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3.1 Scientific Steering Committee for the Joint Global Ocean Flux Study (JGOFS) (Joint with IGBP)

Terms of Reference:

- To identify the fundamental scientific issues and detailed goals and objectives for an international Joint Global Ocean Flux Study.
- To recommend the necessary actions to be taken to implement the plan and coordinate and manage the resulting activities.
- To collaborate, as appropriate, with other related programs and planning activities.
- To report regularly to SCOR and IGBP on the state of planning and accomplishments of JGOFS.

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Patrick Monfray	FRANCE
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Toshiro Saino	JAPAN
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Sharon Smith	USA
Bronte Tilbrook	AUSTRALIA
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**Joint Global Ocean Flux Study (JGOFS)
Final Annual Progress Report
July 2002 to July 2003**

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Introduction

The Joint Global Ocean Flux Study (JGOFS) draws to an end this year, a year where we saw the publication of the Springer book on JGOFS synthesis efforts, the release of the national discrete datasets in JGOFS International Collection (DVD) and the presentations of JGOFS achievements and beyond at the highly acclaimed Open Science Conference in Washington, D.C., USA. Although this will be JGOFS' final year as a part of SCOR and IGBP, there remain a number of unfinished JGOFS activities and synthesis products. The tasks include: two additional Springer books, one on continental margins and the other on the Indian Ocean, the compilation, production and archival of the "integrated JGOFS dataset" in the WDC system, the printing of JGOFS Reports, and finally the closure of the International Project Office. This year's annual report, therefore, will provide a brief summary and history of these and other activities arranged under the leadership of the Scientific Steering Committee, Regional Synthesis Groups, Working Group and Task Teams. In addition, the report describes briefly the history of the International Project Office (IPO) and its supportive role in these activities, and provides an overview of the available resources and estimated expenses for the past twelve months and the next, and the steps planned for the eventual closure of the IPO in December 2003.

Report on the Synthesis Groups, Working Group and Task Teams

All groups and teams presented a successful completion or advancement of their activities and accomplishments at the 18th Scientific Steering Committee Meeting and the Third JGOFS Open Science Conference, which were held at the National Academy of Sciences in Washington, D.C., USA, 4 May and 5-8 May 2003, respectively. These events marked the formal end of the JGOFS Synthesis and Modelling Phase. However, several activities of the Synthesis Groups and Task Teams continue. Below are brief reports on these activities, future plans and timelines.

Data Management Task Team

The first meeting of the Data Management (Working Group) Task Team occurred in Halifax, Nova Scotia, Canada, in 1988. This meeting laid the foundation for a solid and workable data policy for JGOFS. Since that meeting, the DMTT has changed the attitude of data managers and scientists regarding the management of non-physical data. On 13-14 March 2003, the DMTT met for the last time in Bidston, United Kingdom. The first day of the meeting focused on a review of the accomplishments from the DMTT, lessons learned and national reports, which

were presented at the JGOFS Open Science Conference.¹ The second day focused on the production of the DVD "JGOFS International Data Collection. Volume 1: Discrete Datasets". This DVD was distributed during the JGOFS Open Science Conference, held in Washington, D.C., in May 2003. It includes an integrated collection of all JGOFS CD-ROMs and data products available by 31 March 2003, **in particular ten contributions never previously released**. For already published products, reproduction agreements were secured. The DMTT holds the copyright for this DVD product, which is structured by countries, projects and cruises, as often as possible. The practical aspects have been handled by the U.S. NODC for the production of the master copy of the DVD and 1,000 copies, with the financial help of the JGOFS IPO. After the distribution at the OSC and to all DMTT representatives, the main repository for the remaining DVD copies is at the World Data Centre A for Oceanography, Silver Spring, MD, USA.

The Pangaea initiative for JGOFS at the World Data Centre for Marine Environmental Sciences (WDC-MARE) is continuing. Its goal is full accessibility and long-term archiving of all JGOFS data and metadata through the WDC system. Yet the pace is slow because of the lack of basic funding. Members of the Pangaea team met last January in Bremen, Germany, with JGOFS representatives to assess the Pangaea initiative with regard to production of the JGOFS master data set (see Report at http://www.uib.no/jgofs/Publications/other_pub/JGOFS-PANGAEA_Bremen2003.pdf). The DMTT supports the plan of the Pangaea team to publish a second volume in 2004 or 2005, to be titled "International JGOFS Data Collection. Volume 2: Integrated datasets". All datasets in this volume should be accessible in a common file and data format through the Pangaea user and visualization interface and organised by project, cruise and data set for each parameter. The DMTT and IPO will continue to work with the Pangaea team until JGOFS comes to an end in December, and later on a voluntary basis.

Global Synthesis Working Group and JGOFS-GAIM Task Team

The last meeting of the GSWG and JGTT was in June 2002 at a joint GSWG/JGTT/JRC Workshop on "Global Ocean Productivity and the Fluxes of Carbon and Nutrients: Combining Observations and Models" at the EU Joint Research Centre, in Ispra, Italy. The goals of this workshop were to assess the present state of research on global ocean productivity and downward material fluxes from observations and biogeochemical models, and to identify future research needs. Emphasis was on integrated studies and the comparison between methods. During the course of the three days, participants provided answers to such questions as:

- How accurate are satellite productivity algorithms?
- Are sediment trap data consistent with satellite productivity maps?
- Are benthic food supply requirements matched by measured downward fluxes?
- What controls the export and sequestration efficiency?
- How important are ocean margins for global ocean biogeochemical cycles?
- Are modelled productivity rates and fluxes consistent with observations?
- How will marine biogeochemical cycles change in the future?

¹Conkright, M.E., B. Avril, C. Chandler, B. Griffiths, J. Herrmann, M.-P. Labaied, R. Lowry, T. Miyake, J.S. Sarupria and D. Spears, JGOFS Data Management: What has been done? What has been learned?

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- Regarding the next generation of biogeochemical models: what level of complexity is required to improve productivity and flux estimates?
- New technologies and observations: which new datasets will be available in 10 years? Are they sufficient to validate future models?

Many of the speakers' updated presentations are available as pdf files on the JGOFS Web site (<http://www.uib.no/jgofs/jgofs.html>). A final report on the GSWG/JGTT modelling workshop (Ispra, Italy, June 2002) will be published as a JGOFS Report later this summer: *Global Ocean Productivity and the Fluxes of Carbon and Nutrients: Combining Observations and Models* by Reiner Schlitzer, Patrick Monfray and Nicolas Hoepffner with contributions from Gerhard Fischer, Nicolas Gruber, Richard Lampitt, Marina Levy, Edward Laws, Trevor Platt, Steve Spall, and John Steele.

North Atlantic Synthesis Group.

The NASG met along with the POMME Synthesis Meeting of the French PROOF program in Toulouse, France. The goal was to present the latest advances in the science and to organize synthesis posters on the North Atlantic Bloom Experiment for the Open Science Conference. A total of 12 posters were presented, including three general synthesis posters by the NASG group:

- (1) Mike Fasham, Hugh Ducklow, Emilio Fernandez, Véronique Garçon, W. Glenn Harrison, Wolfgang Koeve, Roy Lowry, Laurent Mémerly and David Siegel, *Large scale biogeochemical diagnostics: the North Atlantic carbon machinery*,
- (2) Hugh Ducklow, Mike Fasham, Emilio Fernandez, Véronique Garçon, W. Glenn Harrison, Wolfgang Koeve, Roy Lowry, Laurent Mémerly and David Siegel, *Time series and process study sites in the North Atlantic during the JGOFS decade*, and
- (3) Véronique Garçon, Hugh Ducklow, Mike Fasham, Emilio Fernandez, W. Glenn Harrison, Wolfgang Koeve, Roy Lowry, Laurent Mémerly and David Siegel, *Modelling and data assimilation in the North Atlantic: Towards GODAE*.

Other contributed posters covered observational (in situ, satellite data), and theoretical and modeling studies on the North Atlantic Ocean. They described new insight on large-scale biogeochemical diagnostics of the North Atlantic Ocean, synthesis of results of time-series stations and process studies (PRIME, NABE, POMME, AMT, ANIGO, ESTOC, EUMELI, BATS, etc...), and modelling and data assimilation efforts. The latter efforts included studies on the production and transformation of organic matter in the upper ocean and twilight zone, the transport of biogeochemical tracers in the oceans, and their fluxes across the air sea interface and with continental margins and sediments. At the POMME meeting, Wolfgang Koeve presented a talk on carbon over consumption during the spring bloom in the temperate North Atlantic. A special journal issue on the POMME data synthesis will be published in 2004. POMME data is accessible through the French JGOFS web site. Two NASG members, D. Siegel and V. Garçon, attended and contributed to the work sessions on the last two days of the IGBP/SCOR OCEANS Open Science Conference in Paris.

Indian Ocean Synthesis Group

Ten countries over six years collaborated on the Arabian Sea Process Studies in order to address the biogeochemistry and physical forcing of this fascinating region. The results from 80+ national and international cruises are now found in over 120 peer-reviewed publications on seasonal monsoonal forcing, circulation, CO₂, primary production, bacterial production, microzooplankton grazing, trophic coupling, and export flux to the deep ocean. To synthesize this primary literature and data by scientific teams working across national boundaries, the IOSG plans to produce a book manuscript for the IGBP Book Series for review before the end of the summer. The synthesis book will be a coherent and integrated understanding of the key pathways, their interactions and feedbacks in the region. The book editor (S. Smith) and several associate editors plan to meet in Miami this fall and complete the manuscript before sending to Springer for publication in early 2004. A synthesis poster was presented at the Open Science Conference: Smith, Sharon L. *The Arabian Sea: the carbon cycle's response to strong, predictable physical forcing*.

Equatorial Pacific Synthesis Group

The EPSG fulfilled the main goals assigned to the group by the SSC in 1998. The synthesis was published in several *Deep-Sea Research II* volumes, JGOFS datasets were archived in national databases, modelling was advanced as national and international field activities continue, which were presented at the Open Science Conference:

Le Borgne, Robert, Richard Feely and Denis Mackey. *Carbon fluxes in the equatorial Pacific: a synthesis of the JGOFS programme*, and
Barber, Richard T., Robert R. Bidigare, Walker O. Smith, Jr., John Marra and Richard C. Dugdale, *Regulation of productivity rates and yields in oceanic ecosystems: A JGOFS overview with emphasis on the equatorial Pacific Ocean*.

The new projects planned for the region have gathered a strong international interest and future cooperation, which is another JGOFS legacy.

Most of the Equatorial Pacific Process Studies/cruises ended in 1996; however, the JAMSTEC cruises are continuing every year in the western and central Pacific in January-February. The PMEL carbon dioxide observations are also continuing routinely along the TAO mooring lines, with eight cruises per year. In addition, two time-series studies, involving CO₂ and bio-optical measurements on TAO are being carried out by PMEL, AOML and MBARI. Two other TAO mooring lines will be equipped with CO₂ and bio-optical sensors.

Many of the biological, chemical and physical datasets from Equatorial Pacific Process Studies have been archived at national data centres and are accessible through the following Web sites:

Australia: http://www.marine.csiro.au/datacentre/JGOFSweb/cmr_jgofs.htm (all data),
France: http://www.obs-vlfr.fr/jgofs/html/bdjgofs_eng.html (all data), and
the United States: http://www1.who.edu/jgdms_info.html (all data).

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The pCO₂ datasets are accessible at:

<http://www.pmel.noaa.gov/uwpc2/>,
<http://aoml.noaa.gov/ocd/oaces/index.html>, and
<http://cdiac.esd.ornl.gov/ocd/oaces/index.html>.

Finally, metadata, cruise inventories and most of the data (CD ROMs) were collected, centralized at the JGOFS International Project Office: <http://www.uib.no/jgofs/>, and recently released as part of the JGOFS International Collection of Discrete Datasets (DVD).

Southern Ocean Synthesis Group

The SOSG held a synthesis workshop in Hawaii in February 2002. From September 2002 to May 2003, the SOSG prepared two Southern Ocean synthesis posters for the Open Science Conference: Tréguer, Paul, and Uli Bathmann, *Southern Ocean-JGOFS: a step forward (I) and (II)*, and organised 22 contributed posters. The group also published multiple issues of the *Deep-Sea Research II* volumes over the history of the project. In December 2002, the Australian Antarctic and Southern Ocean science community announced the successful bid to replace the old Antarctic Cooperative Research Centre with a new centre, the Antarctic Climate & Ecosystem Cooperative Research Centre, established in 1 July 2003, which will continue through 30 June 2010. The *ACE Business Plan* is currently available via the Antarctic CRC website www.antcrc.utas.edu.au. ACE plans include biogeochemical process and flux studies, which build on the JGOFS legacy.

North Pacific Synthesis Group

The NPSG held its last meeting immediately after the workshop on Synthesis of JGOFS North Pacific Process Study, 1-2 October 2002, in Sapporo, Japan. The Group discussed: (i) a special issue of the *Journal of Oceanography* on JGOFS North Pacific Synthesis; (ii) a CD-ROM with data from North Pacific Process Studies to be produced by JODC, Japan; (iii) presentations at the 3rd JGOFS Open Science Conference; and (iv) JGOFS follow-up programs in the North Pacific. In December 2002, the Group published a special issue of *Deep-Sea Research II* on North Pacific Biogeochemical Processes (Guest editors: T. Saino, A. Bychkov, C.-T. A. Chen and P. Harrison, Vol. 49, Nos. 24-25, pp. 5297-5808). The volume includes an overview of the North Pacific Process Study and 27 contributed papers from Canada, Japan, China-Taipei and Russia.

A special issue of *Progress in Oceanography* (Guest editors: A. Bychkov and A. Peña) dedicated to the memory of the late Prof. Michael M. Mullin is expected in late 2003. In 2001, the NPSG participated and co-sponsored a topic session on "Plankton size classes, functional groups and ecosystem dynamics: Causes and consequences" at the PICES Tenth Annual Meeting. Selected papers from Canada, Chile, Japan, Korea and U.S.A will be included in the issue. A second special issue in the *Journal of Oceanography* on JGOFS North Pacific Synthesis (Guest editors: Toshiro Saino, Alexander Bychkov, Chen-Tung A. Chen, Paul Harrison and Ishiro Yasuda) is in progress and publication is expected in early 2004

Papers describing the Subarctic Pacific Iron Experiment for Ecosystem Dynamics Study (SEEDS) in the western Subarctic Pacific in June 2001 will be published in a special issue of *Progress in Oceanography* in late 2004. The results of an in situ iron enrichment experiment performed in the eastern Subarctic Pacific, the Subarctic Ecosystem Response to Iron Enrichment Study (SERIES) (July-August 2002) are expected to be published as separate papers in *Nature* in early 2004. Arrangements are also in progress to publish other results as a special issue of *Global Biogeochemical Cycles* or *Journal of Geophysical Research*.

A North Pacific data inventory for CO₂ and CO₂-related data developed by MIRC (Marine Information Research Center, Japan) is now available on line at <http://picnic.pices.jp>. This Web site incorporates the extensive information about Japanese cruises and information about Canadian (Institute of Ocean Sciences, IOS) and U.S. cruises (linked to CDIAC holdings). At present, the inventory is linked to original data (at other locations on the Internet) wherever practical, and serves various historical data sets as they are digitized. However, work is in progress to host some datasets at MIRC and to use the Live Access Server approach so as to provide for improved data visualization over the Internet.

Continental Margins Task Team

Over the past 4 years, the CMTT focused its efforts in producing an overall synthesis and assessment of carbon, nitrogen and phosphorus fluxes on and across continental margins for the JGOFS, LOICZ and IGBP-wide synthesis projects. The product of this synthesis will be published by Springer-Verlag in the IGBP Book Series in early 2004. The CMTT held its last workshop on Global Synthesis in Washington DC, USA (4-6 December 2002), which focused on the overall synthesis of the previous four regional workshops. The Task Team and workshop chairs analysed the status of the book, generated policies to accelerate its completion, and selected K.-K. Liu as lead editor. To facilitate communications with the authors and reviewers of the chapters and centralize efforts with the help of the co-editors Atkinson, Quiñones and Talaue-McManus, the IPO approved and supported a part-time book manager for Liu in China-Taipei. After the Washington DC meeting, the contact with the chapters' authors intensified and the peer-review process began. Springer Verlag expects the book manuscript in late 2003 for publication in early 2004.

