co-ordinator)
Issue 1 Jack
Issue 2 Jack
Issue 3 *Ann/Hiroaki

Theme 2 Dave (Co-ordinator)
Issue 1 Raymond
Issue 2 Arne
Issue 3 Jing
Issue 4 *Patrick/Hiroaki

Theme 3 Wilco (Co-ordinator)
Issue 1 Arne
Issue 2 Wajih
Issue 3 *Wilco/Patrick

Theme 4 *Julie/Carol/Ron/ Alison
*Person responsible for ensuring the job is done

Theme Structure

Theme > Issue > Question

Promising approaches will sit at theme level, not at each level. At the front of each issue all the questions will be highlighted in a text box, then below the body of the text will be each Question followed by text, i.e Question-Text, Question-Text.

Theme length Guideline:

10 pages total per theme, 1 page per issue, ½ page text per question,

Crosscutting Science Issues	Patrick
Time and Space scales	*Patrick/Raymond/Wilco
Synergistic/antagonistic interactions	Dave
Palaeo	Carina

Science Plan length – 80-90 pages combined.

Implementation Plan

Julie

Introduction IS
Approaches to research

Julie/Patrick
Coleen

Linkages with other projects
 Project Organisation and Management
 Education
 Capacity building
 Communication

Julie
 Julie
 *Jing/ Wajih/ Julie
 *Jing/ Wajih/Coleen
 Julie

Other writing assignments:

Hot Topics:

A list of hot topics (below) came out of a brain storming session, members of the IMBER SSC have been assigned to a topic and these people are responsible for drafting text on each topic. These hot topics will appear in the document as highlighted text boxes. A template for the hot topic boxes will be sent out shortly; those drafting the text for a hot topic have a word limit of 2-300 words in 3 bullet points.

Due date: 15 October 2004 - Hot topic sections are due to Claire for compiling.

High CO2	Carol
Extreme and episodic events	Dennis
End to End fodwebs	Coleen
Mesopelagic and respiration	Jack, Raymond, Carol
Feedbacks	Wilco
Genes and functional biodiversity	Ann
Oxygen minimum	Wajih
Trace metals from margins	Dave
Carbon burial in margins	Coleen, Jing
Human Dimensions	Julie

Joint Work/Task Groups -

A number of work groups or task teams were proposed during the SSC meeting, the following SSC members have been given the responsibility of producing a one page description of potential working groups relating to the following topics/priorities. These will be used to set priorities for funding for working groups this year and will also be included in an appendix in the SP/IS to show where IMBER is going in terms of implementation.

Due date: 15 October 2004: The one page descriptions are due to Claire for compiling.

Carbon	*Dennis, Dave, Patrick, Carol, Ann
Modelling	*Patrick, Coleen, Wilco
Continental Margins	*Jack, Jing, John Parslow
Biodiversity	Ann
End to End food webs	*Coleen, Patrick, Hiroaki
Data Management	Julie
GEOTRACES	*Jay, Dave

Human Dimensions	*Julie, Carol
Mesopelagic	Carol, Raymond
Feedbacks	*Wilco, Patrick

* person responsible for ensure section is written.

Thursday 12th August

Review of Themes, Issues and Questions

Those present at the meeting were split into three groups; each group was assigned a theme and asked to revise the issues and questions of the Theme. The following are the revisions that each came up with:

Theme 1. Interactions between biogeochemical cycles and marine food webs

What are the key marine biogeochemical cycles, ecosystem processes, and their interactions, that will be impacted by global change?

Issue 1. Transformation of organic matter in marine food webs

- What controls the stoichiometry and form of “**bioreactive**” elements (dissolved or particulate, organic or inorganic) in space and time?
- What controls **production, transformation, and breakdown** of organic matter in marine food webs?

