2005 SCOR Executive Committee Meeting
Cairns, Australia
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From “Maximising the benefits from Australia’s formal linkages to global scientific activities”
A report funded by the Australian Research Council (April 2005)

Executive summary

This report assembles an inventory of significant global scientific organisations and collaborative opportunities in which Australian scientists and scientific institutions might reasonably be expected to be involved, and maps the extent to which Australia is currently engaged in these programs and the benefits that flow from that engagement. The nature and extent of any gaps between current participation in global scientific programs and potential opportunities are assessed. Mechanisms to enhance Australian scientific involvement in global scientific programs, including the mechanism of subscriptions to international scientific organisations, are also evaluated.

The report finds that Australia is reasonably well engaged with global scientific activities. Approximately 100 major global scientific organisations are identified, along with many more significant activities and organisations under these. Australia is formally engaged to variable degrees with almost all of the global scientific organisations in which Australian scientists and scientific institutions might reasonably be expected to be involved.

The Australian Academy of Science administers funds on behalf of the Commonwealth government to engage with international scientific organisations with a minimum of bureaucracy and administrative cost for maximum effect. An analysis of the subscription levels and mechanisms to the major global scientific organisations suggests that Australia is paying at appropriate levels to most of these organisations. However, because the subscription levels are constantly rising while the government funding received by the Academy for support for international activities has remained essentially static for many years, the Academy is under increasing pressure to meet its international obligations. This has forced the Academy to reduce or cut its membership subscriptions to some global scientific organisations and reduce its funding to support National Committee activities and travel support for Australian voting delegates to General Assemblies of ICSU Scientific Unions. This reduces the benefits from Australia’s engagement in global science activities, and is preventing Australia’s scientific community (via the Academy) from formally engaging with new and potentially worthwhile global activities that are emerging. The Academy welcomes further discussion regarding funding for subscriptions to global scientific activities in the upcoming five-year review into the Academy’s responsibilities.

Several clear benefits from Australia’s formal engagement with global scientific organisations are identified in the report. From Australia’s relatively modest formal membership contributions, it has a high number of scientists involved in leadership roles in global scientific organisations. Australia’s formal engagement has also resulted in a large number of significant international scientific conferences being held in Australia, including the General Assemblies of almost all of the ICSU Unions (which attract up to 6000 delegates). Other benefits include the development of formal and informal links with overseas scientists (resulting in increased international collaboration in Australian scientific publications), involvement in cutting-edge international science (particularly science that can only be carried out on a global scale), showcasing of Australian science, leveraging off scientific funding provided by larger nations, political influence and capacity building in developing countries (particularly in Australia’s region).

Although Australia is well engaged with the main global scientific organisations, this study has identified several strategically important gaps. It is recommended that Australia closes these gaps by becoming a formal member of the following organisations:

An Integrated Programme of Biodiversity (DIVERSITAS);

International Group of Funding Agencies for Global Change Research (IGFA);

International Human Dimensions Programme on Global Environmental Change (IHDP);

Integrated Ocean Drilling Program (IODP); and

Millennium Ecosystem Assessment (MA).

Australia should also consider rejoining:

the Committee on Data for Science and Technology (CODATA); and

the Scientific Committee on Problems of the Environment (SCOPE).

These organisations deal with scientific topics of global prominence that cut across national boundaries, and complement the activities of global science organisations to which Australia is already a member. Australia must formally engage with these organisations, and maintain existing arrangements with other globally relevant scientific organisations, in order to maximise the benefits of Australia's linkages with global scientific activities.

Proposal to SCOR for a second edition of the out-of-print monograph "Phytoplankton Pigments in Oceanography" published in 1997 from the activities of SCOR working Group 78.

1. Preamble

In 1997 a comprehensive pigment monograph was published by UNESCO: "*Phytoplankton Pigments in Oceanography – guidelines to modern methods*" which resulted from the activities of SCOR Working Group 78. It was edited by Drs. S.W. Jeffrey, R.F.C. Mantoura and S.W. Wright, and contained details of classic and modern pigment techniques, preparation of pigment standards, extracting and storing pigments and comparisons of spectrophotometric, fluorometric and chromatographic techniques. A unique set of pigment data, useful for identifying 47 key phytoplankton pigments, was also included.

In October 2004 UNESCO advised the Editors that this widely-used Monograph was out of print. A survey of key oceanographic pigment experts carried out by the Editors recommended that an immediate reprint was essential to the field, and that a second edition incorporating new advances should be considered. SCOR and UNESCO gave financial support for an immediate reprint, provided the Editors wrote a new Foreword listing the key advances and bibliography published since 1997 (see Appendix 1). The decision on a second edition was left until more thoroughly costed proposals could be made.

UNESCO advised SCOR that 500 copies of the original Monograph containing the new Foreword would be available sometime in 2005.

In May 2005, the SCOR Secretariat (Dr. Ed Urban) invited the Editors to provide a proposal, with detailed costings, for a second edition, which could be discussed at the next SCOR Secretariat meeting in Cairns, Australia in August 2005.

Various options were considered by the Editors. Five of the main issues are listed below, followed by more detailed considerations.

2. Summary of Main Issues

The Editors suggest the following activities should be done to assist the decision-making process for a possible second edition.

I. Set-up a revamped Working Group 78, the membership of which should include some of the active original members plus new younger researchers who have contributed to the new advances (see Appendix 1 – "Preface to 2005 Reprint of Original 1997 Monograph").

II. This revamped Working Group should meet soon to decide:
- Details of the new volume
- Authors of chapters/appendices (see Appendix 2, draft)
- Lead editors to drive the publication
- English text editing of each chapter as previously (e.g. Dr Vivienne Mawson)
- Time lines for volume completion.

III. An offer to host this meeting has been made by Dr. R.F.C. Mantoura, Director of the IAEA Oceanographic Laboratory at Monaco, with a suggested time of early 2006. Dr Mantoura was the previous chairperson of WG78.

IV. The Editors suggest that the new "second edition" should be a slim stand-alone supplement to the original Monograph – "Supplement 2006", leaving the original 1997 volume intact (see reasons for this in Section 3, below).

V. Funding necessary to support a face-to-face meeting of the revamped WG78 should be sought. Costing of the new stand-alone Supplementary volume will be possible once the contents, figures and layout are determined. Costs would include Supplement production, publication and promotion.

The Editors agreed that the analytical foundations had been laid down in the original 1997 Monograph, and new advances listed in the Foreword (Preface) to the 2005 reprint (Appendix 1) could be expanded in a modest stand-alone supplementary volume (see Appendix 2).

3. Further considerations.

I. Why a new stand-alone Supplementary Volume?

CSIRO Marine Research Chief, Dr Tony Haymet, advised Shirley Jeffrey in June 2006 that the support she received for the original volume would not be forthcoming, unless external funding was provided. The technology used for preparation and layout of the 1997 volume would be prohibitively expensive to convert to currently used 2006 technology (advice from CSIRO management). The Editors therefore agreed that to keep the issues simple and costs down, a new stand-alone supplementary volume might be the answer. The 1997 Monograph is still valid and widely used (see above).

New chapters would include new advances in:
- Pigment analytical methods
- Pigment chemistry
- Pigment chemotaxonomy
- Theories of algal chloroplast endosymbiotic relationships, and
- Computational methods for interpreting field data (e.g. CHEMTAX)

Appendices would be upgraded where necessary. A new editorial group could take over preparation of the supplementary second edition, with the original editors helping with various aspects as requested.

A CD of the first edition could be included in the sleeve of the second edition to allow researchers access to the full first edition material.

A list of current active researchers in pigment oceanography is provided (Appendix 3), so that SCOR can pursue these matters further, if appropriate.

Thank you for your support, and congratulations that the new reprint by UNESCO Publishing is out. When the issues listed above have been resolved, detailed costing of the project should be possible.

S.W. Jeffrey
R.F.C. Mantoura
S.W. Wright

August 5, 2005
Hobart, Tasmania

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Appendix 1.

Preface, incorporating advances since 1997

The present publication results from the activities of SCOR Working Group 78, *Determination of Photosynthetic Pigments in Seawater*, established in 1985 under the chairmanship of Dr R. F. C. Mantoura. The first meeting, held in Plymouth in 1986, considered intercalibration of pigment methods, and recommended 'hands-on' workshops for measuring chlorophylls and derivatives, carotenoids and derivatives, and field applications. These workshops were held in 1988 and 1989. In May 1992 Drs Jeffrey, Mantoura and Wright began to prepare a comprehensive monograph that would present the workshop results (comparing classic with modern pigment techniques), as well as a comprehensive section of data on key phytoplankton pigments of relevance to oceanography. Detailed protocols for preparing pigment standards, extracting and storing pigments, and spectrophotometric, fluorometric and chromatographic techniques would be included. This volume was published by UNESCO in 1997 under the editorship of Drs Jeffrey, Mantoura and Wright.

In October 2004, UNESCO notified the editors that the widely used Monograph was out of print. A survey of key oceanographic scientists recommended that an immediate reprint was essential to the field and that a second edition incorporating new advances should be considered. SCOR and UNESCO decided to give financial support for an immediate reprint and invited the editors to rewrite the original preface to include some of the key advances and bibliography published since 1997. The decision on a second edition was left until more thoroughly costed proposals could be made.