Paleo-JGOFS Task Team

The PJTT met alongside the OCEANS conference in Paris, France in January 2003 to discuss the future of this task team. Its present aim, namely to introduce the paleo-aspect into the new science plan of the Integrated Marine Biogeochemistry and Ecosystem Research (IMBER) project, has been completed. In 2002, an Expression of Interest was submitted to the EU, which resulted in an open call for a targeted programme (STREP), aimed at improving understanding and use of paleo-proxies. In addition, a proposal for a SCOR Working Group was submitted under the title "Analyzing the links between present oceanic processes and paleo-records". The objective of this working group would be to foster the development of proxies indicative of changes in past ecosystems and paleo-productivity. This group would provide a critical link and information exchange between the different IGBP, SCOR, and WCRP marine projects with interest in paleo-records. If successful, this group will continue and expand the work of the PJTT beyond the life-time of JGOFS.

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Scientific Steering Committee

The Scientific Steering Committee (SSC) held its 18th and Final Meeting at the JGOFS Open Science Conference in Washington, D.C. USA (4 May 2003). The committee presently stands at 19 members: 7 at-large members and 12 foci leaders. The current membership is shown in the table below and all 19 terms end on 31 December 2003. The meeting focused on the business remaining of the Synthesis Groups, Working Group and Task Teams. Immediately subsequent to the SSC Meeting, a short celebration followed to pay honour to JGOFS and extend our appreciation to all that served on the committees since the First Meeting in Miami, FL, USA, January 1988.

Current Membership of the 18th Scientific Steering Committee

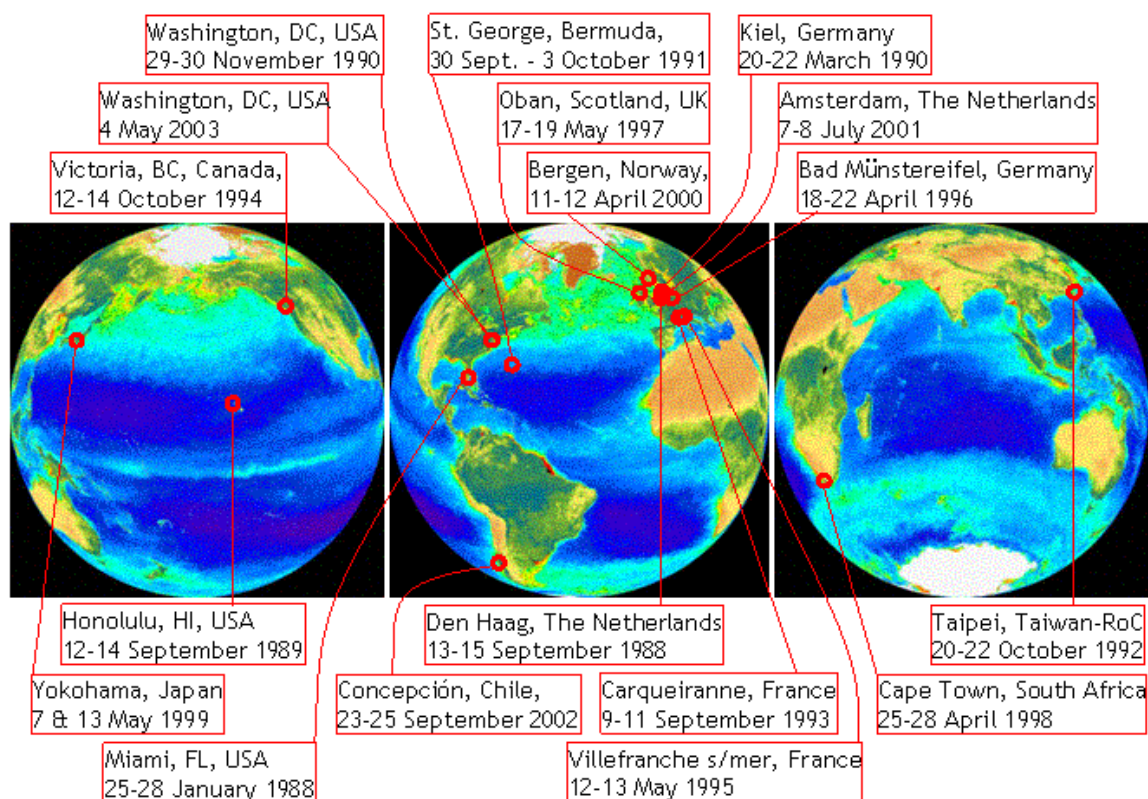
Name	Country	Function	Status	Term Ends
Ducklow, Hugh	USA	Chair	At-large	Dec. 2003
Haugan, Peter	Norway	SCOR/IOC Ocean CO ₂ Panel, OOPC	At-large	Dec. 2003
Saino, Toshiro	Japan	North Pacific SG	At-large	Dec. 2003
Anderson, Robert	USA	SSC, Geochemistry Expert	At-large	Dec. 2003
Hansell, Dennis	USA	SCOR/IGBP IMBER Transition Team	At-large	Dec. 2003
Hong, Huasheng	China-Beijing	SSC, Continental Margins Expert	At-large	Dec. 2003
Tilbrook, Bronte	Australia	SSC, CO ₂ Inventory Expert	At-large	Dec. 2003
Lochte, Karin	Germany	Paleo JGOFS TT	Chair	Dec. 2003
Monfray, Patrick	France	JGOFS-GAIM TT	Chair	Dec. 2003
Quiñones, Renato	Chile	Continental Margins SG	Chair	Dec. 2003
Schlitzer, Reiner	Germany	Global Synthesis WG	Chair	Dec. 2003
Tréguer, Paul	France	Southern Ocean SG	Chair	Dec. 2003
Wallace, Douglas	Germany	SCOR/IOC Ocean CO ₂ Panel	Chair	Dec. 2003
Conkright, Margarita	USA	Data Management TT	Chair	Dec. 2003
Bychkov, Alex	Canada	North Pacific SG	Chair	Dec. 2003
Garçon, Véronique	France	North Atlantic SG	Chair	Dec. 2003

Le Borgne, Robert	France	Equatorial Pacific SG	Chair	Dec. 2003
Platt, Trevor	Canada	Intl Ocean Color C Group	Chair	Dec. 2003
Smith, Sharon	USA	Indian Ocean SG	Chair	Dec. 2003

Brief Historical Perspective of JGOFS Committees and Meetings

A historical view of the Scientific Steering Committees and geographical distribution of its meetings are shown in the figure and table below. Of the 18 SSC Meetings held over the past decade and half, 5 were in North America, 8 in Europe, 2 in Asia, 1 in Africa, 1 in South America and 1 in Bermuda. The figure below shows the actual geographical distribution (city, country, and dates). All told, 68 members travelled to at least two and some to as many as 5 or more meetings over their tenure on the committees.

Geographical location, cities and dates of the 18 Scientific Steering Committee Meetings (satellite images from SeaWiFS Web site, ORBIMAGE / NASA; picture by Bernard Avril)



The average time served by the members was 4.5 years. The membership, including Executive Science Officers, was distributed as follows by country: Australia (4), Canada (6), Chile (1), China-Beijing (2), China-Taipei (2), France (9), Germany (8), India (1), Japan (3), the

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Netherlands (1), New Zealand (1), Norway (3), Russia (3), South Africa (1), Sweden (1), Switzerland (1), UK (7), and the USA (15) [Total: 68]; By gender and developing-country participation: 7 women (10%) and 5 members (7%) from developing countries. Four Executive Officers and three Assistant Executive Officers supported the committee over the decade and half period.

List of All Scientific Committee Members from 1988-2003. Bold Type indicates Chairs, including the time as Past Chair and Vice-Chairs

Name (last)	Name (first)	Country	Notes	Term(s)	Years Served
Anderson	Robert	USA		1999-2003	4
Bathmann	Ulrich	Germany		1998-2000	3
Brewer	Peter	USA		1988-1991	4
Brown	Otis	USA		1988-1994	7
Buat Ménard	Patrick	France		1991-1993	3
Burkill	Peter	UK		1993-2000	8
Bychkov	Alex	Russia		1996-1998	3
Calvert	Steven	Canada		1988-1990	3
Chen	Arthur	China-Taipei		1992-1994	3
Conkright-Gregg	Margarita	USA	Woman	2000-2003	4
Dandonneau	Yves	France		1990-1992	3
de Baar	Hein	Netherlands		1988-1990	3
Denman	Kenneth	Canada		1988-1992	5
Ducklow	Hugh	USA	Executive Officer, 1993-1995 Chair, 2000-2003	1990-1992, 1996-1998, 2000-2003	13
Elderfield	Harry	UK		1988-1990	3
Emerson	Steven	USA		1993-1995	3
Evans	Geoff	Canada	Executive Officer, 1990-1992		3
Falkowski	Paul	USA		1999-2000	3
Fasham	Michael	UK	Vice-Chair, 1988-1990 Chair, 1998-2000	1988-1992, 1996-1997, 1998-2000	10
Field	John	South Africa	Vice-Chair, 1991-1993 Chair, 1994-1998	1991-1993, 1994-1998	8

Garçon	Véronique	France	Woman, Vice-Chair, 2002-2003	1999-2003	5
Hall	Julie	New Zealand	Woman	1994-1999	6
Handa	Nobuhiko	Japan		1993-1995	3
Hansell	Dennis	USA		2001-2003	3
Hanson	Roger	Norway	Executive Officer, 1996-2003		8
Harris	Peter	Australia		1991-1992	2
Haugan	Peter	Norway		1991-1993	5
Hong	Huasheng	China-Beijing	Developing Country, Woman	1998-2003	6
Hu	Dunxin	China-Beijing	Developing Country	1998-1990	3
Koike	Isao	Japan		1988-1990	3
Krishnaswami	Seth	India	Developing Country	1991-1996	6
Le Borgne	Robert	France		1999-2003	5
Leinen	Margaret	USA	Woman	1991-1994	3
Lisitsyn	Aleksandr	Russia		1992-1994	3
Liu	Kon-Kee	China-Taipei	Vice-Chair, 1998-2000	1995-2000	6
Lochte	Karin	Germany	Woman, Vice-Chair, 2001	1995-2003	9
Lowry	Roy	UK		1995-1999	4
McCarthy	James	USA		1995-1997	3
Merlivat	Liliane	France	Woman, Vice-Chair, 1995-1997	1992-1997	6
Minster	Jean-François	France		1988-1990	3
Monfray	Patrick	France		1999-2003	5
Moore	Robert	Canada		1995-1997	3
Morel	André	France		1995-1997	3
Murray	James	USA		1996-1998	3
Parslow	John	Australia		1993-1995	3
Pearman	John	Australia		1990-1992	3
Platt	Trevor	Canada	Chair, 1991-1994	1988-1990, 1991-1994, 1996-2003	15
Priddle	Julian	UK		1991-1993, 1996-1997	5
Quiñones	Renato	Chile		1998-2003	6

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Saino	Toshiro	Japan		1998-2003	7
Sakshaug	Egil	Norway		1994-1999	6
Schlitzer	Reiner	Germany		2001-2003	3
Shaffer	Gary	Sweden		1990-1994	5
Shimmield	Graham	UK		1995-1998	4
Siegenthaler	Ulrich	Switzerland	Deceased	1992-1994	3
Smetacek	Victor	Germany		1992-1994	3
Smith	Sharon	USA	Woman	2002-2003	3
Takahashi	Taro	USA		1995-1997	3
Tambiev	Sergei	Russia		1989-1991	3
Tidmarsh (Gross)	Elizabeth	Canada	Woman, Executive Officer, 1988- 1989		2
Tilbrook	Bronte	Australia		1996-2003	8
Tréguer	Paul	France		2001-2003	3
Wallace	Douglas	Germany		1999-2003	5
Watson	Andrew	UK		1998-1999	2
Wefer	Gerold	Germany		1990-1992	3
Willebrand	Jürgen	Germany		1993-1998	6
Yoder	James	USA		1996-1998	3
Zeitzschel	Bernt	Germany	Chair, 1988- 1991	1988-1991	4

Calendar of Activities from July 2002 through December 2003

In Concepción, Chile, the 17th SSC set the priority for meetings and tentatively allocated funds for activities out to December 2003. The current list of approved JGOFS meetings on the calendar is shown below.

Year 2002 (July - December 2002)

- 17-19 September, Orono, Maine, USA. Equatorial Pacific Synthesis Meeting and Workshop.
- 23-25 September, Concepción, Chile. 17th JGOFS Scientific Steering Committee Meeting.
- 1-2 October, Sapporo, Japan. North Pacific Synthesis Group Meeting and Symposium for the North Pacific synthesis.
- 4-6 December, Washington DC, USA. Continental Margin Task Team Workshop for the Global Synthesis of the Regional Syntheses.

Year 2003

- 7 January, Toulouse, France. Fourth North Atlantic Synthesis Group Meeting.
- 27-29 January, Bremen, Germany. PANGAEA-JGOFS Data Management Workshop.
- 13-15 March 2003, BODC, Merseyside, UK. Data Management Task Team Meeting.

- 4 May, Washington DC, USA. 18th Meeting of the JGOFS Scientific Steering Committee.
- 5-8 May, Washington DC, USA. Final JGOFS Open Science Conference.
- 26 September 2003, Bergen, Norway. JGOFS Executive Meeting. Contact: Roger Hanson, NORWAY.
- To be determined. North Pacific Synthesis Group publication meeting. Contact: Alex Bychkov, CANADA
- To be determined. Indian Ocean Synthesis Group publication meeting. Contact: Sharon Smith, USA
- To be determined. JGOFS/LOICZ Continental Margins Task Team publication meeting. Contact: K.-K. Liu, Taiwan

International Project Office and a Brief History

Historical Perspective

Until the host country Norway and the University of Bergen accepted the enormous financial and institutional responsibility of hosting the JGOFS International Project Office, the financial stability and staff of the International Project Office was distributed and limited from 1988-1995. The first office was established within the SCOR Secretariat in Halifax, Canada, but without sufficient staff support to manage the business of a large-scale ocean project. In 1990 in Germany, funds were secured for the office and it was established at the Institut für Meereskunde, Kiel University. The Executive Science Officer position was filled by a secondment from the Canadian government for Dr. Geoff Evans, while the administrative responsibility continued at the SCOR Secretariat in Halifax. In 1993, Professor Hugh Ducklow followed Dr. Evans as Executive Science Officer at the office in Kiel with support from the National Science Foundation, and the German government extended the Office support for an additional 2 years. In 1995, the SSC initiated a search for new funds to fully support an Office plus an Executive Officer, Assistant Executive Officer to serve as the data and information coordinator, and Administrative Assistant through a direct national funding. Several countries were strongly interested in hosting the Office and staff until Norway, through the efforts of Professor Ulf Lie and Dr. Truls Johannessen, secured direct funding from Research Council of Norway and facilities from the University of Bergen. In 1996, Dr. Roger Hanson followed Dr. Ducklow as Executive Science Officer and established the IPO at the Center for Studies of Environment and Resources and has managed the Office since. The Office has been staffed with an Assistant Executive Science Officer and a secretary/administrative/financial assistant over the past 8 years. The staff continues to provide information and advice to, and serves as the secretariat for, the JGOFS Scientific Steering Committee (SSC) and its planning and synthesis groups, working groups, and task teams. The composition and tasks of the latter are found on the International JGOFS Web site (<http://www.uib.no/jgofs/>). A central task for the past and present IPO is to obtain, evaluate and disseminate information concerning the activities of the scientists involved in the JGOFS field, data analysis and modelling programmes. This information is used to coordinate national activities, to identify planning needs and resource shortfalls, and to help assess, with the SSC, the progress of the project in relation to its scientific goals.