Issue 2. Transfers of matter across ocean interfaces

- What are the time and space scales of remineralisation of organic matter in the **mesopelagic** layer?
- How does horizontal exchange of nutrients between **continental margins** and the ocean interior impact biogeochemical cycles?
- How does vertical exchange between **shelf and slope sediments** and the water column impact food web structure and functioning?

Issue 3. End-to-end food webs and material flows

- How do food web dynamics affect **nutrient availability**?
- How do **key functional groups, species, and genes** affect biogeochemical cycles and how do they do it?
- Which **species interactions** in food webs affect biogeochemical cycling?
- How does **biodiversity** affect food web functioning and biogeochemical cycling?
- How are the interactions between biogeochemical processes and food webs recorded in **palaeo-proxies**?

Theme 2. Sensitivity to Global Change.

What are the responses of key marine biogeochemical cycles, ecosystems and their interactions to global change?

Issue 1. Impacts of climate-induced changes through physical forcing and variability.

- What are the direct effects of changes in ocean temperature?
- What is the impact of changes in circulation, ventilation and stratification?
- What are the effects of changes in the surface ocean light environment?
- What are the impacts of changes in frequency and intensity of extreme and episodic events?

Issue 2. Effects of increasing CO₂ and changing pH.

- What are the effects of CO₂-driven changes in carbonate chemistry?
- What are the effects of pH-driven changes in nutrient and trace metal speciation?
- Which organisms and biological processes are most sensitive to pH change and what are the consequences?
- How, and to what extent, can organisms adapt and/or evolve in response to changes in pH and dissolved inorganic carbon concentrations?

Issue 3. Effects of changing supplies of macro- and micronutrients.

- How will changes in macro/micro nutrient inputs to the ocean affect the cycles of these elements?
- How will changes in the abundance, distribution, and stoichiometry of nutrient elements affect food web structure and function?
- How will eutrophication-driven increases in hypoxia and anoxia affect the food web and cycles of key macro and micro nutrients?

Issue 4. Impacts of harvesting.

- What are the consequences for the entire food web of harvesting of living marine resources?

- How do changes in food web structure due to harvesting impact biogeochemical cycles?

Theme 3: Feedbacks to the Earth System.

What is the role of ocean biogeochemistry and ecosystems in regulating **climate**?

Issue 1 : Change in global oceanic storage of carbon

- What are the **spatial and temporal scales** of storage of carbon in the interior of the ocean?
- How will global change affect carbon **transformation and storage in the mesopelagic layer** and how will these changes be communicated to the surface ocean?
- What is the role of the **continental margins** in ocean carbon storage under global climate change?

Issue 2: Ecosystem feedbacks on ocean physics and climate

- How do marine **food web** structure and variability affect **ocean physics and large-scale climate** and its variability via the upper ocean **heat budget**?
- What will be the effect of global changes in **oxygen minimum zones** on **sources, transport, and outgassing** of N₂O?

Theme 4. Responses to Society: What are the relationships between marine biogeochemical cycles, ecosystems, and the human system?

Issue 1: Human lifestyle effects on the state of the ocean

Issue 2: Mitigation or adaptive policies that could reduce the impact of global change on society

Goal

It was suggested that perhaps we develop a vision statement for IMBER rather than a goal. The suggested vision statement that came out of the discussions is as follows:

“To develop an understanding to anticipate and respond to changes in Ocean Biogeochemistry and Ecosystems in the Anthropocene era.”

Summary Diagram for IMBER

During the IMBER Transition Team Editorial meeting (Baltimore, Nov 2003) the development of a summary diagram of IMBER illustrating the interdisciplinary nature of the project and the domains processes was discussed. The ideas that came out of this discussion were pulled together in the form of two draft figures, these figures were circulated and SSC members were asked to look at the diagrams and give feedback on what they thought of the drafts and how we could improve them.

Action: Coleen Moloney agreed to work on the development of the IMBER diagram.