New Advances (1997 – 2005)

The equipment and materials noted in the original text are those that gave the best results at the time of the experimental phase of Working Group 78. While most of the recommendations are still valid, some have been superseded by recent advances in the following topics:

- *Pigment analytical methods using HPLC.*
- *Pigment chemistry*
- *Pigment chemotaxonomy*
- *Theories of algal chloroplast endosymbiotic relationships*
- *Computational methods for interpreting field data (e.g. CHEMTAX).*

The following lists significant new research papers and reviews (some still in press) in these areas, that the Editors believe will be most useful to the reader. Because of space restrictions, the bibliography is necessarily limited, but the reviews allow access to much recent literature. The references are listed chronologically in relation to their relevant chapters, and represent key advances.

The editors thank the following organisations for support of this publication and for enabling this present reprint: the Scientific Committee for Oceanic Research (SCOR), the Intergovernmental Oceanographic Commission (IOC) of UNESCO, UNESCO Publishing, CSIRO Marine Research, Plymouth Marine Laboratory and the Australian Antarctic Division.

The scientific opinions expressed in this work are those of the authors and should not be interpreted as the views of SCOR or UNESCO.

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Chapter 2: Marine phytoplankton and their pigments

a. Phylogeny: New classes erected

Andersen, R.A., Saunders, G.W., Paskind, M.P., Sexton, J.P. (1993) Ultrastructure and 18S RNA gene sequence for *Pelagomonas calceolata* gen. et sp. nov. and the description of a new algal class, the Pelagophyceae *classis nov.* J. Phycol. 29: 701-715.

Guillou, L., Chrétiennot-Dinet, M.-J., Medlin, L.K., Claustre, H., Loiseaux-de Goer, S., Vaulot, D. (1999) *Bolidomonas:* a new genus with two species belonging to a new algal class, the Bolidophyceae (Heterokonta). J. Phycol. 35: 368 – 381.

Kawachi, M., Inouye, I., Honda, D., O'Kelly, C.J. (2002) The Pinguiophyceae *classis nova*, a new class of photosynthetic stramenopiles whose members produce large amounts of omega-3 fatty acids. Phycol. Res. 50: 31 – 47.

b. Revised algal classifications

Mostaert, A.S., Karsten, U., Hara, Y., Watanabe M.M. (1998) Pigments and fatty acids of marine raphidophytes: a taxonomic re-evaluation. Phycol. Res. 46: 213-220.

Clay, B.L., Kugrens, P., Lee, R.E. (1999) A revised classification of the Cryptophyta. Bot. J. Linn. Soc. 131: 131-151.

Andersen, R.A., Van de Peer, Y., Potter, D., Sexton, J.P., Kawachi, M., LaJeunesse T. (1999) Phylogenetic analysis of the SSUrRNA from members of the Chrysophyceae. Protist 150: 71-84.

c. Pigment distribution across algal classes

Review

Jeffrey, S.W., Wright S.W. (in press) Photosynthetic Pigments in Marine Microalgae: insights from cultures and the sea, *In* Subba Rao, D.V. (editor) *Algal Cultures, Analogues of Blooms and Applications*¸ Science Publishers, Enfield, NH, USA.

Research papers

Van Lenning, K., Latasa, M., Estrada, M., Sáez, A.G., Medlin, L., Probert, I., Véron, B., Young B. (2003) Pigment signatures and phylogenetic relationships of the Pavlovophyceae (Haptophyta). J. Phycol. 39: 379-389.

Zapata, M., Jeffrey, S.W., Wright, S.W., Rodríguez, F., Garrido, J.L., Clementston L. (2004) Photosynthetic pigments in 37 species (65 strains) of Haptophyta: implications for oceanography and chemotaxonomy. Mar. Ecol. Prog. Ser. 270: 83-102.

Latasa, M., Scharek, R., LeGall, F., Guillou L. (2004) Pigment suites and taxonomic groups in Prasinophyceae. J. Phycol 41: 1149 – 1155.

d. Origins of plastid diversity

Reviews

Bhattacharya, D. (1997) *Origins of algae and their plastids*. Springer-Verlag, Vienna, Austria.
Delwiche, C.F. (1999) Tracing the thread of plastid diversity through the tapestry of life. Amer. Nat. 154: S164-S177.
Moreira, D., LeGuyader, H., Phillipè H. (2000) The origin of red algae and the evolution of chloroplasts. Nature 405: 69-72.
McFadden, G.I. (2001) Primary and secondary endosymbiosis and the origin of plastids. J. Phycol. 37: 951-959.
Palmer, J.D. (2003) The symbiotic birth and spread of plastids: how many times and whodunit? J. Phycol. 39: 4-11.

Research papers

Elbrächter, M., Schnepf, E. (1996) *Gymnodinium chlorophorum*, a new green bloom-forming dinoflagellate (Gymnodiniales, Dinophyceae) with a vestigial prasinophyte endosymbiont. Phycologia 35: 381-393.
Tengs, T., Dahlberg, O.J., Shalchian-Tabrizi, K., Klaveness, D., Rudi, K., Delwiche, C.F., Jakobsen K.S. (2000) Phylogenetic analyses indicate that the 19'-hexanoyloxyfucoxanthin-containing dinoflagellates have tertiary plastids of haptophyte origin. Mol. Biol. Evol. 17: 718-729.
Saldarriaga, J.F., Taylor, F.J.R., Keeling, P.J., Cavalier-Smith, T. (2001) Dinoflagellate nuclear SSU rRNA phylogeny suggests multiple plastid losses and replacements. J. Mol. Evol. 53:204-213.
Morden, C.W., Sherwood, A.R. (2002) Continued evolutionary surprises among dinoflagellates. Proc. Nat. Acad. Sci. USA 99: 11558-11560.
Hackett, J.D. Maranda, L., Su Yoon, H., Bhattacharya D. (2003) Phylogenetic evidence for the cryptophyte origin of the plastid of *Dinophysis* (Dinophysiales, Dinophyceae). J. Phycol. 39: 440-448.

e. General algal texts

Van den Hoek, C., Mann, D.G., Jahns, H.M. (1998) *Algae: an introduction to phycology*. Cambridge University Press, U.K., 627 pp.
Graham, L.E., Wilcox, L.W. (2000) *Algae*, Prentice Hall, N.J. 640 pp.

Chapter 3. Pigment metabolism and function

Ort, D.R., Yocum, C.F. (1996) Oxygenic photosynthesis: the light rections. In *Advances in Photosynthesis*, Vol 4,Kluwer Academic Publishers, Dordrecht, The Netherlands, 682pp.
Frank, H.A., Young, A.J., Britton, G., Cogdell, R.J. (1999) The Photochemistry of Carotenoids. In *Advances in Photosynthesis*, Vol 8, Kluwer Academic Publishers, Dordrecht, The Netherlands, 399pp.
Leegood,R.C., Sharkey, T.D., von Caemmerer, S. (2000) Photosynthesis: Physiology and Metabolism. In *Advances in Photosynthesis*, Vol 9, Kluwer Academic Publishers, Dordrecht, The Netherlands, 624 pp.
Ke, B. (2001) Photosynthesis: Photobiochemistry and Photobiophysics. In *Advances in Photosynthesis*, Vol 10 ,Kluwer Academic Publishers, Dordrecht, The Netherlands, 763 pp.
Larkum, A.W.D., Douglas, S.E., Raven,J.A. (2003) *Photosynthesis in Algae*. Kluwer Academic Publishers, Dordrecht, The Netherlands, 479 pp.

Research paper

Liu, Z.,Yan, H., Wang, K., Kuang, T., Zhang, J., Gui, L., An,X., Chang, W. (2004) Crystal structure of spinach major light-harvesting complex at 2.72 Å resolution. Nature 428: 287 – 292.

Chapter 4: Oceanographic applications

a. Ocean colour

Subramaniam, A., Brown, C.W., Hood, R.R., Carpenter, E.J., Capone, D.G. (2002) Detecting *Trichodesmium* blooms in SeaWiFS imagery. Deep-Sea Res. II 49: 107-121.

Sathyendranath, S., Watts, L., Devred, E., Platt, T., Caverhill, C., Maass, H. (2004) Discrimination of diatoms from other phytoplankton using ocean-colour data. Mar. Ecol. Prog. Ser. 272: 59-68.

b. Computational methods

Mackey, M. D., Mackey, D.J., Higgins, H.W., Wright S. W. (1996) CHEMTAX- A program for estimating class abundances from chemical markers: application to HPLC measurements of phytoplankton pigments. Mar. Ecol. Progr. Ser. 144, 265 – 283

Goericke, R., Montoya, J.P. (1998) Estimating the contribution of microalgal taxa to chlorophyll *a* in the field – variations of pigment ratios under nutrient- and light-limited growth. Mar. Ecol. Prog. Ser. 169: 97 – 112.

Havskum,H., Schlüter, L., Scharek, R., Berdalet, E., Jacquet, S. (2004) Routine quantification of phytoplankton groups – microscopy or pigment analysis. Mar Ecol. Prog. Ser. 273: 31 – 42.

c. Pigment degradation products

Bianchi, T.S., Bauer, J.E., Druffel, E.R.M., Lambert, C.D. (1998) Pyrophaeophorbide *a* as a tracer of suspended particulate organic matter from the NE Pacific continental margin. Deep-Sea Res. II 45: 715 – 731.

Goericke, R., Strom, S.L., Bell, M.A. (2000) Distribution and sources of cyclic phaeophorbides in the marine environment. Limnol. Oceanogr. 45: 200 – 211.

Shankle, A.M., Goericke, R., Franks, P.J.S., Levin, L.A. (2002) Chlorin distribution and degradation in sediments within and below the Arabian Sea oxygen minimum zone. Deep-Sea Res. I 49: 953 – 969.