Executive Science Officers (1988-2003)

Ms. Elizabeth Tidmarsh (Gross), 1988-1989
Dr. Geoff Evans (1990-1992)
Professor Hugh Ducklow (1993-1995)
Dr. Roger Hanson (1996-2003)

Assistant Executive Officers (1990-2003)

Dr. Uli Wolf (1990-1995)
Dr. Beatriz Baliño (1996-2000)
Dr. Bernard Avril (2001-2003)

Administrative Staff (1996-2003)

Ms. Judith Stokke (1996-2003)
Ms. Reidun Gjerde (2001-2002)
Mr. Sturle Litland (2002-2003)

Locations

1988-1989, Department of Oceanography, Dalhousie University, Halifax, N.S., B3H 4J1, Canada

1990-1995, Institut für Meereskunde an der Universität Kiel, Düsternbrooker Weg 20, D-24105, Kiel, Germany

1996-2003, Department for the Studies of Environment and Resources, University of Bergen, N-5020, Bergen, Norway

JGOFS SSC and IPO Finances (2002-2003)

In 2002, the project completed an overall operation budget of \$369,221 with funds from the Research Council of Norway, SCOR, IGBP, LOICZ, IOC and the University of Bergen (UiB). These funds covered the administration and activity costs of the project, overheads for the project and facilities, publication costs, travel costs of the committee and activities, such as meetings, workshops and symposia. The total expenditure for 2002 was \$334 666, leaving a balance of \$34 555 from national and international programmes. This sum was carried over to 2003 in support of SSC, IPO and operations. An overview and details of the budget are shown in the table below.

Year 2002 (final)

JGOFS SSC, SG, WG and TT Activities			
Income	Budget	Planned	Notes
Research Council of Norway	\$171 415	\$171 415	Administration, travel, Report Series, etc.
SCOR funds	\$85 000	\$85 000	JGOFS SSC meeting and group activities
University of Bergen (UiB)	\$27 000	\$27 000	Office, supplies, printing, overhead, etc.
IGBP Secretariat	\$20 145	\$20 145	SSC meeting
IGBP Secretariat 2001	\$2 000	\$2 000	Springer-Verlag Publication/Technical
IOC funds	\$9 100	\$7 761	CMTT workshop (returned the balance)
IOC funds	\$11 500	\$11 500	CMTT Global Synthesis Workshop
IOC final installment (Ocean Transport)		\$895	JGOFS WOCE Workshop (2001)
LOICZ funds	\$15 000	\$15 000	CMTT workshop & Global Synthesis
International funds (residuals)	\$28 505	\$28 505	
Subtotal	\$369 665	\$369 221	

Expenses	Budgeted	Expenses	Notes	Dates
International Project Office	\$171 415	\$171 415	Office Administration (staff)	
International Project Office	\$27 000	\$27 000	Office Operations (supplies, travel, reports, etc.)	
SSC Meeting (19)	\$40 000	\$31 505	IGBP/SCOR funds/Chile, Training Course	23-35 Sept
Executive Meeting (5)	\$10 000	\$0	cancelled	
Synthesis Groups and Task Teams Activities				
CMTT (10-12)--Subpolar	\$5 000	\$7 923	Joint c/ LOCIZ, IOC	April
CMTT (10-12) Global Synthesis	\$20 000	\$19 100	Joint c/ IOC & LOCIZ@\$10K each	December
JGTT (10+20)		\$0	Joint with GSWG (c/ GAIN 10K@j	23 June
NASG		\$0	3 meetings	M-dates
DMTT (10)	\$10 000	\$3 654	General Business Mtgs/plans	28-28 Jan
DMTT	\$5 000	\$5 242	Ispra Dataset Rescue	26 June
DMTT	deferred		Bremerhaven Pangaea	jan.03
PJTT (9)	cancelled	\$724	Joint c/ PAGES	nov.01
IOSG		\$364	Ad hoc Mtg in Hawaii	10 Feb
SOSG	\$10 000	\$13 438	Synthesis Workshop, Honolulu, Hawaii	11-12 Feb
EPSG	\$10 000	\$9 864	Workshop, business mtg, misc (budget \$34K)	
NPSG (9)		\$3 208	Meeting and Session @ PICES	
GSWG (+ JGTT))	\$30 000	\$28 695	Joint c/ JGTT and GAIM/ Workshop/Ispra	

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Other meetings and expenses				
IGBP Book managing editor		\$849	Fasham's request for Angela Bayfield	
OSC Planning (Haugan)		\$1 270	Meeting-. -Honolulu/ASLO OSM	February
SCOR Secretariat	\$6 000	\$6 000	estimated travel expenses, Conkright (USA)	
JGOFS Synthesis Book/IOSG	\$2 000	\$0	IGBP-\$2K, Technical layout @ Springer-Verlag	
JGOFS Reports Series		\$0	SCOR funds	
Corrections 2001		\$4 415		
Subtotal	\$346 415	\$334 666		
Balance	\$23 250	\$34 555	international and national residuals	

In 2003, project funds are estimated at \$426 045 with funds expected from the Research Council of Norway, SCOR, IGBP, LOICZ, IOC, IAI, APN, START, and University of Bergen (UiB). These funds will cover the administration and activity costs of the project, e.g., staff, overheads for the project and facilities, publication and mailing costs, travel costs of the committee, staff, synthesis groups, and task teams to meetings, workshops and symposia. As of early July 2003, the confirmed expense of the activities is \$243 080 and a positive balance of \$182,965. However, the budgeted Expense for Year 2003 is \$432 400, with an apparent deficit of -\$6 355. We fully expect this deficit will wane by year's end as we complete the budget of several large activities, e.g., the Open Science Conference and SSC Meeting, which remains open. An overview and details of the budget are shown in the table below.

Year 2003 (as of July)

JGOFS SSC, SG, WG and TT Activities				
INCOME	Budget	Confirmed	Notes	
Research Council of Norway	\$182 900	\$182 900	Administration, travel, JGOFS Report Series	
SCOR funds (2003)	\$85 000	\$85 000	JGOFS SSC meeting and Committee activities	
Residual funds international	\$38 000	\$38 000		
University of Bergen (UiB)	\$27 000	\$27 000	Office, supplies, printing, overhead (offices)	
Residual funds national	\$30 000	\$30 000		
IGBP Secretariat (2003)	\$20 145	\$20 145	SSC meeting	
Funds Raised for LDC scientists	\$45 000	\$45 000	SCOR, IAI, APN, START, IPO	
LOICZ Funds	\$10 000	\$10 000	CMTT Synthesis	
Subtotal	\$426 045	\$426 045		
Expenses	Budgeted	Expenses	Notes	Dates
International Project Office	\$209 900	\$209 900	Administration (staff, supplies, operations)	
SSC Meeting (19)	\$40 000		Washington, D.C.	4 May
Executive plus Meeting (8)	\$10 000		Bergen	September

Hotel, Banquet and Nor. guests	\$10 000		Bergen	September
Synthesis Groups and Task Teams				
CMTT (5-8)	\$10 000		Book Meeting and Springer Verlag layout	October
JGTT (10)			no meeting planned	
NASG (10)	\$11 000	\$3 200	Mtgs in Toulouse, Paris, Nice	7 January
DMTT (10)	\$10 000	\$7 000	BODC Meeting	13-15 March
DMTT	\$3 000	\$2 980	Pangaea Meeting (technical)	25-29 January
PJTT (9)			no meeting planned	
IOSG (3)	\$5 000		Book Editors Mtg, Miami	October
SOSG			no meeting planned	
EPSG (3)	\$6 000		OSC	5-8 May
NPSG (9)	\$10 000		Mtgs in Japan and China	October
GSWG (10)			Meeting cancelled (14 Feb)	cancelled
Other meetings and expenses				
GLOBEC Workshop	\$2 500		Trophic food-web modelling	June
IGBP Congress (Banff)	\$8 000		Banff, Canada participants	June
IGBP/SCOR OCEANS OSC	\$1 000		Paris, France David Siegel	January
CMTT (manager + supplies)	\$3 000	\$3 000	Taipei, Taiwan	March
JGOFS Synthesis Book/IOSG	\$2 000		IGBP-\$2K, Springer Technical layout	December
3rd JGOFS OSC speakers	\$20 000			5-8 May
3rd OSC Receptions	\$15 000	\$15 000	NAS, Smithsonian, Banquet	5-8 May
3rd OSC Invitees from IPO	\$5 000		Norwegian guests of the IPO/OSC	5-8 May
LDC Scientists for the 3rd OSC	\$45 000		Africa, S. Am., SE Asia, E. Europe, M. East	5-8 May
DM DVD Production/copying	\$4 000		distributed to the DMTT, OSC, SSC, WDC	April
SCOR Secretariat	\$2 000		US gov't employee travel	
JGOFS Reports Series	\$10 000		GSWG and Publication List	December
Springer_Fasham_bulk order	\$2 000	\$2 000	40 books paid/shipped/OSC/SSC	April
Subtotal	\$432 400	\$243 080		
Balance	-\$6 355	\$182 965		

Data Management

During the last period, the Data Management Task Team (DMTT) and the JGOFS International Project Office (IPO) continued to document and compile all data and metadata collected on JGOFS cruises over the last decade. With help from the IPO, DMTT members updated the list of JGOFS core parameters, along with the most common units and metadata. At the end of 2002,

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the JGOFS Scientific Steering Committee (SSC), DMTT and IPO reached a consensus on a minimum list of JGOFS parameters that participating countries should focus on in their submissions to the International JGOFS Data Collection. The core parameters list was published in JGOFS Report no. 37 in August 2002 in an almost final form. It is available via the JGOFS Web site (www.uib.no/jgoifs/Publications/Report_Series/JGOFS_37.pdf) as a part of the JGOFS legacy.

Through several, very active international meetings, national activities of the DMTT representatives and some international JGOFS collaborations to secure the identification, documentation and inclusion of the relevant datasets, especially for countries not represented in the DMTT, the equivalent of more than 20 datasets was gathered and has been published in the "International JGOFS Data Collection, 1988-2000. Volume 1: discrete datasets" DVD, which was first distributed during the Final JGOFS Open Science Conference, held in Washington, D.C. (USA) in early May 2003. This DVD product, a major component of the JGOFS legacy, includes data contributions from Australia, Canada, France, India, Japan, Netherlands, New Zealand, Norway, Pakistan, Spain, United Kingdom and United States, and represents more than three quarters of all identified JGOFS datasets with some national contributions delivered up to 96% when compared to the funded science work (e.g., UK, US). This DVD includes an integral copy of all previous JGOFS CD-ROMs and other data products available by March 31, and in particular, ten major contributions never previously released. The DVD is organised by countries, projects and cruises, as much as possible, in order to simplify the exploration of the datasets.

Members of the DMTT worked throughout their tenure to secure funding that would lead to the production of a single file and data format. These efforts were not successful, but due to the continuous dedication of its members, the DMTT was successful in acquiring the rich collection of biogeochemical data contained in this DVD. Yet, the ultimate purpose of the DMTT was initially to provide scientists with a comprehensive biogeochemical data set in a common file and format for use not only in current modelling and synthesis activities but also in future global change studies. Unfortunately, only a compilation of JGOFS discrete datasets is achieved in the international JGOFS framework. However, an initiative is currently developed for JGOFS datasets at the World Data Centre for Marine Environmental Sciences (WDC-MARE): The publication of an "International JGOFS Data Collection, 1988-2000. Volume 2: integrated datasets" DVD is currently anticipated in late 2004. All datasets in this forthcoming DVD should be accessible in a common file and data format through the PANGAEA user and visualization interface and be organised by project, cruise and data set for each parameter. The DMTT and IPO personnel will continue to work with the PANGAEA team until December 2003, and later, on an individual, voluntary basis.

The DMTT and IPO have developed and presented on several occasions, a set of statements ("lessons learned") and recommendations for new projects to consider when data and information plans are developed and implemented. These recommendations are designed to ensure the rapid dissemination of marine data and information and their long-term preservation and accessibility. This will also be part of JGOFS legacy.

In addition, the IPO Assistant Executive Officer and the DMTT Past Chair are currently mandated by IGBP and SCOR to prepare the Data and Information Management Plan for the present and future projects, such as SOLAS, IMBER and the SCOR/IOC GEOHAB initiative. This action will largely benefit from the experience gained in JGOFS.

JGOFS Web Site

During July 2002, the IPO launched a new JGOFS Internet site (www.uib.no/jgofs) with three objectives in mind. The first is to improve the overall organisation of the site and to make it more user-friendly. The second is to preserve accumulated JGOFS knowledge with minimal support until the programme ends in December 2003. And the third is to facilitate the handover of information to future ocean biogeochemistry and ecology programmes as part of the JGOFS legacy. The International JGOFS Web site (about 650 Mb of original content) will be augmented and maintained until the end of the project and it will be made available on CD-ROMs to maintain the continuity with the relevant, new IGBP/SCOR projects or initiatives and to preserve another major JGOFS legacy. Specific efforts have also been made to exhibit JGOFS achievements in data and information management in the marine sciences (www.uib.no/jgofs/DMTT/dmtt.html). For instance, the JGOFS-labelled cruises, identified by each individual country, and compiled by the IPO and DMTT are listed and sorted either by basin (Atlantic, Pacific, Indian, Southern Oceans, and Other Basins) or by country (20 national contributions). In addition, collection of JGOFS publications (JGOFS Reports, books, special issues in journals (45 are listed as official JGOFS contributions at http://www.uib.no/jgofs/Publications/Special_Issues/special_issues.html), peer-reviewed articles, electronic data publications (25 are listed as JGOFS-related contributions at http://www.uib.no/jgofs/Publications/cd_roms/index.html) and slide presentations) are also gathered for the benefit of all JGOFS and future marine scientists.

Third JGOFS Open Science Conference

In May 2003, JGOFS held its final Open Science Conference. Several goals were set for the Final Conference. First, the conference wished to bring together all JGOFS scientists and students involved in the project since its inception. Second, it presented the major accomplishments of the national and international JGOFS process studies, time-series stations, ocean surveys, and ocean modelling. Third, it reached out to the broader global change programs in climate, human dimension and biodiversity research by linking conference themes to emerging issues in the global carbon cycle. Fourth, it included science and educational activities for the general public. And finally, it offered the scientific community and general public an opportunity to discuss ocean-related issues and concerns with renowned JGOFS scientists and notable national officials. All oral presentations and some poster contributions are available on the US-JGOFS website or the International JGOFS Web site.

The first goal of the conference program and organizing committees to ensure full participation of JGOFS and related global change research scientists was a major financial undertaking, and well beyond our immediate sponsors. To be successful, we sought the support and generosity of

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our affiliates at the regional, international programs and intergovernmental organizations in oceanography, marine science and global change research. The IPO raised co-sponsorship funds from the Asia-Pacific Network for Asia and western Pacific scientists (APN, \$12,000), the Inter-Americas Institute for Global Change Research for South and Central American scientists (IAI, \$3,000), the Scientific Committee on Oceanic Research (SCOR, \$8,000) and finally the System Analysis, Research, and Training for assistance with young and mid-career African and Southeast Asia scientists (START, \$10,000). In addition, the IPO contributed an amount of about \$10,000 for Eastern Europe and Middle East scientists and \$15,000 for Conference Receptions. An overview of OSC funds and financial support are shown in the tables below (next page).