Time line

20 August	Revised Theme, Issue and Questions revised by Theme Co-ordinators and sent to Claire.
17 September	Those responsible for issues and sections to send their revised versions back to the various Theme co-ordinators.
15 October	Theme Co-ordinators are to send Claire the revised issues and sections to Claire for collating.
	Hot Topics and One page description of potential Working Groups to be sent to Claire.
3 November	Claire to circulate new draft of SP/IS.
26 November	Comments on the SP/IS by the SSC to be back to Claire
3 December	Claire to send collated comments back to Theme and section co-ordinators. Exec members will bring together the comments and will present the major issues and questions at the Executive Meeting for discussion.
13 -16 December	First IMBER Executive Meeting
20 December	Requests for updated text for SP/IS sent to SSC members
5 January 2005	Final text to Claire for editing
Mid January 2005	Final Edit
February 2005	Submission to Sponsors

Responses to projects and programmes

It was decided that Claire would draft letters to each of the projects and programmes that had provided presentations to the IMBER SSC meeting, acknowledging the reviews and recommendations presented by each project and explaining how IMBER intends to respond to these recommendations.

Action: Claire to draft letters to each project.

Development of IMBER communications tools

Website – Ed and Claire had developed a basic web site for IMBER (www.imber.info), the SSC were asked to visit the web site and give their comments and suggestions on what they think of the site and how it could be improved to Claire.

Action: All SSC are asked to visit the website and provide Claire with comments on the website.

Newsletter – At present updates on IMBER and the projects development are sent out as needed using an email list. People can subscribe to this list from a link to Claire's email from the IMBER website. It was decided that this method of communication be continued in the mean time, and that every 3-4 months an electronic bulletin be sent out via the present email list.

Action: Claire to put together an IMBER update and send out via electronic bulletin

Brochure – The development of a brochure for IMBER was discussed, there were a number of suggestions put on the table for how we could promote IMBER, either through a folding A4 sized brochure, and A5 sized flyers or even post cards. One suggestion was an A4 sized document with a brochure on one side and a poster on the other.

Promotion - It is important for SSC members to take opportunities to promote IMBER where ever possible. The importance of the marketing IMBER and the Project was also discussed.

- Need to encourage current programmes to join IMBER, look at the development of IMBER endorsement.
 - Action. Claire to update the IMBER presentation and send out to the SSC members for their use.
-

Roles and Responsibilities of SSC members

All SSC members are asked to promote IMBER own country.

Development of IPO options –

There have been 3 options of potential IPO host countries, the following SSC members have been involved or are looking into the possibilities in each of these options. Patrick - France; Carol – UK; Jing - China

Liaison roles

IMBER will work collaboratively with other projects and programmes, various members of the IMBER SSC have been assigned as the link between IMBER and each its collaborative partners.

GLOBEC	Julie/Hiroaki
LOICZ	Jack/Waijh/Jing
DIVERSITAS	Ann
CoML	Ann
GEOTRACES	Jay
SOLAS	Dennis
GOOS	Julie
CLIVAR	Wilco
GAIM/AIMES	Patrick
Data Management	Julie
Modelling	Patrick?Coleen

Budget for 2004-05

Ed presented the budget for IMBER. The budget for the remainder of 2004 and 2005 is approximately \$89K, if it is estimated that in the next 16 months \$25K will be spent on SSC expenses. This would leave enough in the budget for 3-4 workshops or meetings, maybe more if we can get other programmes to contribute to joint workshops etc.

IMBER Executive Committee meeting

A core executive committee of Julie, Dennis and Patrick was decided on with the involvement of additional SSC members depending on the focus of each meeting. The first IMBER Executive Meeting will be held 13-16th December 2004, and will focus on reviewing the IMBER SP/IS after revision by the SSC. The Co-ordinators responsible for each of the SP/IS Theme's will be involved in this meeting and will form the IMBER Executive until the next SSC meeting.

Next SSC meeting

April/May 2005, was considered a good time of year for the next IMBER SSC Meeting. The location will be decided in due course, with a possibility of a meeting in Goa, India or Shanghai, China.