Chapter 5: Field studies using HPLC and CHEMTAX

Review

Wright, S.W., Jeffrey, S.W. (In press) Pigment markers for phytoplankton production *In:* Volkman, J.K. (ed.) *Marine Organic matter: Chemical and biological markers*, Springer Verlag, Heidelberg, Germany.

Chapter 6: Algal culturing procedures

Andersen, R.A. (2005) *Algal culturing techniques*. Elsevier, London U.K, 578 pp.

Chapter 12: HPLC methods

Reviews

Jeffrey, S.W., Wright, S.W., Zapata M. (1999) Recent advances in HPLC pigment analysis of phytoplankton. Mar. Freshw. Res. 50: 879-896.

Garrido, J.L., Zapata M. Chlorophyll analysis by new high performance liquid chromatography methods. *In* B. Grimm, R.J. Porra, W. Rüdiger and H. Scheer. [eds.] (2005) *Chlorophylls*

and Bacteriochlorophylls: Biochemistry, Biophysics and Biological Function. Kluwer Academic Publishers. The Netherlands (in press).

Wright, S.W., Jeffrey, S.W. (in press) Pigment markers for phytoplankton production *In:* Volkman, J.K. (ed.) *Marine organic matter: Chemical and biological markers*, Springer Verlag, Heidelberg, Germany.

Recommended research papers

The methods of Zapata *et al.* (2000) and Van Heukelem and Thomas (2001) (see below) offer superior resolution to that described in Chapter 12, particularly separating polar and non-polar chlorophyll *c* pigments, divinyl chlorophylls *a* and *b*, and fucoxanthin derivatives. These methods are highly recommended. The method of Garrido and Zapata (1997) has a different retention order and is useful for confirming pigment identities. When bacteriochlorophylls are present, the method of Airs *et al.* (2001) is recommended.

Garrido, J.L., Zapata, M.. (1997) Reversed-phase high-performance liquid chromatography of mono- and divinyl-chlorophyll forms using pyridine-containing mobile phases and polymeric octadecylisilica. Chromatographia 44: 43-49.

Zapata, M., Rodríguez, F., Garrido, J.L. (2000) Separation of chlorophylls and carotenoids from marine phytoplankton: a new HPLC method using a reversed phase C_8 column and pyridine-containing mobile phases. Mar. Ecol. Prog. Ser. 195: 29-45.

Van Heukelem L., Thomas C.S. (2001) Computer-assisted high performance liquid chromatography method development with applications to the isolation and analysis of phytoplankton pigments J. Chromatog. A 910: 31-49.

Airs R.L., Atkinson J.E., Keely B.J. (2001) Development and application of a high resolution liquid chromatographic method for the analysis of complex pigment distributions. J Chromatogr A. 917: 167-77.

Part IV Data sheets: New pigments

a. Carotenoids

Egeland, E.S., Liaaen-Jensen, S.. (1995) Ten minor carotenoids from Prasinophyceae (Chlorophyta). Phytochem 40: 515-520.

Egeland, E.S., Guillard, R.R.L., Liaaen-Jensen S. (1997) Additional carotenoid prototype representatives and a general chemosystematic evaluation of carotenoids in Prasinophyceae (Chlorophyta). Phytochem. 44: 1087-1097.

Meyer-Harms, B., Pollehne, F. (1998) Alloxanthin in *Dinophysis norwegica* (Dinophysiales, Dinophyceae) from the Baltic Sea. J. Phycol. 34: 280-285.

Bjørnland, T., Fiksdahl, A., Skjetne, T., Krane, J., Liaaen-Jensen, S. (2000) Gyroxanthin – the first allenic acetylenic carotenoid. Tetrahedron 56: 9047-9056.

b. Chlorophylls

Reviews

Scheer, H. The pigments. *In* B.R. Green and W.E. Parsons [eds.] (2003) *Light-harvesting antennas in photosynthesis*. Advances in Photosynthesis and Respiration, Vol 13. Kluwer Academic Publishers, The Netherlands. p. 29-81.

Macpherson, A.N., Hiller, R.G. (2003) Light-harvesting systems in chlorophyll *c*-containing algae, *In* B.R. Green and W.W. Parson [eds.] *Light harvesting antennas in Photosynthesis.* Advances in Photosynthesis and Respiration, Vol. 13, Kluwer Academic Publishers, The Netherlands, p. 323 – 352.

Zapata, M., Garrido, J.L., Jeffrey, S.W. (in press) Chlorophyll *c* pigments: current status. *In* B. Grimm, R.J. Porra, W. Rüdiger and H. Scheer [eds.]. *Chlorophylls and*

Bacteriochlorophylls: Biochemistry, Biophysics and Biological Function. Kluwer Academic Publishers. The Netherlands.

Research papers

Hess, W.R., Partensky, F., van der Staay, G.W.M., Garcia-Fernandez, J. M., Börner, T., Vaulot, D.(1996) Coexistence of phycoerythrin and a chlorophyll *a/b* antenna in a marine prokaryote. Proc. Natl. Acad. Sci. USA 93: 11126-11130.

Helfrich, M., Ross, A., King, G.C., Turner, A.G., Larkum A.W.D. (1999) Identification of [8-vinyl]-protochlorophyllide *a* in phototrophic prokaryotes and algae: chemical and spectroscopic properties. Biochim. Biophys. Acta. 1410: 262-272.

Garrido, J.L., Otero, J., Maestro, M.A., Zapata M. (2000) The main non-polar chlorophyll *c* from *Emiliania huxleyi* (Prymnesiophyceae) is a chlorophyll c_2-monogalactosyldiacylglyceride ester: a mass spectrometry study. J. Phycol.36: 497-505.

Miyashita, H., Ikemoto, H., Kurano, N., Miyachi, S., Chihara, M. (2003) *Acaryochloris marina* gen. et. sp. nov. (Cyanobacteria) an oxygenic photosynthetic prokaryote containing Chl *d* as a major pigment. J. Phycol. 39: 1247-1253.

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Appendix 2
Draft Contents of possible supplementary volume (second edition)

PART 1

ADVANCES IN PHYTOPLANKTON BIOLOGY, PIGMENT SIGNATURES and NEW METHODS

Chapter 1 - Advances in phytoplankton biology and pigment signatures:
Would contain discussion of:

- new classes
- origins of plastid diversity (Delwiche scheme)
- our latest pigment distribution scheme (56 pigments across 32 algal groups, Jeffrey and Wright, in press).

Chapter 2 - Pigment metabolism and function
Discussion of:

- Photosynthesis
- Photoprotection
- Epoxide cycles

Chapter 3 - Pigment analytical methods using HPLC
Discussion of:

- three excellent new high resolution HPLC pigment methods
- HPLC methods for bacteriochlorophylls
- HPLC and mass spectrometry
- NMR
- three recent reviews (2 in press)

Chapter 4 – Pigment degradation products (diagenesis) (e.g. new cyclic pheophorbides see Goericke)

PART II

PIGMENT APPLICATIONS IN OCEANOGRAPHY.

Chapter 5 - Computational methods for interpreting phytoplankton pigment data.
Discussion of:

- Simultaneous equations
- CHEMTAX
- representative pigment ratios for field use
- site studies

Chapter 6 - Ocean colour and pigment algorithms.
Discussion led by Shubha Sathyendranath

Chapter 7 - Phytoplankton pigment measurement by total reflectance

Chapter 8 - Pigment : carbon biomass allometry

Chapter 9 - Applications to field studies - recent literature synopsis

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PART III

APPENDICES - (mostly short topics by different authors)

A. Pigment data sheets (new phytoplankton pigments, diagenetic products, bacteriochlorophylls) (about 10 -15 new data sheets)

B. New algal cultures for new sources of pigments

C. New Chlorophyll c structures and visible absorption spectra

D. New Carotenoid structures and visible absorption spectra

E. Re-evaluation of extraction methods

F. New cultures examined quantitatively for pigments (literature)

G. Update on extinction coefficients

Appendix 3.

Pigment Researchers in Oceanography (2005)

Dr Ralf Goericke	r.goericke@ucsd.edu
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Editors of 1997 Monograph

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shirley.jeffrey@csiro.au

In accordance with the international character of SCOR and UNESCO, the nationalities included in the above list are as follows:

Argentina
Australia
Canada
Denmark
Germany
France
Japan
Monaco
Norway
South Africa
Spain
The Netherlands
UK
USA

SCOR WG 109
Biogeochemistry of Iron in Seawater

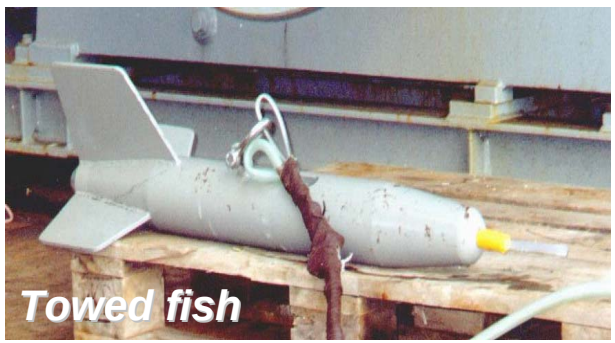
Subtask on certification of dissolved iron in seawater

Andrew R. Bowie [a,b,c*], Eric P. Achterberg [c], Peter L. Croot [d], Hein J.W. de Baar [d], Patrick Laan [d], James W. Moffett [e], Simon Ussher [c] and Paul J. Worsfold [c]

a Antarctic Climate & Ecosystems CRC, Hobart, Tasmania, Australia
b Australian Centre for Research on Separation Science, University of Tasmania, Hobart, Tasmania, Australia
c School of Earth, Ocean and Environmental Sciences, University of Plymouth, Plymouth, United Kingdom
d Royal Netherlands Institute for Sea Research, Texel, The Netherlands
e Marine Chemistry and Geochemistry, Woods Hole Oceanographic Institution, Woods Hole (MA), USA