Overall budget allocated or raised by the SSC and IPO

	Amount	Funds	Notes
JGOFS SSC Members and Speakers	\$40 000	JGOFS	Conference Speakers and SSC
Open Science Conference Speakers	\$20 000	JGOFS	Conference Speakers
Funds Raised for LDC Scientists	\$33 000	APN, START, SCOR, IAI	LDC scientists support
Norwegian Guests of JGOFS	\$7 500	International Project Office	Johannessen, Sakshaug, others
Conference Receptions and Breaks	\$15 000	University of Bergen	Smithsonian and NAS
Eastern Europe and Middle Eastern Scientists	\$5 000	JGOFS	Oguz (Turkey), Ahmed (Oman), and Kutub (Israel)
Total (estimated)	\$120 500		

Funds Raised for or Contributed to the Conference by the IPO

Source	Amount	Countries (number of scientists)
Asian Pacific Network (APN)	12 000	China (2), India (2), Pakistan (1), Korea (1)
Global Change System for Analysis Research and Training (START)	10 000	India (2), Cameroon (1)
Scientific Committee on Oceanic Research (SCOR)	8 000	India (3)
Inter America Initiative (IAI)	3 000	Chile (1), Brazil (1), Columbia (1)
Joint Global Ocean Flux Study (JGOFS)	6 000	Turkey (1), Oman (1), Israel (1)
International Project Office (IPO)	7 500	Norway (2-3)
Total (estimate)	\$46 500	

List of Scientists that requested and offered financial support by the IPO and U.S. PO

Names	Country	Project/Topic
Baastien Knoppers	Brazil	Continental margins
Charles Gabche	Cameroon	Coastal/humans
Daniela Turk	Canada	Remote sensing
Rodrigo Gonzalez	Chile	Eastern Pacific
Seung-Hyun Son	China-Beijing	East China Sea
Shang Chen	China-Beijing	East China Sea
Gladys Bernal	Colombia	Paleoceanogr.
Aurelien Paulmier	France	Oxygen Min. Zone
Mathieu Mongin	France	Si cycling
Pieter van Beek	France	Water column
Mangesh Gauns	India	Arabian Sea
Shyam M. Gupta	India	Bay of Bengal
MVS Guptha	India	Bay of Bengal
Anil L. Paropkari	India	Coastal/humans
S. Shanmuganandan	India	Depos. of fixed N
S.S. Sundarvel	India	Bay of Bengal
M. Madhupratap	India	Arabian Sea
SWA Naqvi	India	Arabian Sea
MM Sarin	India	Arabian Sea
K.S. Yajnik	India	Arabian Sea
Hema Naik	India	Benthic N cycling
M. Dileep Kumar	India	Arabian Sea
Mutaz A.Kutub Qutob	Israel	Red Sea
Jae-yeon Kim	Korea	East China Sea
Saiyad Ahmed	Oman	NASEER Project
Samina Kidwai	Pakistan	NASEER Project
Temel Oguz	Turkey	Black Sea
Paula McLeod	UK	Modelling
Matt Church	USA	North Pacific
Anitra Ingalls	USA	AESOPS
Phoebe Lam	USA	Fate of POC
Galen McKinley	USA	North Atlantic

Publications

SCOR and the IPO support the printing of the JGOFS Reports (ISSN: 1016-7331) in Bergen, Norway, distribute them internationally free of charge to libraries, institutions and scientists, and make them available as pdf files from the JGOFS Web site. Since July 2002, the IPO has:

- managed the technical editing and printed the following report: No. 37 Data Management Task Team Meeting Minutes, January 2002 & June 2000. August 2002,

- assisted the DMTT with the edition of the DVD "JGOFS International Data Collection. Volume 1: Discrete Datasets", and
- assisted M. Fasham (editor), with the edition of the book *Ocean Biogeochemistry: The Role of the Ocean Carbon Cycle in Global Change*, International Geosphere-Biosphere Programme Book Series Nr. 11, Springer-Verlag, ISBN: 3-540-42398-2, May 2003.

In addition, several special issues have been published as official JGOFS contributions in 2002-2003:

- K.-K. Liu, T.-H. Peng, P.-T. Shaw, Circulation and biogeochemical processes in the East China Sea and the vicinity of Taiwan, *Deep Sea Research II*, 50(6-7), 2003 (Continental Margins)
- W.O. Smith Jr. and R.F. Anderson, US Southern Ocean JGOFS Program (AESOPS): Part III, *Deep Sea Research II*, 50(3-4), 2003 (Southern Ocean)
- S. Tsunogai, K. Iseki, Y. Saito, M. Kusakabe, Biogeochemical Cycle in the East China Sea, *Deep Sea Research II*, 50(2), 2003 (Continental Margins)
- T. Saino, A. Bychkov, C.-T. A. Chen and P. J. Harrison, North Pacific Biogeochemical Processes, *Deep Sea Research II*, 49(24-25), 2002 (North Pacific)
- J.E. Bauer, D.J. Demaster, D.J. Repeta and P.G. Verity, Biogeochemistry and Cycling of Carbon in the Northwest Atlantic Continental Margin: Findings of the Ocean Margins Program, *Deep Sea Research II*, 49(20), 2002 (North Atlantic / Continental Margins)
- G. Parrilla, G. Siedler and P.Y. Le Traon, Canary Islands, Azores, Gibraltar Observations (CANIGO), Volume II: Studies of the Azores and Gibraltar regions, *Deep Sea Research II*, 49(19), 2002, (North Atlantic, related)
- V.H. Strass, U.V. Bathmann, M.M. Rutgers van den Loeff and V. Smetacek, Mesoscale Physics, Biogeochemistry and Ecology of the Antarctic Polar Front, Atlantic Sector, *Deep Sea Research II*, 49(18), 2002 (Southern Ocean)
- G. Parrilla, G. Siedler and P.Y. Le Traon, Canary Islands, Azores, Gibraltar Observations (CANIGO), Volume I: northern Canary Islands basin, *Deep Sea Research II*, 49(17), 2002, (North Atlantic, related)
- P. Tréguer, P. Pondaven, D.M. Nelson, R.F. Anderson, The Southern Ocean II: Climatic Changes and the Cycle of Carbon, *Deep Sea Research II*, 49(16), 2002 (Southern Ocean)
- P.H. Burkil, S.D. Archer, C. Robinson, Dimethyl Sulphide Biogeochemistry within a Coccolithophore Bloom: An Overview, *Deep Sea Research II*, 49(15), 2002 (Others, related)
- R. Le Borgne, R.A. Feely, D.J. Mackey, The Equatorial Pacific JGOFS Synthesis, *Deep Sea Research II*, 49(13-14), 2002 (Equatorial Pacific)
- S.L. Smith, The 1994-1996 Arabian Sea Expedition: Oceanic Response to Monsoon al Forcing, Part 5, *Deep Sea Research II*, 49(12), 2002 (Indian Ocean)
- J.C. Marty, Studies at the DYFAMED (France JGOFS) Time-Series Station, N.W. Mediterranean Sea, *Deep Sea Research II*, 49(11), 2002 (Time-Series)
- P. Tréguer, P. Pondaven, R.F. Anderson, M. Abbott and P. Boyd, The Southern Ocean I: Climatic Changes in the Cycle of Carbon in the Southern Ocean, *Deep Sea Research II*, 49(9-10), 2002 (Southern Ocean)

- R. Anadon and M. Estrada, Carbon Fluxes in High Productivity Areas in the Antarctic Peninsula - Fruela Cruises, *Deep-Sea Research II*, 49(4-5), 2002 (Southern Ocean)
- S. Doney, J. Sarmiento and P. Falkowski, The US JGOFS Synthesis and Modeling Project: Phase I, *Deep-Sea Research II*, 49(1-3), 2002 (Synthesis and Modeling)

Newsletters (articles)

Office Closure

The International Project Office plans to close its offices at the University of Bergen on 31 December 2003, which marks the end of eight successful years in Norway. In September during the final JGOFS Executive Meeting in Bergen, the Executives and the Office will honour our hosts and friends at the Research Council of Norway and the University of Bergen. JGOFS has much to be grateful and appreciative for. Without the continuous financial and facility support over the years, JGOFS and the SSC would not have functioned as well as it has.

Plans are now well underway to transfer and archive JGOFS and IPO holdings and documents to the University of Bergen, libraries in the USA and Norway, National and World Data Centre system, and to future programmes via IGBP and SCOR. The official financial records covering JGOFS activities/accounts over the past eight years will be held in Norway at the University. Office copies of all transactions will be archived for several years at the Center for Studies of the Environment and Resources. For future reference and access to the financial records, the IPO will provide contact information of the responsible person(s) at the University to SCOR and IGBP. Other complete holdings, such as the JGOFS Report Series, Annual Reports to SCOR, IGBP and Norwegian Research Council over the years will be transferred to the National Library in Norway (Mo i Rana) and all collected series from 1988 to 2003 will be transferred to the Library at Woods Hole Oceanographic Institution and held with the US JGOFS Planning Office and Data Management records, reports, and historical documents. The JGOFS Web site, which will be maintained regularly, will remain online at least for one year and will also be copied on CD ROMs, to be transferred to the SCOR, IGBP, chosen libraries, and interested individuals, and possibly to future ocean programmes if requested before Office closure.

For further information about JGOFS or any of the activities discussed in this report, please contact Roger B. Hanson, Executive Director, Joint Global Ocean Flux Study IPO, Centre for Studies of Environment and Resources, University of Bergen, 5020 Bergen, NORWAY, Tel: +47-5558-4244, Fax: -9687, E-mail: roger.hanson@jgofs.uib.no, Homepage: <http://www.uib.no/jgofs/jgofs.html>.

3.2 Scientific Steering Committee on Global Ocean Ecosystem Dynamics (GLOBEC) (Joint with IGBP and IOC)

Terms of Reference:

- To oversee the development and implementation of the Global Ocean Ecosystem Dynamics program in accordance with the published Science Plan.
- To develop a detailed Implementation Plan for GLOBEC for presentation to the sponsors and the larger scientific community.
- To recommend to the sponsoring organizations the necessary actions to be taken in accordance with the GLOBEC Science and Implementation Plans and to coordinate and manage the resulting activities.
- To collaborate, as appropriate, with other related global change programs and planning activities, such as JGOFS, LOICZ, WCRP, the IOC program on Ocean Science and Living Resources (OSLR), and the emerging Global Ocean Observing System.
- To establish appropriate data management policies to ensure sharing and preservation of the GLOBEC data set, taking into account the related policies of the sponsors.
- To report regularly to SCOR, IGBP, and IOC and to other bodies such as WCRP, ICES, and PICES, on the state of planning and accomplishments of GLOBEC.

Chair:

Francisco Werner
Marine Sciences, CB# 3300
Chapel Hill, NC 27599-3300

Tel: +1-919-962-0269
Fax: +1-(919-962-1254
E-mail: cisco@unc.edu

Members:

Jurgen Alheit	GERMANY	Rosemary Ommer	CANADA
Tim Baumgartner	MEXICO	Geir Ottersen	NORWAY
John Field	SOUTH AFRICA	Ana Parma	ARGENTINA
Eileen Hofmann	USA	Jeffrey Runge	USA
Patrick Lahodey	NEW CALEDONIA	Qisheng Tang	CHINA-Beijing
Celia Marrase	SPAIN		

Executive Officer: Manuel Barange

Executive Committee Reporter: Akira Taniguchi

GLOBEC: Global Ocean Ecosystem Dynamics

Report of the SCOR/IOC/IGBP GLOBEC International Programme for 2002 to the SCOR Executive Committee. Moscow, Russia, 15-19 September 2003

Manuel Barange, Director GLOBEC International Project Office
Plymouth Marine Laboratory, UK, m.barange@pml.ac.uk

1. RECENT PROGRESS: Symposia, Working Group and Integration activities

1.1. GLOBEC Open Science Meeting

The Proceedings of the OSM (Qingdao, China, October 2002) will be published as a special volume of *Fisheries Oceanography* in August 2003. The volume includes 27 peer-reviewed papers. A summary of the research highlights of the meeting is appended at the end of this report (in plastic folder after p. 3-40).

1.2. GLOBEC/PICES/ICES 3rd Zooplankton Symposium. Gijon, Spain, May 2003

This symposium was GLOBEC's largest effort this year, co-sponsored by the International Council for the Exploration of the Sea (ICES) and the North Pacific Marine Science Organization (PICES). The title of the meeting was "*The Role of Zooplankton in Global Ecosystem Dynamics: Comparative Studies from the World Oceans*", and the main goal was to define the "state of the art" in zooplankton ecology and to determine key research initiatives to be pursued in the 21st Century. It was convened by Luis Valdes (ICES), Tsutomu Ikeda (PICES) and Roger Harris (GLOBEC). This was the largest GLOBEC meeting to date, bringing 420 attendees from 50 countries

The symposium sessions were:

- a) Physical variability and zooplankton population dynamics
- b) Role of zooplankton in biogeochemical cycles
- c) Climate influences: What are the long-term zooplankton data sets telling us?
- d) New approaches to zooplankton modelling
- e) Progress in molecular biology
- f) Application of new technologies
- g) Comparative life histories and life cycles of zooplankton populations within and between the North Pacific and North Atlantic oceans
- h) Microzooplankton in the marine pelagial: Recent advances from molecules to ecosystems

The meeting also included three satellite workshops on:

- Gelatinous zooplankton and fish: Predators, prey or nuisance (Pat Kremer)
- Meso and bathypelagic zooplankton study: Current status and future aspects (Tom Ikeda)

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- Climate variability, zooplankton abundance and distribution – comparative opportunities from the world’s oceans (Ian Perry and Hal Batchelder)

The Proceedings will be published as a Special Issue of *ICES Journal of Marine Science*, edited by Roger Harris, Tom Ikeda, Skip McKinnell, Bill Peterson and Luis Valdes. The submission deadline is 27 June 2003, with a publication date expected for spring 2004.

1.3. Focus 1 working group: Retrospective Analysis and Long-term time series

The working groups of Foci 1, 2 and 3 met in parallel in October 2002, prior to the GLOBEC OSM. Foci 4 met In June 2002 in Sidney, Canada.

Foci 1 WG activities in recent months and plans for the future include:

- The Focus hosted two meetings in Nov. 2002 and March 2003, in Swakopmund, Namibia, aimed at developing cooperation activities between the Benguela and Humboldt Currents. The second meeting produced a report on “Long-term dynamics of the Benguela and Humboldt: An ecosystem perspective”, to be published in the GLOBEC report series.
- The group submitted an article to the *PAGES Newsletter* to link paleoceanographic efforts under GLOBEC with those under other IGBP programmes.
- A proposal is being drafted to support a workshop on “Ecosystems comparisons” through the Rockefeller Foundation’s Bellagio Conference Centre. This would be part of GLOBEC’s integration and synthesis activities.
- A workshop, funded by GLOBEC and Japanese national sources, will be hosted in Tokyo, Japan, 9-12 December 2003, to continue the Focus’ effort on rescuing long-term data series. Previous meetings in this direction included a rescue effort for the California-Humboldt region (Lima, Peru, May 2001) and Benguela region (Cape Town, February 2001).
- As a result of the Gijon Zooplankton symposium, described above, ICES/PICES/GLOBEC would like to organise a workshop in 2004/2005 to produce a time series of zooplankton abundance in the major oceans, equivalent to the time series of pelagic fish abundance that have been used to develop the concepts of teleconnections and regime shifts in the pelagic domain.
- Focus 1 is developing a review paper on influences of climate on fisheries, to be presented at the 4th World Fisheries Congress in Vancouver, May 2004.
- Finally, a new field activity to obtain paleoceanographic data from the Humboldt Current is to start in 2004. This will address the Foci’s objective of comparing paleoceanographic records in the California, Benguela and Humboldt currents.

1.4. Focus 3 working group: Prediction and Modelling

Main activities of the group in recent months include:

- Focus 3 is leading an IOC/SCOR activity on “Basin-Scale Ecosystem Modelling”. This activity is co-sponsored by PICES, JGOFS and GLOBEC. The group met in Harlow, UK (29 May – 2 June), and included B. de Young, M. Heath, C. Werner, M. Kishi, E.

Murphy (Focus 3), F. Chai, D. McGillicuddy (JGOFS), P. Monfray (IMBER) and B. Megrey (PICES). The group intends to produce a review paper for *Science* or *Nature* by late 2003 which will map out the steps involved in advancing marine ecological modelling towards a resolution of the ocean basin, multi-decadal problem, and ultimately a basin-scale prognostic modelling capability. The group will meet again October 22-25, 2003.