IRONAGES standard: sampling

- 1000 liters HDPE cubic tank
- Filled to 700 liters over 8 hours
- South Atlantic Ocean, 6.0^{o}S 5.6^{o}W
- Acidified to ~pH 2 using 700 ml Q-HCl
- Homogenised by gentle shaking of tank

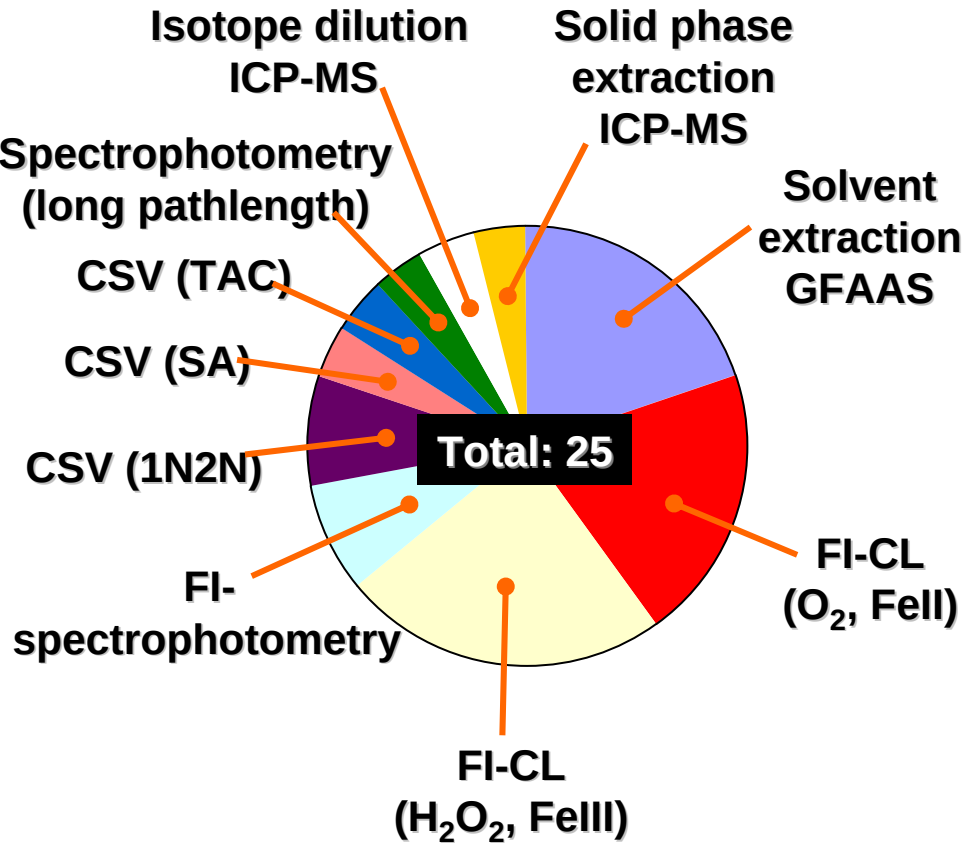


IRONAGES standard: bottling

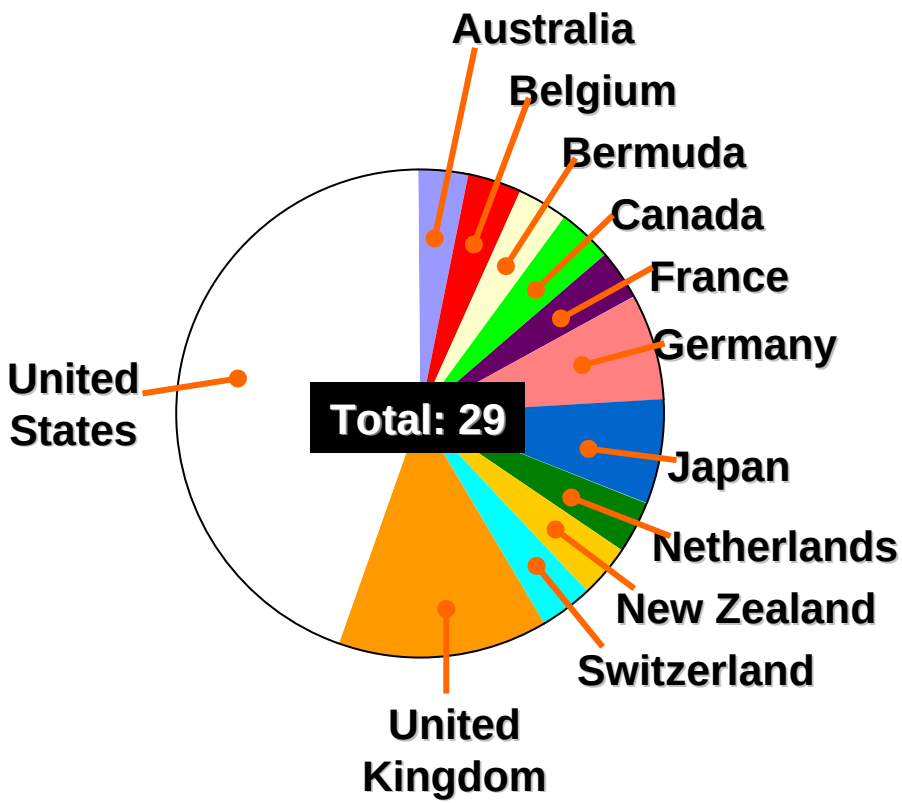
- Transfer from tank to clean laboratory using Teflon FEP line and peristaltic pump
- 200 x 1 l LDPE bottles filled in two batches - 160 UoP & 40 at Royal NIOZ

- Trials for:
  - homogeneity
  - time-series stability
  - sample storage
- Other bottles were sent to ~25 worldwide iron laboratories

IRONAGES standard: participants/methods



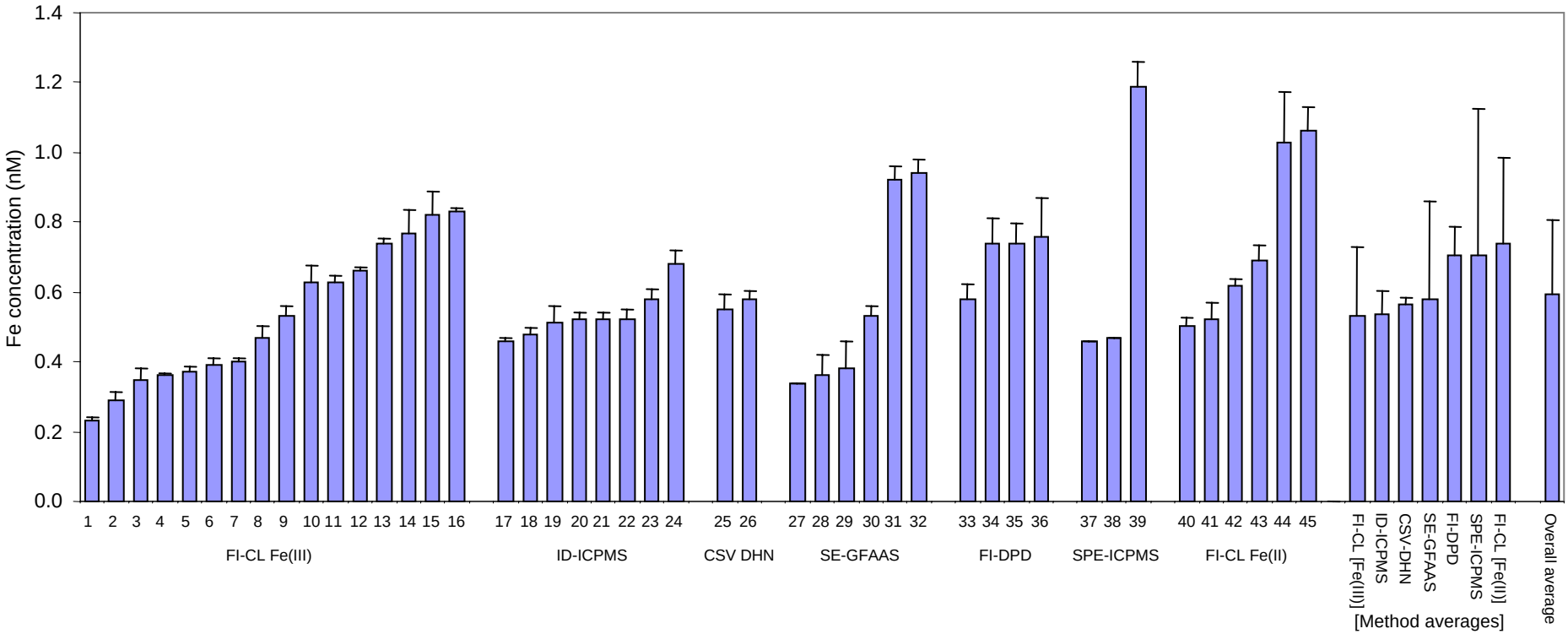
Analytical methods used during the IRONAGES exercise



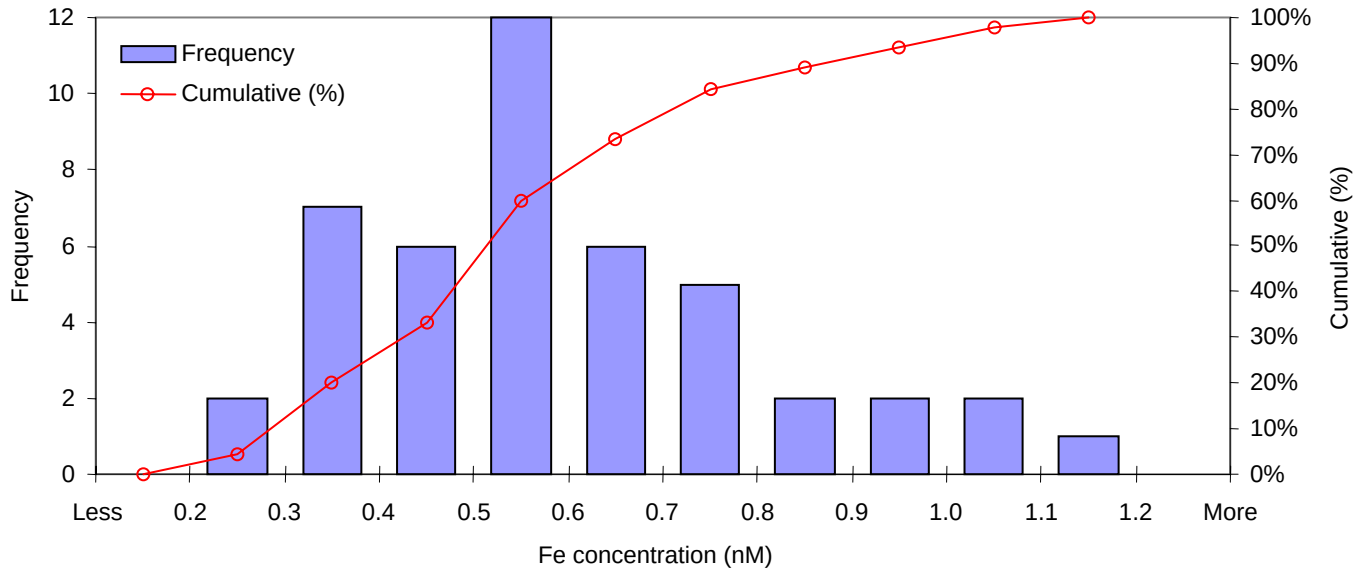
Laboratories participating in the "Ironcal" workshop, San Antonio, January 2000

Results:
Laboratory data versus different types of analytical methods

Jim Moffett, independent chair



Results:
Histogram laboratory intercomparison
Jim Moffett, independent chair



Results now in press in Marine Chemistry:
(pdf file available on request)

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Marine Chemistry XX (2005) xxx-xxx

MARINE CHEMISTRY

www.elsevier.com/locate/marchem

A community-wide intercomparison exercise for the determination of dissolved iron in seawater

A.R. Bowie [a,b,c]*, E.P. Achterberg [c], P.L. Croot [d], H.J.W. de Baar [d], P. Laan [d], J.W. Moffett [e], S. Ussher [c] and P.J. Worsfold [c]

What is Next:

SAFE exercise aboard RV Melville in Pacific, October 2004
Samples and data are now being processed

A community-wide intercomparison exercise for the determination of dissolved iron in seawater

Andrew R. Bowie [a,b,c]*, Eric P. Achterberg [c], Peter L. Croot [d], Hein J.W. de Baar [d], Patrick Laan [d], James W. Moffett [e], Simon Ussher [c] and Paul J. Worsfold [c]

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Marine Chemistry, accepted and in press

Abstract

The first large-scale international intercomparison of analytical methods for the determination of dissolved iron in seawater was carried out between October 2000 and December 2002. The exercise was conducted as a rigorously "blind" comparison of 7 analytical techniques by 24 international laboratories. The comparison was based on a large volume (700 L), filtered surface seawater sample collected from the South Atlantic Ocean (the "IRONAGES" sample), which was acidified, mixed and bottled at sea. Two 1 L sample bottles were sent to each participant. Integrity and blindness were achieved by having the experiment designed and carried out by a small team, and overseen by an independent data manager. Storage, homogeneity and time-series stability experiments conducted over 2.5 years showed that interbottle variability of the IRONAGES sample was good (<7 %), although there was a decrease in iron concentration in the bottles over time (from 0.8-0.5 nM) before a stable value was observed. This raises questions over the suitability of sample acidification and storage. For the complete dataset of 45 results (after excluding 3 outliers not passing the screening criteria), the mean concentration of dissolved iron in the IRONAGES sample was 0.59±0.21 nM, representing a coefficient of variation (%CV) for analytical comparability ("community precision") of 36 % (1s), a significant improvement over earlier exercises. Within-run precision (5-10 %), inter-run precision (15 %) and inter-bottle homogeneity (<7 %) were much better than overall analytical comparability, implying the presence of: (1) random variability (inherent to all intercomparison exercises); (2) errors in quantification of the analytical blank; and (3) systematic inter-method variability, perhaps related to secondary sample treatment (e.g. measurement of different physicochemical fractions of iron present in seawater) in the community dataset. By grouping all results for the same method, analyses performed using flow injection – luminol chemiluminescence (with FeII detection after sample reduction) [Bowie et al., 1998. Anal. Chim. Acta 361, 189] and flow injection – catalytic spectrophotometry (using the reagent DPD) [Measures et al., 1995. Mar. Chem. 50, 3] gave significantly (P=0.05) higher dissolved iron concentrations than analyses performed using isotope dilution ICPMS [Wu and Boyle, 1998. Anal. Chim. Acta 367, 183]. There was, however, evidence of scatter within each method group (CV up to 59 %), implying that better uniformity in procedures may be required. This paper does not identify individual data and should not be viewed as an evaluation of single laboratories. Rather it summarises the status of dissolved iron analysis in seawater by the international community at the start of the 21st century, and can be used to inform future exercises including the SAFE iron intercomparison study in the North Pacific in October 2004.

ICSU Insight
Newsletter, July 2005, vol 3, n° 2

Excepts from Newsletter

Strategic Initiatives

Strategic Plan 2006-2012

The Executive Board expresses its sincere thanks to all those Members and individuals who provided invaluable comments on the earlier draft version of the Strategic Plan. A revised draft was considered by Officers on 25 and 26 July and will be sent to all ICSU Members, Interdisciplinary Bodies and key partners in early August. This critical document will provide the basis for the discussions at the ICSU General Assembly in October.

Scoping Group on Natural and Human-Induced Hazards

Like the hazards themselves, scientific research on hazards crosses national borders and is inherently international in nature. However a major challenge for the scientific community is to develop a truly global and interdisciplinary approach to the understanding, assessment and prediction, and mitigation of hazards. A Scoping Group has been appointed to develop an outline proposal for discussion at the General Assembly.

International Science Panel on Renewable Energy

Working in partnership with the Fraunhofer Institute for Solar Energy Systems, ICSU has convened an ad hoc working group to develop a proposal for an International Science Panel on Renewable Energy (ISPRE), which is envisioned as an international, interdisciplinary platform for promoting and coordinating R&D for renewable energy technologies. This working group will also be helping ICSU address the issue of renewable energy for the upcoming meetings of the UN

Commission on Sustainable Development.

International Polar Year (IPY), 2007-2008

Over 100 full IPY proposals were submitted to the IPY International Project Office before the initial deadline of 30 June. A rolling IPY proposals schedule has been established with more IPY proposals being accepted 30 September 2005 and 16 January 2006.

The 2nd meeting of the Joint Committee will be held at WMO in November At the invitation of ICSU and WMO, the Arctic Council has accepted to become an ex officio member of the Joint Committee. A similar invitation has been sent to the Antarctic Treaty Consultative Meeting (ATCM).

ICSU Regional Office for Africa

The ICSU Regional Office for Africa will be inaugurated on 1 September 2005 by the South African Minister for Science and Technology. All ICSU Scientific Unions and Interdisciplinary Bodies as well as National Members in the region and key partners have been invited to this event. The 2nd Meeting of the Regional Committee for Africa will be held in Pretoria on 29-20 August immediately followed by a joint meeting will the ICSU Policy Committee on Developing Countries on 31 August. The report from the First ICSU Regional Meeting for Africa has been published by the Research Council of Zimbabwe.

ICSU Regional Office for Asia and the Pacific

A brief report on the highly successful ICSU First Regional Meeting for Asia and the Pacific, held at the Akademi Sains Malaysia on 25-27 April 2005, is now available. The meeting was opened by the Malaysian Minister for Science, Technology and Innovation, HE Jamaludin Jarjis. The Minister offred Malaysia as a host for the ICSU Regional Office for Asia and the Pacific. The ICSU National Members present recommend that the offer be accepted. The meeting further recommended that the region involve all of Asia and the Pacific, not only the developing countries of that region.

Data and Information

World Summit on the Information Society (Phase II)

ICSU-CODATA, in collaboration with other international organizations is organizing an International Workshop on “Creating the Information Commons for e-Science: Toward Institutional Policies and Guidelines for Action”, that will take place at UNESCO in Paris on 1st and 2nd September 2005.
All ICSU members are encouraged to contribute to the inventory of science in the

information society activities that is being prepared as part of the stock-taking exercise for the second phase of the World Summit on the Information Society (Tunis, December 2005).

Capacity Building

Young scientists

ICSU participated in a recent international symposium attended by over 150 graduate students, 'Kyoto and Beyond: A Good Climate for Responding to Climate Change?' (June 2005), organized by the SENSE (Socio-Economic and Natural Sciences of the Environment) Research School, a collaborative venture of eight Dutch Universities, aimed at promoting an integrated understanding of environmental change.