- Members of Focus 3 participated in a workshop to develop a marine ecosystem model of the North Pacific Ocean, including pelagic fish in Yokohama (Japan), 3-6 March 2003. The goals of the workshop were to develop a two-way model which includes prey-predator system between lower trophic ecosystem and fish, and to build a Lagrangian model which can be consider fish migration and fish population dynamics embedded in a basin-scale 3-D circulation model. The output will be a set of papers to be submitted to *Ecological Modelling*.
- Focus 3 is preparing a proposal, for submission to the APN for funding, to secure a workshop on “Climate Interactions and Marine Ecosystems: Effects on the Structure and Function of Marine Food Webs and Implications for Marine Fish Production in the North Pacific Ocean and Marginal Seas”. The request will also include 4-month funding for two post-doctoral fellows, from Russia and China, to conduct preliminary work.
- Finally, the group is considering hosting a workshop on Optical Particle Counter (OPC)/ Video Plankton Recorder (VPR) use, following the very successful GLOBEC methodological workshops on the Continuous Underway Fish Egg Sampler (CUFES) and OPC, in 2000 and 2001. This workshop would ideally take place in mid-2004.

1.5 Focus 4 working group: Feedback from changes in marine ecosystem structure

The first meeting of the Focus was in Sidney in June 2002, on the topic of “Social impacts of changes in marine ecosystems”. The central questions identified are:

- 1) How do marine ecosystem changes affect coastal communities?
- 2) What are the reciprocal effects of human responses on marine ecosystems?

Additional activities of the group (recent and future) include:

- Organising a session at the 2nd GLOBEC Open Science Meeting on “Social impacts from changes in marine ecosystem structure”.
- Preparing a paper on “Scale issues in marine ecosystems and human interactions”, to be published in *Fisheries Oceanography*.
- A presentation (by R. Ommer) on “Social issues/implications of marine ecosystem changes” at a symposium on “Science for Resource-Dependent Communities” in Anchorage, Alaska (13-17 January 2003). The symposium was sponsored by the Gulf of Alaska Ecosystem Monitoring Program, the Exxon Valdez Oil Spill program, and the U.S. GLOBEC programme.
- A session hosted at the 3rd IGBP Congress on “Vulnerability of coastal communities to natural and human-induced changes in living marine resources”.
- A session at the IHDP Open Science Meeting (Montreal; October 2003) on “Global Environmental Change and Coastal Systems: A Microcosm of Coupled Human-

Environmental Systems”. The session is sponsored by GECHS, GLOBEC, IDGEC and LOICZ. GLOBEC’s paper is entitled: “Communities of fish and communities of fishers: Understanding human-ecosystem interactions in the coastal ocean” and is co-authored by R. Ommer, B. Neis and R. Ian Perry.

- GLOBEC Focus 4 is supporting a speaker at the PICES XII Annual Meeting (October 2003 in Seoul, Korea) under the session “Human Dimensions of Ecosystem Variability”. The invited speaker is Lawrence Hamilton, who will present “Ecosystem–Society Interactions in the Northern Atlantic: Human Dimensions of Fisheries Collapse”.

In the immediate future the group will:

- Develop an activity on Eastern Pacific Coastal Fisheries in collaboration with GECaFS (the IGBP/IHDP/WCRP joint project on Global Environmental Change and Food Systems) with the objective of developing strategies to reduce societal vulnerability to changes in marine ecosystem productivity induced by El Niño/La Niña, and other aspects of GEC.
- Initiate planning for a major symposium on “Social Impacts of changes in marine ecosystem structure”, probably for late 2005/early 2006.
- Host the 2nd F4WG Working Group meeting (25-26 June 2003, Banff, Canada) to discuss a review paper integrating natural system and social system models in four regions: NW Atlantic, NE Pacific, the Humboldt and SW Africa.

1.6 GLOBEC Integration and Synthesis

GLOBEC intends to complete its activities in 2009, in agreement with SCOR, IGBP and the IOC. This sets a clear time frame for the SSC to plan integration and synthesis activities. The SSC has developed a plan to tackle this crucial stage of the programme, along the following lines:

- Develop a fast and brief document by the 2004 SSC meeting, to set up the goals, milestones and pathways to synthesis. This would include an inventory of existing syntheses.
- Support the synthesis activities already undertaken by the CCC, CCCC and SO regional programmes (see below), and encourage SPACC to initiate integration and synthesis.
- Consider the possibility of publishing a book with descriptions of the achievements of each national, multinational and regional programme. This should also include the applications of the research.
- Following the above, the Foci WG would work with the SSC in setting up how to synthesise information from the different activities conducted under GLOBEC, using the outcomes of the points above. It may be that at this stage GLOBEC committees would need re-structuring to ensure that we capture GLOBEC’s legacy adequately. Additional funding would have to be identified to activate this phase.
- The SSC will continue to plan for OSMs to continue to build the community and bring up the science.

- The SSC commits to prepare a brief (2-3 pages) research highlights publication every year, to be included in sponsors reports, and to continue focusing on delivery.

2. REGIONAL AND NATIONAL PROGRAMME UPDATES (see Annex 1 for more details)

GLOBEC currently has four regional programmes, and has a further two in planning phase.

2.1 ICES-GLOBEC Cod and Climate Change project (CCC)

The activities of the group in recent months and in the future include the following:

- A synthesis workshop held in New Bedford, US, May 2003. This was aimed at producing a book on cod based upon the activities of the WG, probably to be published in the *IGBP Science Series*.
- A WG meeting to develop a new action plan for 2003-2009, New Bedford, US, May 2003.
- A theme session on transport of cod larvae at ICES ASC, Tallinn, Estonia, Sept. 2003
- A meeting of the WG, focused on synthesis activities, Bergen, Norway, 7-10 May 2004
- A major ICES-GLOBEC symposium on “*The influence of climate change on North Atlantic fish stocks*”, Bergen, Norway, May 2004, co-sponsored by ICES and GLOBEC.
- An update of the ICES CRR report (205) on *Spawning and Life History Information for North Atlantic Cod Stocks* (originally published in 1994) to be completed over 2004.

As part of the strategic development of the project for 2003-2009, the group intends to conduct annual workshops targeting specific topics:

- Cod survival through the first year of life: Relationship to zooplankton dynamics and sources of mortality (2005).
- Influence of climate on tropho-dynamics of cod ecosystems (2006)
- The decline (and recovery) of cod stocks throughout the North Atlantic (2007)
- The response of cod to climate change scenarios (2007)
- Implications of results from CCC for fisheries management (2008)
- Synthesis II Workshop (2009).

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2.2. Small Pelagics And Climate Change

Activities of the SPACC programme are grouped along four main themes.

Theme 1: Retrospective data analysis (coordinators: J Alheit/ T Baumgartner)

- Will organise a meeting on Long-term Dynamics of Small Pelagic Fish and Zooplankton in Japanese waters, 9-12 December 2003, as introduced under Focus 1.
- Will support a new paleoceanographic research activity to be initiated in the Humboldt (Peru), (also reported above under Focus 1), which has the potential to provide comparative data to answer SPACC questions.

Theme 2: Comparative Population Dynamics (Coordinator: M. Barange)

- Completed the activities of a Study Group on “Use of environmental data in the management of pelagic fish” (funded by IOC). Outputs: Two GLOBEC Reports (Special Contributions 5 and 6), eight research papers in the primary literature and one database of environmental data for the 4 main upwelling areas.

Theme 3: Spawning habitat dynamics (Coordinator: C Roy, D Checkley, L Castro)

- Currently planning a Workshop on “Characterising and comparing spawning habitats of small pelagic fish” (Conveners: L Castro, C van der Lingen and D Checkley) for 12-13 January 2004.
- Also planning a meeting on “Spawning habitat quality and dynamics and the daily egg production method”, for 14-16 January 2004 (Conveners L Castro, C van der Lingen and P Freon). Both meetings to take place in Concepción, Chile. Funding limited to local sources, with the possible support from IRD and SCOR.

Theme 4: Economic Consequences of pelagic fish fluctuations (Coordinator: S Herrick and J Hunter)

- Planning a workshop on economic and social consequences of climate change on small pelagic fish. (Conveners: S. Herrick/ R Hanesson). Dates and venue for this workshop still to be finalised, but likely to take place in 2004. About 50% of the funding required has been identified and we are currently searching for additional support.

Finally, the following programme news must be reported:

- The SPACC Executive Committee will have a planning meeting to facilitate integration activities, in Concepción, Chile, January 2004.
- SPACC scientists are developing a research proposal in the Humboldt Current by French, Peruvian, Chilean scientists, focused on hydrodynamic modelling, fish behaviour and the causes of regime shifts.
- SPACC has been very successful in implementing Eastern Boundary Current hydrodynamic models. Benguela, California and Humboldt hydrodynamic models are available with regional configuration based on the same tool (ROMS). The implementation of a fourth region (Canary Current) will commence in September.

- The Trilateral (Canada, USA, Mexico) sardine forum continues its activities, aimed at sustaining collaborative work on sardine in the three countries.

2.3 Southern Ocean GLOBEC

The primary objective of SO GLOBEC is to understand the physical and biological factors that contribute to enhanced Antarctic krill growth, reproduction, recruitment and survivorship throughout the year. Its focus also includes the predators and competitors of Antarctic krill, such as seal, penguins, whales, fish, seabirds and other zooplankton. The field programme includes:

- The Australian programme conducted near 70 E
- The German programme, focused in the West Antarctic Peninsula and Lazarev Sea. A new phase of this activity will start 2004-2007 in the Lazarev Sea, if funding is approved (to be requested soon).
- The U.S. programme conducted research around the West Antarctic Peninsula, which has completed its field work and is planning its synthesis.
- The British programme, centred in the west Antarctic Peninsula and Scotia Sea. As part of their activities they will deploy new current meters in South Georgia, providing flow fields in another area of SO GLOBEC activity.
- The Korean program, particularly near the Bransfield Strait.

The research highlights of the recently completed US-SO GLOBEC fieldwork are as follows:

- The three mooring deployment/recovery cruises, the most recent in Feb-March 2003, which has provided the first long-term record of current measurements in Antarctic coastal waters.
- The process and survey cruises conducted in April-May 2001 and 2002, and in August-September 2001 and 2002, bringing up the total of cruises to eleven in two years.
- The passive acoustic mooring programme which has provided medium to long-term records of cetacean calls. Results of these programme revealed:

A) Blue whale recordings all year around in the Southern Ocean, although the animals were not visible to observers: is this an adaptation of the previously heavily exploited blue whale to avoid humans, or the result of a single whale stranded in the area for a whole year?

B) Recordings of sei whales obtained for the first time.

C) Recordings of unidentified whales collected, which appear to be from minke whales, although it is believed that they do not produce sound.

Cruise reports for all cruises are available, as well as a poster describing field activities, from the SO GLOBEC Office (www.ccpo.odu.edu). SO GLOBEC published a special issue of *Oceanography* magazine last year and is planning special sessions at national and international meetings (e.g., IUGG). The first volume of SO GLOBEC research is to be published in *Deep Sea Research* in 2004. 22 manuscripts have been submitted and will be edited by E Hofmann, P Wiebe, D Costa and J Torres.

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As part of the follow-on activities:

- The U.S. NSF Polar Program will issue a special announcement for SO GLOBEC synthesis and modelling activities, due in late 2003.
- Planning for a follow-on program to SO GLOBEC has started. The new programme will be named ICCED – Integrated analysis of Circumpolar Climate interactions and Ecosystem Dynamics in the Southern Ocean, and it may be an activity co-sponsored by IMBER and GLOBEC. It will be circumpolar and interdisciplinary, aiming to understand climate interactions in the SO and implications for ecosystem function and feedbacks to biogeochemical cycles. Its focus will include cetaceans. The IWC will remain a full partner.

2.4. PICES-GLOBEC Climate Change and Carrying Capacity (CCCC)

CCCC is moving into its “synthesis phase”. An Integration Workshop was held in Qingdao, October 2002 to this effect, to:

1. integrate research activities on:
 - comparisons of coastal ecosystems around the N. Pacific and N. Atlantic rim, with focus on zooplankton and small pelagic fishes;
 - latitudinal comparison of North Pacific ecosystems;
 - linkages between open-ocean and coastal ecosystems (with focus on salmon)
2. establish a planning team to evaluate and consider possible scientific directions, hypotheses, and experiments for PICES CCCC modelling activities
3. continue monitoring activities through the MONITOR Task Team:
 - CPR time-series collection
 - develop a protocol for contributing information to a “State of the North Pacific Ecosystem Status Report”

These efforts are leading to a major symposium on CCCC Synthesis in 2005/6

The CCCC Session at PICES XII (Oct. 2004) has the title of “CCCC, GLOBEC, and GLOBEC-like results: First steps toward synthesis of the impacts of large-scale climate change on North Pacific marine ecosystems”. Planning will soon begin to identify a successor-program to CCCC.

2.5. New Regional Programmes: CLIOTOP (CLimate Impacts on Oceanic TOP Predators)

CLIOTOP is currently under planning. The objective is to organize a large-scale worldwide comparative effort aimed at identifying and elucidating the key processes involved in ecosystem functioning. In particular, it is envisaged to determine the impact of climate variability at various scales on the structure and function of open-ocean pelagic ecosystems and their top predator species. The first planning meeting of CLIOTOP will take place in Sete, France on 3-7 November, 2003, to draft a science plan for submission to the GLOBEC SSC. Initial discussions on the Science Plan indicate that CLIOTOP may have four Foci:

- Focus 1- How climate variability affects biology of tuna and other top predator oceanic species at an individual level

- Focus 2- How climate variability affects population dynamics of tuna and other top predator oceanic species
- Focus 3- How climate variability affects pelagic ecosystems
- Focus 4- How to integrate climate and environmental variability in the modelling of oceanic top predator populations and ecosystems

CLIOTOP builds up on an existing GLOBEC programme on large pelagic fish in the equatorial Pacific entitled “Oceanic Fisheries and Climate Change Project” (OFCCP). The objective of OFCCP is to investigate the effect of climate change on the productivity and distribution of oceanic tuna stocks and fisheries in the Pacific Ocean with the goal of predicting short- to long-term changes and impacts related to climate variability and global warming.

The OFCCP partnership involves regional organisations: SPC, IATTC, and national institutes: CSIRO (Australia), NIWA (New Zealand), Univ. Hawaii, Univ. Maryland, Univ. Maine, NMFS Hawaii (USA), IPSL (France), NRIFSJ (Japan), and Univ. Tokyo (Japan). It has four components:

- Monitoring the upper trophic levels of the pelagic ecosystems. Recent activities include:
 - Archival tagging by CSIRO (South Western Pacific), SPC (Western and Central Pacific), Univ. Hawaii (Hawaii), Hawaii NMFS (Central and North Pacific), IATTC (eastern Pacific), NRIFSJ North Pacific (Japan -Kuroshio);
 - Development of a new observation system for monitoring the upper trophic levels of the pelagic ecosystem (Dagorn L., Holland K.). Project funded by the PFRP Hawaii (400,000 USD); and
 - Acoustic surveys (New Zealand, Australia).
- Food-web structure in pelagic ecosystems. A new 3-year project on this component has recently been approved by SPC GEF + PFRP (414,000 USD) on Trophic structure and tuna movement in the cold tongue-warm pool pelagic ecosystem of the equatorial Pacific. (Allain V., Olson R., Galvan Magaña F., Popp B., Fry B.). The first meeting of the 4 PIs was organised in July 2002 in Honolulu and a second meeting funded by the project was organised in Noumea (SPC) in April 2003.
- Modelling from ocean basin to individual scale. A project is currently underway on “Mixed-resolution models for investigating individual to population spatial dynamics of large pelagics” (Lehodey P., Kirby D., McClatchie S., Murtugudde R., Dagorn L., Holland K., Polovina J., Sibert J.). Project funded by the PFRP Hawaii.
- Socio-economical impacts. Efforts initiated by GLOBEC Focus 4 continue, with the aim of coupling SEPODYM (a physical-biological model) with an economical model (in collaboration with U. Chakravorty), and considering the impact of Regime shift at a generational time scale (with R. Sumaila).

2.6. New Regional Programmes: Ecosystem Studies of Sub-Arctic Seas (ESSAS)

Following a presentation to the GLOBEC SSC by G Hunt in 2002, GLOBEC undertook to plan a series of meetings to develop a Science Plan of a programme on Sub-Arctic Ecosystems that could fit under the GLOBEC umbrella. The first planning meeting was held in Bergen (Norway)

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in May 2003, with financial support of SCOR-NSF and the Norwegian Research Council. Attendees to the meeting included: S Astthorsson (Iceland), F Carlotti (France), K Drinkwater (Canada), H-J Hirche (Germany), G Hunt (USA), M Kashiwai (Japan), S Kristiansen (Norway), M Kingsley (Greenland), A Krovnin (Russia), H Loeng (Norway), B Megrey (USA), F Mehlum (Norway), S Moore (USA), G Ottersen (Norway), K Richardson (Denmark), V Ozhigin (Russia) and Y Sakurai (Japan).

At the meeting the goal of ESSAS was established as: “*to compare, quantify, and predict the impact of climate variability on the productivity and sustainability of sub-arctic marine ecosystems*”. The following Cross-cutting Hypotheses were formulated:

- Forcing mechanisms and biological processes controlling energy flow are similar across all of the sub-arctic seas. Lessons learned in one system can be transferred to other areas.
- Temperature influences the direction on energy flow within the pelagic/benthic subcomponents of the ecosystem.
- (Changes in) Physical and anthropogenic forcing mechanisms influence the relative importance of top-down vs. bottom-up control of energy flow in the ecosystem.

The Science Plan was outlined according to four major themes. Questions under each theme were identified, and the authors to contribute to the drafting selected. The themes are:

- Theme 1: How do large-, regional- and local-scale atmospheric patterns cascade into spatio-temporal changes in the ocean physics that are important for ecosystem dynamics in the sub-arctic seas?
- Theme 2: What are the mechanisms that link physical forcing to biological processes and their spatial and temporal scales of interaction?
- Theme 3: To what extent do biological processes regulate the structure, energy flow, and dynamics of the food webs in sub-Arctic ecosystems?
- Theme 4: What are the societal and economic impacts of climate variability on sub-arctic marine ecosystems and the feedbacks from changes in ecosystem use on these impacts?

A second planning meeting will take place in Seattle, October 2003, with a view of circulating a draft science plan to the GLOBEC SSC in May 2004.

2.7 New National Programmes

The main GLOBEC activity in Norway (entitled “Mare Cognitum”) came to an end recently. Scientists from the Institute of Marine Research, the University of Bergen, the University of Oslo, the Bjerknes Centre of Excellence, the Nansen Environmental and Remote Sensing Centre and the Ålesund University College have submitted three new national projects to be considered as Norwegian contributions to GLOBEC. These are: ECOBE (Effects of North Atlantic Climate Variability on the Barents Sea Ecosystem), CLIMAR (Climate and Production of Marine Resources) and ADAPT (Adaption to the Ecosystem: Co-evolution of Life History of Calanus and Herring in the Norwegian Sea).

For a complete list of national activities see the appendix attached.

3. *GLOBEC and the SCOR-IGBP IMBER Project*

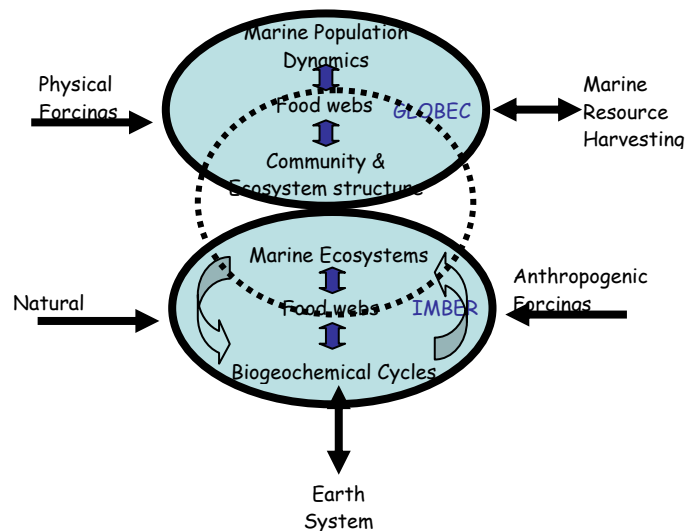
During the last years of JGOFS its co-sponsors, SCOR and IGBP initiated planning activities to develop a new international research approach on marine biogeochemistry. GLOBEC has actively participated in these activities, from the initial “Future of Marine Biogeochemistry” meeting (Plymouth, UK, September 2000), which the GLOBEC IPO assisted in organising.

GLOBEC’s involvement became particularly important when IGBP and SCOR expressed their wish for the new research programme (IMBER) to work closely with GLOBEC, leading to a merging of activities by 2009 (sunset clause of GLOBEC). This date is now fixed, so that a full integration and synthesis phase for GLOBEC can be planned. This date has also been carefully set so as to honour national, multinational and regional GLOBEC projects (see Appendix 1), whose funding timeline has been in many cases carefully timed to the duration of the international project.

To develop the links between GLOBEC and IMBER the Executive Officer of GLOBEC has been an ex-officio member of the OCEANS TT. The chair of the IMBER TT (J Hall) was invited to address the GLOBEC Open Science Meeting in Qingdao (October 2002), and to participate in the 7th GLOBEC Scientific Steering Committee meeting. Equally, GLOBEC’s Chair (F. Werner’s) was a speaker at the OCEANS OSM and M. St John (GLOBEC Focus 2 member) chaired one of the working group sessions at the OCEANS OSM.

At the IGBP Congress in Banff, Canada during June 2003, the first draft of the IMBER science plan was circulated to the GLOBEC SSC. In order to contribute positively to the development of the Plan the GLOBEC SSC prepared the following response to the IMBER TT:

- (1) With the conclusion of JGOFS, the SSC of GLOBEC strongly endorses the scientific need for a complementary sister project focussing on biogeochemical cycles in the ocean.
- (2) We also endorse and support the general thrust of the draft Science and Implementation Plan for IMBER, but recognise the need to tighten it up in places.
- (3) Our main concern is that misleading impressions may be given to people not familiar with the sister projects in IGBP-2.



- (4) The impression may be given that IMBER will cover most aspects of Marine Ecosystems and of Biogeochemical Cycles in the Ocean.
- (5) We therefore suggest that a section comparing the scope of IMBER with that of GLOBEC (and probably also SOLAS and LOICZ), should be given up front along the lines of the above diagram, and according to the issues described below.
- (6) GLOBEC is concerned with food webs and community structure but mainly at the larger end of the size spectrum, whereas IMBER will be concerned with the microbial loop, nutrient cycling, detritus and the smaller end of the size spectrum, and with primary production, along with SOLAS.
- (7) We recommend that GLOBEC and IMBER form a joint task team with the explicit task of integrating studies, models and understanding of food webs from end-to-end. This would then be a joint responsibility of BOTH PROJECTS, and not either one alone.
- (8) There should be a clear time line for the initial IMBER project (e.g., 2004-2008) with a joint GLOBEC / IMBER task team to guide the formation of a new merged project in 2009 or 2010.
- (9) In conclusion, the GLOBEC SSC looks forward to co-operating with its new sister SSC and project in many joint ventures. At the national level, many countries, including most developing countries, will not be able to afford both GLOBEC and IMBER national programmes, and will have single national programmes addressing both international projects. This is also likely to be the case in polar oceans where joint programmes including both IMBER and GLOBEC scientists will be the norm. The GLOBEC SSC looks forward to synthesis and completion of GLOBEC by 2009 and will work, through a joint task team, towards a merged project thereafter.

4. GLOBEC IPO

The GLOBEC IPO's is co-sponsored by the Plymouth Marine Laboratory and the Natural Environment Research Council of the UK. Funding is secured until March 2005. NERC has been informed that GLOBEC would like to initiate a process of evaluation of the activities of the programme, leading to an extension of the current grant beyond 2005. While there has been no response to date, NERC has announced a new funding stream dedicated to Earth System Science and international project office support.

<i>GLOBEC Funding 2003</i> [@]	<i>US \$</i>	<i>Objective</i>
UK -NERC	124,957	IPO support (until March 2005)
PML	41,652	In-kind support (until March 2005)
IGBP Contribution to SSC 2003	19,000	SSC activities (annual)
NSF-SCOR	85,000	Programme activities (annual)
	7,000	For travel of developing country scientists
IOC (through SCOR)	10,000	SSC activities (annual)
NOAA (through SCOR)	24,555	For OSM <i>Fisheries Oceanography</i> issue
NSF-ESSAS (through SCOR)	88,500	Development of ESSAS programme
Norwegian Research Council	15,000	Development of ESSAS programme
TOTAL	\$415,664	

@ not including national programmes or funds not raised/ managed from outside the IPO

SCOR is thanked for its support to GLOBEC activities.

5. GLOBEC SSC 2003

The membership of the GLOBEC SSC is shown in the Table below.

Name	Gender	Country	Function	Term end
Dr Jürgen Alheit	M	Germany	Chair Focus 1, SPACC Exec	(Ex-Officio)
Dr Tim Baumgartner	M	Mexico	SSC, Focus 1, SPACC Exec	2 nd term 2004
Prof John Field	M	South Africa	SSC	1 st term 2004
Dr Roger Harris	M	UK	SSC Past-Chair, Focus 2	(Ex-Officio)
Prof Eileen Hofmann	F	USA	SSC, SO Chair	(Ex-Officio)
Dr Patrick Lehodey	M	New Caledonia	SSC, Focus 4	2 nd term 2005
Dr Celia Marrase	F	Spain	SSC, Focus 3	2 nd term 2004
Prof Rosemary Ommer	F	Canada	SSC, Focus 4 co-Chair	2 nd term 2005
Dr Geir Ottersen	M	Norway	SSC, CCC Co-Chair	2 nd term 2005
Dr Ana Parma	F	Argentina	SSC	1 st term 2004
Dr Ian Perry	M	Canada	Focus 4 co-Chair	(Ex-Officio)
Dr David Runge	M	USA	SSC	1 st term 2005
Prof Qisheng Tang	M	China	SSC	1 st term 2005
Prof Francisco Werner	M	USA	SSC Chair, Focus 3	1 st term as Chair 2005

GLOBEC has reduced the size of its core membership of the SSC (not of the larger SSC) to add some flexibility during early implementation of IGBP Phase II, and to ensure representation of key regional programmes and Foci working groups in the deliberations of the SSC.

6. CALENDAR OF ACTIVITIES (May 2003-May 2004)

- 25-26 June 2003: GLOBEC Focus 4 Working Group Meeting, Banff, Canada
- 15-19 September 2003: SCOR Executive Committee, Moscow, Russia
- 24-27 September 2003: ICES ASC, Tallinn, Estonia (GLOBEC-CCC Session)
- 10-18 October 2003: PICES XII, Seoul, Korea (GLOBEC Focus 4 and CCCC sessions)
- 16-18 October 2003: IHDP Open Science Meeting, Montreal, Canada (GLOBEC Focus 4 session)
- 22-25 October 2004: IOC/SCOR Basin-Scale Ecosystem Model workshop, Harlow, UK
- 31 October- 1 November 2003: 2nd GLOBEC-ESSAS planning meeting, Seattle, USA
- 4-7 November 2003: GLOBEC-CLIOTOP planning meeting. Sete, France
- 9-12 December 2003: SPACC workshop on Long-term Dynamics of Small Pelagic Fish and Zooplankton in Japanese waters, Tokyo, Japan
- 12-14 January 2004: SPACC meeting on spawning habitats of small pelagic fish, Concepción, Chile

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- 15-16 January 2004: SPACC meeting on spawning habitat and the DEPM. Concepción, Chile.
- 17-18 January 2004: SPACC Executive committee meeting. Concepción, Chile.
- February 2004: GLOBEC Focus 1 WG meeting. TBA
- 26 February 2004: UK-GLOBEC Open Meeting, London, UK
- 1-5 March 2004: SC-IGBP meeting. St Petersburg, Russia.
- 31 March - 3 April 2004: IOC-SCOR Symposium on “Quantitative Ecosystem Indicators.” Paris, France
- 2-6 May 2004: 4th World Fisheries Congress. Vancouver, Canada.
- 7-10 May 2004: CCC working group meeting. Bergen, Norway.
- 11-14 May 2004: ICES-GLOBEC Symposium on “The Influence of Climate Change on North Atlantic Fish Stocks.” Bergen
- April/May 2004. GLOBEC SSC meeting

Meetings for Focus 2, Focus 3 and Focus 4 WG for 2004 have not yet been finalised.

Appendix 1. GLOBEC National, Multinational and Regional Programmes (Note: This is constantly evolving)

NATIONAL GLOBEC PROGRAMMES					
Country	Duration	Name-code	Funding	Contact	Nature of Prog.
Brazil	1998-2002	DEPROAS	Conselho Nacional de Desenvolvimento Cientifico e Tecnologico	Y. Matsuura	3
Canada	1996-1999	GLOBEC Canada	Natural Sciences and Engineering Research Council Fisheries and Oceans Canada	B. de Young	1
Chile	1997-	FONDAP-Humboldt	Chilean National Commission for Science and Technology	R Escribano	3
China-Beijing	1997-	China GLOBEC	National Natural Science Foundation of China Ministry of Science and Technology	Q. Tang	1
France	1999-	PNEC	Call for proposals, funded for 1 year. Proposals can be resubmitted each year. Mean duration ~4 years.	F. Carlotti	4
Germany	2000-	GLOBEC Germany	Waiting for funding to be approved by Federal Ministry for Education, Science, Research and Technology plus participating institutions	J. Alheit	1
Italy	2000-	SINAPSI	Ministero dell'Universita' e della Ricerca Scientifica e Tecnologica	M. Zavatarelli	
Japan	1997-	Japan GLOBEC	One project funded by Japanese Government, others seem to be institute/university funded	T. Sugimoto	4
Mexico	1997-	IMECOCAL	Consejo Nacional de Ciencia y Tecnologica IAI	T. Baumgartner	3
Netherlands	1993-	Several	Various loosely affiliated projects, various funding agencies	G Franz	4

Norway	2002-2005	ECOBEC, CLIMAR ADAPT	EU funding, Norwegian Research Council, Norwegian Institutes and Institute of Marine Research	W. Melle/ S. Sundby	2
Portugal	1999-	GLOBEC Portugal	Portuguese Foundation for Science and Technology, IPIMAR	M. Santos	4
Spain	2001-	GLOBEC Spain	Ministerio de Ciencia, IEO, CSIC	C. Marrase	4
Turkey	1997-	Black Sea GLOBEC		T. Oguz	3
Ukraine	1997-	Ukraine GLOBEC	INTAS, UK DETR Darwin Initiative + others	V. Zaika	4
UK	2000-2005	Marine Productivity (largest)	NERC Thematic money – individual projects by proposal	P. Williamson	1
USA	1994-	US GLOBEC	NSF and NOAA – individual projects by submitted proposals	M. Fogarty	1
MULTI-NATIONAL GLOBEC PROGRAMMES					
Name-Code	Duration	Countries	Funding	Contact	Nature of prog.
BENEFIT	1997-	South Africa, Namibia, Angola, Norway, Germany	Norwegian and German donor agencies, Governments of Angola, Namibia, South Africa	N. Sweijd	1
LIFECO	2000-2003	Norway, Germany, UK, Denmark	EU FP 5	M. St John	3
TASC	1996-1999	Norway, UK, Denmark, Iceland, Germany, France, ICES	EU MAST	K. Tande	3
ENVIFISH	1999-2001	EU countries, Angola, Namibia, South Africa	EU INCO	L. Nikjaer	3
VIBES	1997-2000	France, South Africa	ORSTOM	P. Freon	3
IDYLE	2001-	France, South Africa	ORSTOM	P. Freon	3
NATFISH	2002-	Norway, Morocco, Mauritania, Senegal, Italy	EU INCO	L. Nikjaer	3
OFCCP	2001-	USA, New Caledonia, Mexico, Australia, France, New Zealand, Japan, IATTC	National Funding agencies of participating countries, GEF.	P. Lehodey	3
REGIONAL PROGRAMMES					
Name-Code	Start Year	Countries	Funding	Contact	Nature of prog.
SPACC	1993-	Spain, France, Germany, Japan, Chile, Peru, Senegal, Mauritania, Portugal, USA, Mexico, and others	National	D. Checkley, C. Roy	4
ICES-CCC	1993-	ICES countries	National, ICES	K. Drinkwater, G. Ottersen	4
PICES-CCCC		Japan, China, Korea, Russia, Canada, USA	National, PICES	M. Kashiwai, H. Batchelder	4