Priority Area Assessment on Capacity Building

The Committee on Scientific Planning and Review (CSPR) and the Executive Board have discussed the draft report from the Priority Area Assessment on Capacity Building. They were very appreciative of the ambitious report of the Panel, but requested the Secretariat to work with the Panel in preparing a more focussed report with emphasis on issues where ICSU can make a real contribution to capacity building. It was also realized that the ICSU family is already making significant contributions in the area of capacity building.

Environment

Global Change and Development Research

The International Group of Funding Agencies for Global Change Research (IGFA) and ICSU organized a highly successful symposium on the Interface Between Global Change and Development-Oriented Research (17-19 May 2005, Stockholm). The meeting brought together scientists and funders from the two communities for discussion on how interaction and collaboration can be strengthened. The report from the meeting will be made available on the IGFA website.

Sustainable Development

13th session of the UN Commission on Sustainable Development

The thirteenth session of the UN Commission on Sustainable Development (CSD-13) took place in New York in April. ICSU acted again as a "co-organising partner", together with the World Federation of Engineering Organizations (WFEO), for the participation of the S&T Community. In 2004-2005, the CSD has focused on the

issues of freshwater, sanitation and human settlements. CSD-14 will focus in 2006 will focus on climate, air pollution and industry.

Science and Policy

Bio-security

ICSU, together with two of the International Unions (IUBMB and IUPAB), was invited to provide input to the meeting of the States Parties to the Biological Weapons Convention, which took place in Geneva in June. The overarching theme was codes of conduct for scientists. Whilst acknowledging the responsibilities of the scientific community for strengthening the Weapons Convention and ensuring biosafety, ICSU also expressed its concern that increased regulations are having a deleterious impact on the practice of science.

Science and Society

All members who provided comments on the Strategic review, Science and Society: Rights and Responsibilities, are thanked for their very helpful input. The finalized review report has now been published.

World Science Forum – Budapest

ICSU is one of the co-sponsors of the World Science Forum – Budapest, which will be held on 10-12 November 2005 with focus on “Knowledge, Ethics and Responsibility – to Strengthen the Ethical Aspects of Knowledge in Society”.

ICSU Governance and Policies

28th General Assembly

Preparations are proceeding well for the General Assembly in Suzhou (18-22 October). About 200 participants have already registered. The detailed programme and proposed actions were finalized at the officers meeting on 25-26 July and the final documents will be posted online in august. (Restricted to ICSU Members and Guests)

ISCU Natural Hazards Scoping Group

Terms of reference

Background

The devastating effects of the 26 December 2004 tsunami showed that natural disasters can result in large losses of human lives and economic assets. The Munich Re 2002[1] [1]review stated that in 2002, 11,000 lives were lost through natural catastrophes and economic losses totalled $US55bn, an increase from 2000 but below the record $US100bn in 1999. Windstorms and floods accounted for over two-thirds of the 700 events. Millions of people are injured or displaced each year because of natural disasters, and property damage has been doubling about every seven years over the past 40 years.

Concern about natural disasters is the focus of programmes such as the United Nation International Strategy for Disaster Reduction (ISDR), the World Bank Disaster Management Facility and the "Disasters: Reducing loss of life and property from natural and human-induced disasters" societal benefit area of the Global Earth Observation System of Systems (GEOSS).

At the January 2005 World Conference on Disaster Reduction (Kobe, Hyogo, Japan), governments agreed to the following declaration: "*We can and must further build the resilience of nations and communities to disasters through people-centred early warning systems, risks assessments, education and other proactive, integrated, multi-hazard, and multi-sectoral approaches and activities in the context of the disaster reduction cycle, which consists of prevention, preparedness, and emergency response, as well as recovery and rehabilitation. Disaster risks, hazards, and their impacts pose a threat, but appropriate response to these can and should lead to actions to reduce risks and vulnerabilities in the future.*"

Though hazards will continue to exist, it is the vulnerability established often through people's choices that turns hazards into disasters. The changing global climate introduces additional complexities. Internationally, there is considerable knowledge and research on: the analysis and design of infrastructure and public health systems; mitigation and adaptive management; severe weather, earthquakes and other hazardous events; and policies for the management of risk and interactions among different levels of government.

However, in a field that is highly interdisciplinary, much of the research is conducted along single-disciplinary lines. Hazards have been considered independently and much of the analysis has had a retrospective, rather than forward-looking, view. Moreover, the scientific knowledge that we have is not always translated into policies that are effective in minimising the human and economic costs of hazards.

[1]http://www.munichre.com/publications/302-03661_en.pdf

7-16b

Scoping Group

The ICSU Priority Area Assessment on Environment and its Relation to Sustainable Development (ICSU, 2003[2]) proposed "Natural and human-induced hazards" as one of four possible new fields of work. This field was also highlighted as an "emerging" scientific issue in the ICSU Foresight Analysis (ICSU 2004[3]). ICSU, as an institutional partner, has also been involved in preparing the Geohazards Theme[4] of the Integrated Global Observing Strategy Partnership (IGOS-P).

The Executive Board has therefore decided to appoint a Scoping Group to examine possible initiatives in this area and report to the ICSU 28th General Assembly (October 2005). The Group's report should consider the past achievements of the ICSU Committee on Disaster Reduction (CDR) and the previous Scientific Committee for the International Decade on Disaster Reduction (SC-IDNDR). Any Hazard Programme should build on the disciplinary expertise of the ICSU Unions (in particular the Geo-Unions and the hazards theme of the Year of Planet Earth[5]), the relevant subject areas of the Global Environmental Change programmes, and Interdisciplinary Bodies with additional components, such as population health and critical infrastructure (through appropriate partners).

On the basis of the Scoping Group report, the General Assembly will be asked to make a decision on the planning of a new initiative, and an *ad hoc* Planning Committee will then be established if appropriate.

Mandate of Scoping Group

Taking into account relevant past and on-going activities both within and beyond the ICSU family:

1. to identify significant gaps in the international research effort on scientific aspects of natural and human-induced environmental hazards, and in particular to identify any areas where lack of interdisciplinary cohesion and interaction may be impeding progress;
2. to consider possible shortcomings in the way that national and international policy-makers are making use of the relevant scientific knowledge (in its broadest sense) when devising policy initiatives intended to reduce the likelihood or minimise the impact of an environmental hazard;
3. to make recommendations about the scope for a possible multi-disciplinary ICSU initiative in relation to (1) and/or (2). These recommendations should include an analysis of the potential customers for such an initiative (eg policy-makers whom it is intended to influence), and the partners with whom ICSU might work. They should also include suggestions about how the initiative might achieve greater impact by drawing on the experience and concerns of those most directly affected by some of the environmental hazards under consideration; and
4. to report to the General Assembly, via the Executive Board, in October 2005.

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[2] http://www.icsu.org/Gestion/img/ICSU_DOC_DOWNLOAD/58_DD_FILE_ICSU_PAA_REPORT.pdf

[3] http://www.icsu.org/Gestion/img/ICSU_DOC_DOWNLOAD/371_DD_FILE_Foresight_Analysis.pdf

[4] http://dup.esrin.esa.it/igos-geohazards/

[5] http://www.esfs.org/downloads/Hazards.pdf

The Scoping Group should interpret ‘natural and human-induced environmental hazards’ to include naturally occurring events such as earthquakes and volcanic eruptions, and events such as floods and landslides that may be the unintended consequences of human activity. It should cover both phenomena within the subject matter of the geosciences and phenomena with broadly ecological dimensions. Warfare and associated activities fall outside the scope. In general, the focus is on events that are manifested over relatively short periods, rather than gradually evolving phenomena such as climate change. Within these parameters, the Group should focus on the areas on which it judges it most useful to devote its efforts.

Modus operandi
This group will meet once, in June-August 2005, and prepare a short report (i.e., ~10 pages) for approval at the ICSU General Assembly in October 2005.

Membership

Chair : Gordon McBean (Canada)

Members:

- Edward Barbier (USA)
- Tom Beer (Australia)
- Chien-Jen Chen (China, Taiwan)
- Robert Chen (USA)
- Richard J. Eiser (United Kingdom)
- Katherine C. Ewel (USA)
- Virginia Garcia Acosta (Mexico)
- Nila Kapor-Stanulovic(Serbia)
- Hans Kienholz (Switzerland)
- Robert Missotten (UNESCO)
- Daniel Murdiyarso (Indonesia)
- Jan Sopaheluwakan (Indonesia)
- Coleen Vogel (South Africa)

Observer: (invited by the Chair)

- Peter Bobrowsky (Canada)

THE INTERNATIONAL COUNCIL FOR SCIENCE

SCIENTIFIC COMMITTEE ON ANTARCTIC RESEARCH

SCAR ANNUAL REPORT TO SCOR FOR THE PERIOD SINCE THE SCOR VENICE MEETING

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1. SCAR and its Role in Relation to the Antarctic Treaty

SCAR, the Scientific Committee on Antarctic Research, is the principal organization dealing with Antarctic scientific research (see http://www.scar.org). It is the authoritative voice on Antarctic scientific research from the ionosphere to the mantle, from bacteria to seals, from the ice sheet to the deep sea floor, on the role of Antarctica in the Earth System, and on astronomy from Antarctica.

SCAR is an interdisciplinary committee of the International Council for Science (ICSU). Formed in 1958, SCAR was charged with "*furthering the coordination of scientific activity in Antarctica, with a view to framing a scientific programme of circumpolar scope and significance*". In this role SCAR inherited the mantle of the Antarctic component of the International Geophysical Year for 1957-58 (IGY).