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SO		USA, Australia, UK, Germany, IWC, and others.	National	E. Hofmann	1, 4
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- 1- Specific GLOBEC call by national funding agencies, for individual scientists to bid against.
- 2- As for (1), but only affiliated to GLOBEC after funding has been allocated
- 3- Single project affiliated to GLOBEC post-funding (often with many PIs)
- 4- Group of relevant, independent projects under national funding, affiliated to GLOBEC as a group

3.3 Global Ecology and Oceanography of Harmful Algal Blooms (GEOHAB) (joint with IOC)

Terms of Reference:

- To oversee the development of a Science Plan for the international SCOR/IOC program on the Global Ecology and Oceanography of Harmful Algal Blooms (GEOHAB) and to submit it within one year for the approval of the sponsors of the program and subsequent publication. The SSC should ensure that the Science Plan has input from the international HAB scientific community.
- To develop a detailed Implementation Plan for GEOHAB taking into account input from the scientific community, for presentation and approval by the sponsors and publication within two years.
- To coordinate and manage the resulting activities in accordance with the GEOHAB Science and Implementation Plans.
- To collaborate, as appropriate, with organizations such as ICES, PICES, etc. and related programs such as GLOBEC, LOICZ, and the emerging Global Ocean Observing System.
- To ensure effective communication between related national and regional HAB research efforts.
- To report regularly to SCOR and IOC, and to other bodies as needed, on the state of planning and accomplishments of GEOHAB.

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Allan Cembella	CANADA	Arturo Sierra-Beltran	MEXICO
Marta Estrada	SPAIN	Steve Thorpe	UK
Wolfgang Fennel	GERMANY	Jing Zhang	CHINA
Ken Furuya	JAPAN		(Beijing)
Patricia Glibert	USA		

Ex-officio Member:

Beatriz Reguera (IOC IPHAB)

IOC Staff:

Henrik Enevoldsen

Executive Committee Reporter:

Julie Hall

GEOHAB

Activities 2002-2003

I - Meetings and activities

The GEOHAB Scientific Steering Committee (SSC) met in plenary in La Rochelle, France on 4-7 December 2002 to finalise the structure of the *GEOHAB Implementation Plan*. The editorial committee met 18-21 February 2003 in Copenhagen, Denmark to finish preparing the plan for review.

The chairman attended the EU-U.S. workshop on Harmful Algal Blooms in Trieste (Italy) 4-9 September 2002 to promote GEOHAB as an umbrella for these activities. He was invited to Ottawa, Canada on 22-27 August 2002 by the Canadian Department of Fisheries and Oceans to contribute to the development of a network of excellence on HABs in Canada. The chairman was also invited to the Gordon Research Conference on "Coastal Ocean Modeling" in June 2003 as an invited speaker, which helped in drawing the attention of physicists to the exciting problems and challenges raised by HAB population dynamics, especially at the small scale (i.e., the viscous range). The GEOHAB SSC will build on this foundation to establish durable co-operation with some physical modellers.

A workshop on the definition of real-time observing systems for ecosystem dynamics and harmful algal blooms, sponsored by EU-EC, ESA, CNRS, IFREMER and ONR, NSF, NOAA, and endorsed by SCOR, IOC, ICES and PNEC, was held in Villefranche sur Mer, France on 11-21 June 2003. The workshop gathered 87 participants. The proceedings will be on line at the Web site: <http://www.HABWATCH.org>.

The four Core Research Projects defined by the SSC have not benefited from a sufficient input from the scientific community, contrary to other programs developed in the past. The next step is therefore to hold a series of four Open Science Meetings before the end of 2004 on the following topics: Upwelling, Fjords and Coastal Embayments, Semi-Confined Areas and Stratified Environments.

An Open Science meeting is planned in Lisbon, Portugal (17-20 November 2003) in order to draw a detailed action plan on the "Upwelling" Core Research Project. The three other Core Research Projects are planned for 2004. The actions plans for "Fjords and Coastal Embayments" and "Semi-confined zones" will be detailed in the first semester of 2004 while the one on "Stratified Environments" is planned for late 2004.

The GEOHAB SSC benefits from other groups' activities, such as the

- IOC-ICES Working Group on Harmful Algal Blooms Dynamics
- ICES Working Group on Modelling Physical- Biological Interactions
- ICES Study Group on the Implementation of GEOHAB in the Baltic Sea

II - Implementation Plan

The *Implementation Plan* for GEOHAB has been submitted to SCOR and IOC and has been revised according to the comments of eight external reviewers. The major question concerned data management from the different Core Research projects. To answer that question, the SSC relied on advice from more experienced SSC members on this topic and presented a revised version of the *GEOHAB Implementation Plan* which is downloadable from the GEOHAB Web site.

For the purposes of implementation, the GEOHAB SSC has adopted a three-category system for defining and endorsing GEOHAB research:

Core Research is comparative, interdisciplinary, international, and directly addresses the overall goals of GEOHAB as outlined in the *GEOHAB Science Plan*. Core Research will directly address Programme Element 4 on Comparative Ecosystems and thus will cross-cut the other Programme Elements.

A major objective of Core Research is the integration achieved by the application of coupled biological/chemical/physical models to HAB dynamics in geographically distinct ecosystems sharing common features. Modelling activities within Core Research Projects may include the application of specified models to different ecosystems, testing and validation of different models within given ecosystems, and modification of existing models to fit current, emerging or hypothetical data sets. The extent to which HAB species respond in a similar way in ecosystems with similar characteristics will assist in defining the oceanographic processes that influence their population dynamics and community interactions. Interpreted via models, this comparative approach is ultimately expected to lead to an enhanced capability for HAB prediction.

Targeted Research addresses specific objectives outlined in the *GEOHAB Science Plan*. Targeted Research may be solicited by the SSC as the need arises from Core Research Projects. Targeted research differs from Core Research in scope and scale. Whereas Core Research must be comparative, integrative and multi-faceted, Targeted Research activities may be more tightly focussed and directed to a research issue or element. It is expected that such studies of specific processes and mechanisms will facilitate the wider and larger-scale Core Research studies. For example, investigations on specific methods for model comparisons and intercalibration are targeted activities, valuable in their own right, yet are also essential to conduct comprehensive field studies and modelling in Core Research Projects.

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Regional/National Research includes activities relevant to the objectives of the *GEOHAB Science Plan*, but may have other overall objectives. Regional/National research is co-ordinated at a regional or national level rather than by the SSC, but can apply for endorsement from GEOHAB. Examples include

- GEOHAB-Canada has been endorsed formally as a national research activity
- A regional study on ciguatera has also been endorsed
- GEOHAB (GEOHAB-China) was endorsed in 2001.

To be endorsed by GEOHAB, Regional/National Research activities must share objectives with GEOHAB in furthering the understanding of the ecological and oceanographic mechanisms underlying HAB population dynamics. As an example, toxin production will be studied if toxin production directly influences population dynamics, for example, grazing inhibition. Thus, phytoplankton and toxin monitoring *per se*, or research on toxicity, human health, and environmental impacts, are not endorsable as GEOHAB activities, but research projects aimed at understanding factors leading to HABs may be. Although HAB monitoring will not be endorsed by GEOHAB, the programme will seek to use data from national and international monitoring programmes in conjunction with Core Research Projects, modelling, and other activities. While the GEOHAB SSC is not directly responsible for co-ordination or implementation of Regional/National Research activities, it can provide advice on aspects of National Programmes that can advance GEOHAB's goals. The GEOHAB SSC will compile a register of monitoring programmes in a metadata base. The SSC will assist in linking relevant aspects of national plans with GEOHAB-related research in other regions of the world.

GEOHAB Finances

Income	2002	2003	2004	2005
Carry-over from previous year		\$1,960.00	\$18,231.14	-\$4,268.86
NOAA (through SCOR)	\$4,801.76	\$0.00	\$20,000.00	\$0.00
NSF (through SCOR)	\$20,000.00	\$30,000.00	\$30,000.00	\$20,000.00
SCOR Support for LDC Travel		\$5,000.00		
FLAD		\$1,400.00		
IFREMER	\$15,027.00	\$6,933.00		
Registration Fees		\$7,500.00	\$22,500.00	
IOC	\$14,050.00	\$20,000.00	\$20,000.00	\$20,000.00
Total	\$53,878.76	\$72,793.00	\$110,731.14	\$35,731.14
Expenses				
Publications		\$10,000.00		
SCOR Administrative Expenses	\$1,726.55	\$50.42		
Subcommittees	\$3,455.36			
Other Meetings	\$6,776.57	\$427.44		
SSC Meeting 1 IOC	\$14,050.00			
SSC Meeting 1	\$1,207.44		\$25,000.00	\$25,000.00
SSC Meeting 2 (SCOR and IOC)	\$19,387.84			
SSC support and HABWATCH meeting	\$5,315.00			
Editorial Committee		\$6,933.00		
HABs in Upwelling Systems		\$37,151.00		
HABs in Fjords and Coastal Embayments			\$30,000.00	
HABs in Stratified Systems			\$30,000.00	
HABs in Eutrophified Systems			\$30,000.00	
Total	\$51,918.76	\$54,561.86	\$115,000.00	\$25,000.00
Remaining	\$1,960.00	\$18,231.14	-\$4,268.86	\$10,731.14

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3.4 Surface Ocean–Lower Atmosphere Study (SOLAS) (joint with IGBP, WCRP, and CACGP)

Terms of Reference:

- To develop the Surface Ocean - Lower Atmosphere Study (SOLAS) Science Plan and an Implementation Strategy, in accordance with guidance of the sponsoring organisations.
- To oversee the development of SOLAS in accordance with its Science Plan/Implementation Strategy.
- To collaborate, as appropriate, with other related projects, of IGBP, WCRP, SCOR and CACGP and related projects and programmes (e.g., IHDP, DIVERSITAS, IOC and the Global Ocean Observing System (GOOS), etc.)
- To establish appropriate data management policies to ensure access to, sharing of, and preservation of SOLAS data, taking into account policies of the sponsors.
- To report regularly to SCOR, IGBP, WCRP and CACGP on the state of planning and accomplishments of SOLAS.
- The SOLAS SSC, its subsidiary groups and International Project Office shall operate in accordance with the operating procedures for IGBP Projects and as required by other co-sponsors.

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Mitsuo Uematsu	JAPAN
Ilana Wainer	BRAZIL
Doug Wallace	GERMANY

Executive Committee Reporter: Robert Duce

IGBP Liaison: Wendy Broadgate

SOLAS REPORT TO SCOR 2002/2003

SOLAS Science Plan and Implementation Strategy

A draft version of the SOLAS Science Plan and Implementation Strategy is now available for download from the SOLAS web site (www.solas-int.org). The Implementation sections, and the whole of Focus 2, are currently being reviewed and it is hoped that a final, hard copy version will be available by the end of the year. Progress on the SP and IS was largely achieved by the concerted efforts of the SSC at their second meeting in Gif-sur-Yvette, France in Nov 2002. A smaller writing group met in Norwich in Feb 03 to complete some sections and began the editorial work. Editing continued in Norwich until the draft was made available on the web in April.

SOLAS National Activity

National SOLAS programmes continued to gather pace throughout the year. The Canadian SOLAS programme (\$9M over 5 years) got in the water with a successful cruise in the NW Pacific (Subarctic Ecosystem Response to Iron Enrichment Study, SERIES) and has just completed the first of three north-west Atlantic cruises studying seasonal variations in climatically active gas fluxes.

In the UK, the Natural Environment Research Council recently approved an £11M, 6-year thematic programme called UK SOLAS. The programme includes funding for the SOLAS International Project Office for 5 years.

The Japanese SOLAS-related programmes, namely, the Sub-arctic ocean Enrichment and Ecosystem Dynamics Study (SEEDS), Studies on the Antarctic Ocean and Global Environment (STAGE), SNIFFS, the Subtropical Nitrogen Fixation Flux Study and The Variability of Marine Aerosol Properties (VMAP) project, are all going well and discussions on a future Japan-SOLAS programme are underway.

The German *Meteor 55* cruise marked the entry of Germany into international SOLAS efforts. It was successful in bringing together marine chemists, atmospheric chemists and biologists from several countries to work collaboratively on trace gas, trace metal and nitrogen ocean-atmosphere cycling.

In China (Beijing), the China National Committee for IGBP (CNC-IGBP) has established a SOLAS working group. The National Natural Science Foundation of China (NSFC) decided to support China SOLAS with a budget of 8 Million RMB (about one million US dollars) for the next 4 years. Planning for a regional programme involving researchers in China, Korea and Japan is under way.

Attempts to secure EU funding for an EU-SOLAS project continue, but so far unsuccessfully. SOLAS crosscuts many of the topics outlined in the first two calls of Framework VI, but there does not seem to be an institutional framework that would support a SOLAS-type of proposal. The possibility of a EUROCORES programme is being pursued.

SOLAS Communication

To coincide with the launch of the SP and IS, the SOLAS Web site was redesigned and expanded. It now contains more information about national programmes and is considerably more interactive with opportunities for researchers to submit their research for SOLAS endorsement, advertise for collaborators and publicise upcoming cruises.

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The SOLAS mailing list has expanded to include over six hundred members.

SOLAS science has been presented at the EGS-AGU-EUG Joint Assembly, the JGOFS OSC, the CLIVAR SSG, the WCRP JSC, SC-IGBP and IUGG Japan.

Interactions with other projects

A WCRP working group on surface fluxes is to be developed with SOLAS playing a significant role from its inception.

SOLAS interactions with its IGBP sister projects (IGAC and ILEAPS in the atmosphere, LOICZ, IMBER, and GLOBEC in the ocean) will be addressed at two sessions of the IGBP Congress in June. The results of these sessions will be made available on the SOLAS Web site.

IGAC and SOLAS are also due to consider the role of the proposed Air-Ice Chemical Interactions (AICI) task at the Congress.

Future Activity

2003 promises to be a busy year for SOLAS. The UK NERC money will allow a full IPO to be established and this will dramatically enhance the ability of SOLAS to coordinate international research. Allied to this, funding is being secured for meetings of the SOLAS working groups which will oversee the implementation of the SOLAS SP and IS.

The working groups will be constituted at the third SSC meeting, to be held in June in Banff Canada. They are:

- Focus 1 WG: Biogeochemical Interactions and Feedbacks Between Ocean and Atmosphere
- Focus 2 WG: Exchange Processes at the Air-Sea Interface and the Role of Transport and Transformation in the Atmospheric and Oceanic Boundary Layers
- Focus 3 WG: Air-Sea Flux of CO₂ and Other Long-Lived Radiatively Active Gases
- WG on Data and Model Management

It is envisaged that several of these groups will meet before the end of this year.

SOLAS Science 2004, the first international symposium to present the progress of SOLAS, will be held in Halifax, Nova Scotia, Canada on 10-14 Oct. 2004. It is being organised by the Canadian SOLAS office.