SCAR's area of interest includes Antarctica, its offshore islands, and the surrounding Southern Ocean including the Antarctic Circumpolar Current, the northern boundary of which is the Subantarctic Front. Subantarctic islands that lie north of the Subantarctic Front and yet fall into SCAR's area of interest include: Ile Amsterdam, Ile St Paul, Macquarie Island and Gough Island.

SCAR's has Observer status within the Antarctic Treaty System, and provides advice and responds to requests in the form of Information Papers and Working Papers to the annual Antarctic Treaty Consultative Meeting (ATCM) and the Committee for Environmental Protection (CEP).

SCAR's Members are representatives of national organizations adhering to ICSU, or nominated by national organizations adhering to ICSU. SCAR's membership has changed from the original 12 countries to 28 Full Members and 4 Associate Members (nations with an interest in becoming full members). See Appendices 1, 2, 3 for SCAR's Members, Executive Officers, Secretariat, and Organisational Chart.

SCAR continues to play a unique and crucial role in contributing to the scientific understanding of the south polar region of the planet. Under SCAR's leadership, and within the framework of SCAR Scientific Research Programmes, SCAR Members and their national scientific communities increase scientific knowledge about Antarctica and understanding of the processes taking place there on and under the land surface, in the atmosphere and the ocean, in the ice and in outer space. Studies by SCAR scientists increasingly show how Antarctic processes contribute to the working of the Earth System, and *vice versa*, and of how the south polar environment is influenced by human activities originating both within and outside the region. They also indicate what needs to be done to safeguard the environment. In addition, through the provision of relevant information, assessments and advice to the ATCM, SCAR helps policy makers meet international commitments in the Antarctic. SCAR continues its leading role in international efforts to monitor and protect the environment, by providing critical information on the role of Antarctica in global warming, climate change and sea-level rise, and on the effects of climate change on living organisms. It is axiomatic that improved scientific understanding demands free and unrestricted geographic access to the region, and the free and unrestricted exchange of scientific data and information.

SCAR carries out its work on coordination with a number of partners. It is playing an increasing role in the coordination of science in the Southern Ocean through a number of agreements or partnerships:-

(i) with SCOR through the joint SCAR/SCOR Oceanography Expert Group;

(ii) with SCOR and others in co-sponsorship of the newly evolving biogeochemistry and ecosystems programme (ICCED);

(iii) with SCOR for co-sponsorship of a session at the IAPSO/IABO/IAG Dynamic Planet meeting in Cairns (August 2005), on Interdisciplinary research in the Southern Ocean

(iv) with the WCRP through the CLIVAR/CliC/SCAR Southern Ocean Implementation Panel;

(v) with the WCRP for joint sponsorship of the International Panel on Antarctic Buoys;

(vi) with GLOBEC for co-sponsorship of Southern Ocean GLOBEC;

(vii) with iAnZone, for affiliation to SCAR as well as SCOR;

(viii) with the IGOS Partners for co-leadership of the Cryosphere Theme, which addresses sea ice among other things;

(ix) with WCRP for co-sponsorship of the Climate and Cryosphere programme (CliC), which includes sea-ice among other things;

(x) with the Sloan Foundation for leadership; of the Census of Antarctic Marine Life (CAML), as part of the global Census of Marine Life (CoML);

(xi) with Italy for co-sponsorship of the Ross Sea Conference (Venice, October 10-14).

(xii) between SCAR's Joint Committee on Antarctic Data Management (JCADM), and IOC's IODE programme, on linkages between National ocean Data Centres (NODCs) and National Antarctic Data Centres (NADCs).

SCAR has assisted in the organisation of oceanographic meetings including:

(a) SCAR hosted the recent Southern Ocean Implementation Panel meeting on Modes of Variability, at the Scott Polar Research Institute, Cambridge, UK (June 27-30, 2005);

(b) SCAR is organising a meeting of the SCAR/SCOR oceanography Expert Group in Venice (October 7-8, 2005);

(c) SCAR is assisting SCOR with the session in Cairns (see iii, above);

(d) SCAR is assisting Italy with the Ross Sea meeting (see xi, above).

2. Delivering Science in the 21st Century

At its 28th session, in Bremerhaven, during October 2004, SCAR completed the restructuring that began with an independent review commissioned in April 1999. The principal changes are as follows (roman numerals (i) through (x), below):

i. SCAR has converted its Secretariat to an Executive Office run by an Executive Director, Dr C Summerhayes, formerly of UNESCO;

ii. SCAR has adopted a new Constitution and Rules of Procedure, which embrace a new vision, mission and objectives.

The Vision is

> *"To establish through scientific research and international cooperation a broad understanding of the nature of Antarctica, the role of Antarctica in the Earth System, and the effects of global change on Antarctica."*

The Mission is

> *"To be the leading independent organization for facilitating and coordinating Antarctic research, and for identifying issues emerging from greater scientific understanding of the region that should be brought to the attention of policy makers".*

Five Main Objectives provide a new focus on achieving this mission:

- to initiate, develop, and co-ordinate high quality international scientific research in the Antarctic region, and on the role of the Antarctic region in the Earth system;
- to provide objective and independent scientific advice to the Antarctic Treaty Consultative Meetings and other organizations on issues of science and conservation affecting the management of Antarctica and the Southern Ocean.
- to facilitate free and unrestricted access to Antarctic scientific data and information;
- to develop scientific capacity in all SCAR Members, especially with respect to younger scientists, and to promote the incorporation of Antarctic science in education at all levels;
- to communicate scientific information about the Antarctic region to the public.

3. The International Polar Year (2007-2008)

SCAR is making a significant contribution to the proposed International Polar Year (IPY)(1 March 2007 – 1 March 2009). During 2004, SCAR made significant contributions to the activities of ICSU's IPY Planning Group and its development of the "Framework for the IPY". Subsequently, the SCAR Executive Director has been appointed an *ex officio* member of the new ICSU/WMO Joint Committee on the IPY, which is steering the IPY process, and which includes several SCAR scientists. Several SCAR programmes, including SCAR's five major Scientific Research Programmes (SRPs), described below, prepared Expressions of Interest (EoIs) for submission to the IPY selection process by the end of 2004. At the first meeting of the Joint Committee (March 2005) the SCAR SRPs were designated lead projects for substantial subsets of the 850 EoIs submitted. Full proposals for those lead projects were submitted by the 30 June deadline. There are further deadlines for other projects on September 30 (2005) and 15 January (2006).

4. New Developments

The SCAR Delegates, meeting in October 2004, approved plans for a new set of five major Scientific Research Programmes (SRPs) that will be SCAR's scientific flagships for the next 5–10 years. They are:

- Antarctica and the Global Climate System (AGCS) a study of the modern ocean-atmosphere-ice system;
- Antarctic Climate Evolution (ACE) a study of climate change over the past 34 million years since glaciation began;
- Evolution and Biodiversity in the Antarctic (EBA) a study of the response of life to change;
- Subglacial Antarctic Lake Exploration (SALE) a study of the chemistry and biology of long buried lakes beneath the ice sheet;
- Interhemispheric Conjugacy Effects in Solar-Terrestrial and Aeronomy Research (ICESTAR) a study of how the Earth's outer atmosphere responds to the changing impact of the solar wind at both poles.

Plans for these can all be downloaded from the SCAR web site. Those with an ocean component are AGCS, ACE and EBA (see brief descriptions in Appendix 4). Most of the activities contributing to these programmes will be funded nationally. SCAR's international coordination will add value to national efforts. Scientists interested in participating in and contributing to the 5 scientific research programmes are invited to contact the SCAR Secretariat (info@scar.org).

SCAR also supports a variety of other scientific activities in which value is added to national efforts through international cooperation. These activities are coordinated by Action Groups operating for short periods, and Expert Groups where more time is needed to achieve success. Brief descriptions of the Groups with an ocean component are given in Appendix 5, and are available in more detail on the SCAR web site.

SCAR fully appreciates the value of communication both internally and with the general public. A SCAR Communication Strategy has been approved, and the SCAR web site has been upgraded. Two SCAR articles have been published in EOS, and one is in press there.

5. Highlights of Scientific Coordination Activities

This report gives selected examples and is not exhaustive.

5.1 Scientific Research Programmes

In 2004 SCAR's Standing Scientific Groups (SSGs) put considerable effort into developing the five new Scientific Research Programmes. All five programmes were evaluated by external reviews, on the basis of which they were approved by the Delegates for start up at the beginning of 2005. Implementation Plans have now been drafted and were approved by the Executive Committee for AGCS, ACE and EBA in July 2005.

AGCS developed its Implementation Plan at a meeting in Cambridge on June 30, 2005. Mike Meredith of the British Antarctic Survey (BAS) is leading the ocean component of AGCS. AGCS is part of continuing high priority efforts to determine the extent of environmental change across the Antarctic in recent decades. The SSG on Physical Sciences (SSG-PS) contributed to this work through the creation of a number of new data sets of key environmental variables. Analyses of these data sets have resulted in assessments of climatic change over the Antarctic since the IGY in 1957–58. A major conclusion is that there has been a complex pattern of change across the Antarctic over the last 50 years with the Antarctic Peninsula warming more than anywhere else on Earth while the rest of the continent has shown little change. While that is true of the surface, it is not true of the troposphere, which has warmed significantly. Sea ice has decreased off the Antarctic Peninsula, but increased off the Ross Sea.

Recognizing that Southern Ocean biodiversity is an important and significant component of the World marine biodiversity, and that a large part of the Southern Ocean biodiversity remains unknown, in particular in the deep sea, a substantial component of SCAR's EBA programme will focus on the biodiversity of the Southern Ocean. Part of this work will take place through the new Action Group on a Census on Antarctic Marine Life (CAML), which is a contribution to EBA. CAML is led by Michael Stoddart of the Australian Antarctic Division, and has been awarded a start-up

grant of US$525,000 for 2 years by the Alfred P Sloan Foundation. CAML met in June in Brussels to develop plans. Plans for EBA will be discussed during the 4th SCAR International Biology Symposium, in Curitiba, Brazil (July 24-30, 2005).