The SOLAS Summer School will run on 30 June-11 July 2003 at the Institut d'Etudes Scientifiques de Cargèse Université de Corse, in Corsica, France. It was heavily oversubscribed with 233 applications, most of very high quality, and 72 SOLAS researchers have been accepted to the course. Nearly a third of these are from developing countries and a large proportion of all the students will receive financial assistance.

Casey Ryan,
May 2002

	2001	2002	2003	2004
Income				
SCOR - NSF	\$30,000	\$30,000	\$35,833	\$55,000
SCOR - Carryover from Previous Year	\$27,000	\$45,477	\$41,628	\$14,461
IGBP	\$20,000	\$20,000	\$19,000	\$20,000
IGBP Carryover		\$5,839		
ICSU		\$40,000		
Total	\$77,000	\$141,316	\$96,461	\$89,461
Expenses				
PSL (phone, admin support, consumables)	\$5,027	\$25,839	\$0	\$0
Exec. Comm./Nat. Reps.		\$49,704	\$0	\$12,000
Publications			\$695	
SSC Meeting	\$21,584	\$12,123	\$21,242	\$15,000
Editorial Meeting			\$3,474	
Participation in other meetings		\$23,000	\$5,178	\$6,750
WG 1 Meeting			\$25,000	\$15,000
WG 2 Meeting		\$5,000	\$0	\$0
WG 3 Meeting			\$25,000	\$25,000
WG 4 Meeting			\$0	\$0
Open Science Meeting				\$15,000
Overhead to SCOR		\$1,500	\$1,500	\$1,500
Adjustment for 2002 expenses			-\$88	
Total	\$26,611	\$117,165	\$82,000	\$90,250
Remaining Balance	\$50,389	\$41,628	\$14,461	-\$789

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3.5 Integrated Marine Biogeochemistry and Ecosystem Research (IMBER) (joint with IGBP)

Terms of Reference:

- To develop a new IGBP/SCOR activity in ocean biogeochemistry and ecosystems within the IGBP II Vision for the next 10 years of ocean research. The new activity should be developed in harmony with the Global Ocean Ecosystem Dynamics (GLOBEC) project and be designed and implemented in close collaboration with GLOBEC.
- To revise the Draft Framework Report in Biological and Chemical Aspects of Global Change Research in the Oceans to form the intellectual basis for an Open Science Conference (planned for December 2002).
- To organise an Open Science Conference to generate new ideas for the development of the science and implementation of the Ocean Biogeochemistry and Ecosystems project.
- To use both the Framework Report and community input from the Open Science Conference to produce a Science Plan/Implementation Strategy for the new activity by the end of 2003.
- To cooperate with GLOBEC, the Land-Ocean Interactions in the Coastal Zone (LOICZ) project, the Surface Ocean-Lower Atmosphere Study (SOLAS), and other relevant projects and programmes in the development of the Science Plan/Implementation Strategy.

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Executive Committee Reporter: John Field

IGBP Liaison: Wendy Broadgate

IMBER: Integrated Marine Biogeochemistry and Ecosystem Research (previously OCEANS)**Report 2002/2003**

**Submitted by
Dr. Julie Hall, IMBER Chair
on behalf of the IMBER Transition Team.**

*Contents**New Name**Transition Team meetings**Science focus of IMBER**Linkages with other projects and programmes**Way forward and timeline**Funding**Acknowledgements**New Name*

At the request of the sponsors (SCOR and IGBP) a new name for the ocean biogeochemistry and ecosystems project (formerly called "OCEANS") was identified and has been agreed to by both sponsors. The new name is IMBER: Integrated Marine Biogeochemistry and Ecosystem Research.

Transition Team meetings

The IMBER Transition Team has held four meetings and convened a major open science conference since the 2002 SCOR General Meeting:

- a) An editorial meeting was held in November 2002 (Bolger Centre, Washington DC, USA) at which the format of the *IMBER Science Plan/Implementation Strategy* was established. In addition, the responsibilities of the Transition Team members at the Open Science Conference were discussed, along with planning for the conference.
- b) To assist in the development of the *IMBER Science Plan/Implementation Strategy*, an Open Science Conference was held in Paris, France on 7-10 January 2003. The main aim of the conference was to gather input from the scientific community for the science themes of the new project. The conference started with 15 plenary lectures, which were followed by working group discussions. In addition, there were two poster sessions with a total of 200 posters presented, the abstracts of which are available on the conference Web site (www.igbp.kva.se/obe/). The conference was attended by 370 participants from 36 countries.

The IMBER Open Science Conference working groups were:

1. Trace elements in ecological and biogeochemical processes
2. Physical forcing of biogeochemical cycling and marine food webs
3. Climatic modulation of organic matter fluxes
4. Direct effects of anthropogenic CO₂ on biogeochemical cycles and ecosystems
5. Integrating food-web dynamics from end to end
6. Continental margins
7. The mesopelagic layer
8. Biogeochemical hotspots, choke points, triggers, switches and non-linear responses
9. Feedbacks to the Earth System
10. Coupled models of biogeochemical cycles and ecosystems

The working groups were asked to identify and prioritise key research questions and what we need to know to answer those questions. They were also asked to identify any promising approaches, emerging technologies and regional considerations. In addition to the working group discussions, short oral reports were given on related current national and international activities and any future plans relevant to the development of the IMBER project. Patrick Holligan (Southampton Oceanography Centre) gave a "Conference Summary" presentation and this summary, the conference programme, abstracts, and final working group reports are all available on the Web site. Input from the IMBER working groups, plenary speakers, comments submitted via the IMBER Web site, along with other material, have been used by the IMBER Transition Team to identify the key science themes and issues which will form the scientific focus of the new project.

c) Before the Open Science Conference in January 2003 (Paris, France), the Transition Team held a one-day meeting dealing with the logistics of the conference. The Transition Team met for two days after the conference to collate and synthesise the scientific input from the working group to formulate the science focus of the IMBER project. The working group reports were integrated to form the initial IMBER Themes and Issues. Several articles about the conference have been provided to GLOBEC, LOICZ and JGOFS for publication in their project newsletters.

d) A second editorial meeting in was held in March 2003 (Washington DC, USA) prior to the JGOFS Open Science Meeting. At this meeting the *IMBER Science Plan/Implementation Strategy* outline (Appendix 1) was further refined and initial drafts of the Themes and Issues were prepared for the IGBP Congress in Banff.

e) The IMBER Transition Team met during the IGBP Congress in June 2003 (Banff, Canada). At this meeting, the Transition Team refined the *IMBER Science Plan* and began developing the *Implementation Strategy* for the project. The Transition Team also took this opportunity to meet with the scientific steering committees of GLOBEC, SOLAS and LOICZ to discuss key implementation issues between the projects.

Science focus of the IMBER project

The IMBER project focus is biogeochemical cycles, ecosystems and their interactions (Figure 1). The overarching question for the project is

“How do marine ecosystems, biogeochemical cycles and their interactions respond to global change and, in turn, feed back to the Earth System?”

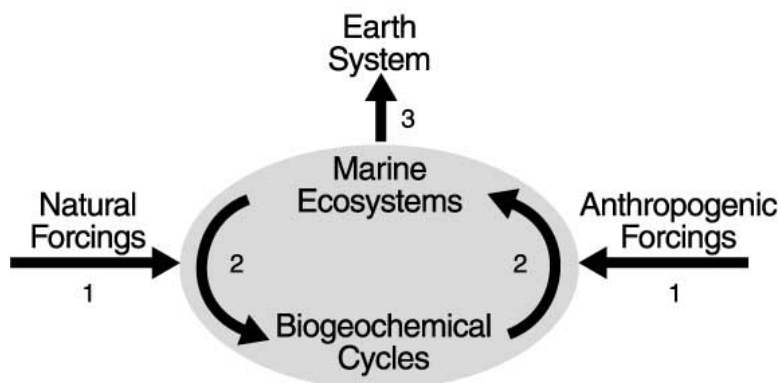


Figure 1: The scientific questions of the IMBER project focus on the impacts of natural climatic and anthropogenic forcings on geochemical cycles and marine ecosystems (arrows 1), with particular focus on how these forcings alter the relationships between elemental cycles and ecosystems (arrows 2) and how these responses feed back to the Earth System (arrow 3).

The Science Plan for IMBER has been divided into three Themes and within each theme, three Issues have been identified. Each Issue has a number of major science questions to provide a focus for the project. The IMBER scientific Themes and Issues are:

- Theme 1: Interactions between marine biogeochemical cycles and ecosystems
- Issue 1: Sources and sinks in biogeochemical cycles, and macro/micro nutrient stoichiometry
 - Issue 2: Relationships between biodiversity, structure, function and stability of marine ecosystems
 - Issue 3: Role of macro/micro nutrient availability, assimilation and cycling in controlling food-web structure and function
- Theme 2: Sensitivity of ecosystems, biogeochemical cycles and their interaction, to global change
- Issue 1: The impact of climate-induced changes in circulation, ventilation, and stratification on biogeochemical cycles and ecosystems
 - Issue 2: Response of biogeochemical cycles, ecosystems, and their interactions, to increasing anthropogenic CO₂ and changing pH
 - Issue 3: Response of biogeochemical cycles, ecosystems, and their interactions, to changes in the fluxes of macro/micro nutrients into the marine environment from land and air
- Theme 3: Feedbacks from biogeochemical cycles and the ecosystem to the Earth System components
- Issue 1: Oceanic regulation of atmospheric CO₂ concentration
 - Issue 2: Feedbacks from the biogeochemical cycles and the ecosystem to climate
 - Issue 3: Feedbacks to Human Dimensions

Several key domains have been identified for IMBER research, including the euphotic zone, the mesopelagic layer, continental margins, and high-latitude oceans.

The main *Science Plan/Implementation Strategy* sections (see Appendix 1) which have been drafted to date are: IIb Project Scope; III Themes and Issues; V Project Organisation.

Linkages to Other Projects and Programmes

During the IGBP Congress, working group discussions were held with the other marine projects to discuss potential collaborations.

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The IMBER Transition Team and GLOBEC SSC recognized the need for close collaboration between the two projects and identified the following options to facilitate that collaboration:

- formation of a joint “end-to-end food webs” task team
- joint endorsement of projects (with the likely outcome that some programmes may get endorsed by both projects)
- formation of a joint long-term planning team, which will develop an implementation strategy for post-2009 research.
- back-to-back SSC meetings
- ex-officio members on both Scientific Steering Committees
- publication of joint newsletters
- co-location of the project IPOs

The IMBER Transition Team and SOLAS SSC recognized that there are important collaborative opportunities between the projects. The key links between IMBER and SOLAS are most likely through SOLAS Foci 1 and 3 (to facilitate collaboration, it was agreed that IMBER will have a representative on the SOLAS working groups 1 and 3). The projects will work towards joint endorsement of projects (as with GLOBEC, the endorsement would be at individual project level and therefore some programmes may be endorsed by both IMBER and SOLAS).

The IMBER Transition Team and LOICZ SSC recognised that although the projects have taken a different approach to their implementation, there must be close collaboration between them in the region of the continental margins. This will be facilitated through the LOICZ Theme 3 and the IMBER Continental Margins working group.

There were very productive side meetings between IMBER Transition Team members and the PAGES Executive Officer Keith Alversen, and with the DIVERSITAS chair Michel Loreau to discuss the collaborative links between the projects. These will be developed further in the coming months.

Howard Cattle (executive officer of CLIVAR) attended part of the IMBER Transition Team meeting to discuss the development of key collaborations between IMBER and CLIVAR, in particular with the CLIVAR ocean basin panels.

Way Forward

The timeline for the remaining development of the *IMBER Science Plan/Implementation Strategy* is to have the Themes and Issues sections completed by July 2003. The remaining sections of the *Science Plan/Implementation Strategy* will be written by September, and a full draft of the *Science Plan/Implementation Strategy* will be available on the project Web site for comment by the scientific community by October 2003. After the integration of the comments, the *Science Plan/Implementation Strategy* will be sent to SCOR and IGBP for review.

The IMBER Transition Team has funds remaining for an editorial meeting in late 2003, if necessary. The IMBER SSC will have adequate funds available for its first meeting, as well as several small meetings designed to work on detailed research plans for IMBER activities.

IMBER acknowledges the special contribution by IGBP in 2003 to support local costs in the IMBER Chair's institution for project assistance.

Funding

Income	2002	2003	2004
SCOR - NSF	\$55,000	\$41,667	50000
SCOR Carry-over from Previous Year	\$5,704	\$108,935	\$4,935
IGBP	\$24,868	\$28,500	20000
IGBP (staff support)	\$4,000	\$29,625	
IGBP Ocean Vision	\$2,189		
SCOR		\$16,214	
ICSU	\$50,000		
Registration Fees		\$38,462	
Total Income	\$141,761	\$263,402	\$74,935
Expenses			
2002 Potomac OCEANS Transition Team Meeting	\$23,124		
Representation at GLOBEC, WOCE, LOICZ OSCs	\$3,510		
Ocean Vision meeting	\$2,189		
Open Science Conference in Paris	\$4,003	\$134,389	
TT meeting in Paris		\$26,415	
Side Meeting at JGOFS OSM		\$5,771	
Other SCOR Admin		\$2,806	
NIWA Expenses		\$29,625	
IGBP Congress in Banff		35,794	
SP/IS Editorial Meeting		\$12,000	
2004 SSC Meeting			25000
SSC Executive Committee Meeting			15000
Subgroup Meeting 1			15000
Subgroup Meeting 2			15000
Subgroup Meeting 3			15000
Total Expenses	\$32,826	\$246,800	\$70,000
Remaining Balance	\$108,935	\$16,602	\$1,602

Acknowledgements

I would like to thank Ed Urban, Wendy Broadgate, Liz Gross, Penny Cooke and the teams from the SCOR and IOC offices for their excellent support in organising the Open Science Conference in Paris. Special thanks must also go to Ed Urban and Wendy Broadgate for their continued support for the project.

APPENDIX 1: Structure of the IMBER Science Plan/Implementation Strategy document

- I Executive Summary (general science and social science audience)
- II Introduction (research community/general science audience)
 - a) Goals/Aims/Objectives
 - b) Project Scope
 - d) Scientific and Societal Relevance
 - Education and extension
 - Capacity building
 - e) IMBER Approach
 - f) Integration/Co-ordination within the project
 - g) Linkages
 - h) IMBER Science Plan and Implementation Strategy Structure
- III Themes (3)
 - a) Objective and Introduction
 - b) Issue # (3 issues per theme)
 1. Introduction/Rationale
 2. Issue objectives
 - What do we need to know about each major science question
 3. Promising Scientific Approaches
 4. Implementation
 - Linkages with other projects
 - c) Strategy for Implementation
- IV Cross cutting Science Activities
 - a) Synthesis and Modelling
 - b) Sustained observations
 - c) Emerging technologies
 - d) Data management
 - e) Core measurements
- V Project organisation and management
 - a) Project organisation
 1. Concept of approach
 2. International Steering Committee
 3. International Project Office (IPO)
 4. National Committees
 5. Regional Projects
 - b) Recognition of research as IMBER
 - c) Project timelines
 - d) Education
 - e) Communication
- VI Integrating activities
 - a) Strategy of integration with other IGBP II projects
 - b) Strategy of integration with other Programmes and Projects
- VII References
- VIII Acronyms
- IX Glossary

3.6 Land-Ocean Interactions in the Coastal Zone (LOICZ)

Removed letter from Robert Duce to Han Lindeboom

The above letter was sent to LOICZ to convey to the chair and IPO Executive Officer the decisions that resulted from the 2002 SCOR General Meeting. Since that time, Ed Urban has been in touch with several potential funding sources to try to help raise funding to back up SCOR's intention to help fund LOICZ Theme 3 activities. SCOR provided \$3,000 in funds for a LOICZ-related meeting, for travel of developing country scientists, as a "good-faith" gesture. LOICZ has offered to co-fund WG 122. Ed Urban was able to join the LOICZ SSC for part of their meeting in Banff in June 2003 and was able to convey SCOR's intentions in person.