The Standing Scientific Group for the Life Sciences (SSG-LS) is also developing a Marine Biodiversity Information Network (MarBIN) that will contribute to the compilation, dissemination, and integration of fundamental information on the Antarctic marine biodiversity for scientific, monitoring, management and conservation purposes. This will be connected to the CoML's Ocean Biodiversity Information System (OBIS).

The evolution of climate is the focus of attention of the newly approved Antarctic Climate Evolution (ACE) programme within the SSG on Geosciences. Initial work by the ACE team has been published as a set of 13 papers in a Special Issue of *Global and Planetary Change* **45** (pages 1–332) in 2005, with an introduction on "Long-term changes in Southern high-latitude ice sheets and climate, the Cenozoic history" by the editors, F Florindo, D M Harwood and G S Wilson. The ACE Steering Committee met in Vienna in April to develop its Implementation Plan, under the leadership of Rob Dunbar (USA) and Martin Siegert (UK).

5.2 Action and Expert Groups

Recognizing the need to invest more effort in understanding the role of the Southern Ocean in climate and biodiversity, SCAR now co-sponsors much Southern Ocean research with global programmes having Antarctic interests (as noted above). Creation of the SCAR/SCOR Oceanography Expert Group is a step in that direction. It is intended to complements the activities of other groups active in the Southern Ocean, and will be managed in concert with them. A first informal meeting of some members of the group took place in Cambridge on June 28th, 2005.

SCAR is working with the space agencies and UN agencies through the Partnership for an Integrated Global Observing Strategy (IGOS) to devise a bi-polar programme to improve observations of the cryosphere.

The Expert Group of Operational Meteorology has worked with COMNAP to produce an International Antarctic Weather Forecasting Handbook. The WMO provided funding for a hardcopy version that is being distributed to all nations active in the Antarctic.

The READER Action Group has produced a new, improved database of mean, Antarctic tropospheric/stratospheric temperatures, winds and heights from surface observations and radiosondes (http://www.antarctica.ac.uk/met/READER/). READER is now part of AGCS.

The ASPeCT Expert Group has continued to develop its database of sea ice parameters from in-situ ship observations. Data from 81 voyages were added over the last two years. The data archive has been used in a number of studies, including comparisons

with satellite ice edge location to determine seasonal variability in the reliability in the satellite estimates, comparisons with sea ice-ocean models and the development of a circumpolar climatology of area-averaged albedo. A comprehensive database should be available by year end. ASPeCT is now part of AGCS.

The research programme EVOLANTA published the proceedings of one of their workshops as a special issue of *Antarctic Science* (**16**, no. 1, March 2004). EVOLANTA is now part of EBA.

The EASIZ sea ice programme was successfully terminated with a closing symposium in September 2004 in Croatia. The proceedings will be published in a special issue of *Deep Sea Research*.

A new Action Group on Marine Survey Coordination has been established to improve coordination of planned marine surveys within the Antarctic community.

A new Expert Group on the International Bathymetric Chart of the Southern Ocean (IBCSO) will develop new compilations of bathymetric data for inclusion in the Chart.

6. Future Plans

This report gives selected examples and is not exhaustive.

6.1 Scientific Coordination

The first priority is implementation of the five newly approved Scientific Research Programmes. Draft Implementation Plans for the new programmes were approved by the SCAR Executive in July. The new programmes are already involved in developing proposals for the IPY.

SCAR will also maintain the key activities of its Action and Expert Groups. A detailed record of the activities of these groups during 2005 can be found under EVENTS on the SCAR web page. The efforts of the Action Group on Marine Acoustics, which is investigating the relationship between noise in the ocean and the behaviour of cetaceans, and which resulted in a report to the XXVII ATCM, is continuing, as a means of providing scientific advice to the ATCM. A meeting is planned in Spain in January 2005.

SCAR will continue to provide inputs to the IPY process.

Key meetings involving SCAR in 2005 include:

1. SCAR–COMNAP Workshop on Practical Biological Indicators of Human Impacts in Antarctica, 16–18 March 2005, College Station, USA; to assess biological indicators of human impact and advise on implementing meaningful monitoring programmes in Antarctica.

2. Continental drilling 2005: A Decade of Progress and Opportunities for the Future; 30 March – 1 April 2005, Potsdam, Germany.
3. Climate and Cryosphere (CliC) 1st Science Conference; 11–15 April 2005, Beijing, China.
4. SCAR Workshop on Antarctic Conservation in the 21st Century, 23–25 May 2005, Stellensbosch, South Africa.
5. Southern Ocean Implementation Panel Meeting; 27–30 June 2005 Cambridge, UK; to discuss modes of variability and the IPY.
6. SCAR IX International Biology Symposium; 25–29 July 2005, Curitiba, Brazil.
7. International Association of Meteorology and Atmospheric Sciences Meeting; 2–11 August 2005, Beijing, China; to discuss Climate 7.Variability and Change in the Polar Regions: Causality and Prediction.
8. SCAR will co-sponsor special IAG/IAPSO sessions on "Oceanography and geodesy in polar regions" and on "Ocean interactions with sea ice, polynyas, ice shelves, and icebergs" as part 8.of the IAPSO/IABO Symposium, 22–26 August 2005, Cairns, Australia, and co-sponsors with SCAR the session on Interdisciplinary Research in the Southern Ocean.
9. International Conference on Glacial Sedimentary Processes and Products; August 2005, Aberystwyth, UK.
10. Third International Conference on the Oceanography of the Ross Sea; 10–14 October 2005, Venice, Italy.
11. International Symposium on Sea Ice; 4–9 December 2005, Dunedin, New Zealand

6.2 Developing Scientific Capacity

The Antarctic research programmes of SCAR Member nations vary greatly in their size and capacity. Some have scientific communities that are large, scientifically advanced and long standing. Others have relatively small and new Antarctic science communities that are still developing. To enable all in the SCAR family to participate in, contribute to and benefit from SCAR's activities, it is incumbent on SCAR to work with appropriate national agencies to help to enhance the research capacity of all of its Members and Associate Members. This requirement has become more pressing with the significant increase in SCAR Membership in recent years. SCAR has drafted a strategy for capacity building. One aspect of the potential capacity building programme that is already active is the SCAR Fellowship Programme, which provides a small number of annual awards. Four have been awarded in 2005. SCAR also arranges

training workshops. For example, a JCADM training workshop on Antarctic Data Management will be held in Buenos Aires in late 2005.

6.3 Communication

A SCAR brochure is to be developed along with a listing of past SCAR achievements.

7. Concluding Remarks

SCAR continues to play a central role in the development of scientific understanding in the Antarctic region. This role will be enhanced in future by SCAR's involvement at the heart of the planning process for the International Polar Year. SCAR's five new Scientific Research Programmes will make a major contribution to, and will help to lead the development of, the International Polar Year in the region. SCAR is keen to continue to play a major role as the scientific partner to other organisations with interests in the south polar region and the Southern Ocean. SCAR has considerably increased its involvement with other organisations in research in the Southern Ocean.

Appendix 1

MEMBERSHIP OF SCAR

Full members:	*Date of admission to Associate Membership*	*Date of admission to Full Membership*
Argentina		3 February 1958
Australia		3 February 1958
Belgium		3 February 1958
Chile		3 February 1958
France		3 February 1958
Japan		3 February 1958
New Zealand		3 February 1958
Norway		3 February 1958
South Africa		3 February 1958
Russia (formerly Union of Soviet Socialist Republics)		3 February 1958
United Kingdom		3 February 1958
United States of America		3 February 1958
Germany (including former German Democratic Republic)		22 May 1978
Poland		22 May 1978
India		1 October 1984
Brazil		1 October 1984
China		23 June 1986
Sweden	(24 March 1987)	12 September 1988
Italy	(19 May 1987)	12 September 1988
Uruguay	(29 July 1987)	12 September 1988
Spain	(15 January 1987)	23 July 1990
Netherlands	(20 May 1987)	23 July 1990
Korea, Republic of	(18 December 1987)	23 July 1990
Finland	(1 July 1988)	23 July 1990
Ecuador	(12 September 1988)	15 June 1992
Canada	(5 September 1994)	27 July 1999
Peru	(14 April 1987)	22 July 2002
Switzerland	(16 June 1987)	3 October 2004

Associate Members:

Pakistan	15 June 1992
Ukraine	5 September 1994
Bulgaria	5 March 1995
Malaysia	3 October 2004

ICSU Union Members

IGU	International Geographical Union
IUBS	International Union of Biological Sciences
IUGG	International Union of Geodesy and Geophysics
IUGS	International Union of Geological Sciences
IUPAC	International Union of Pure and Applied Chemistry
IUPS	International Union of Physiological Sciences
URSI	Union Radio Scientifique Internationale

Appendix 2

SCAR Executive Committee

President

Professor Dr J Thiede, Alfred-Wegener-Institut für Polar- und Meeresforschung, Building E–3221, Am Handelschafen, D-27570 Bremerhaven, Germany

Vice-Presidents

Professor J López-Martínez, Departamento Geología y Geoquímica, Universidad Autonoma de Madrid, Facultad de Ciencias, Madrid 28049, Spain

Dr C Howard-Williams, National Institute of Water and Atmospheric Research, Box8602, Christchurch, New Zealand

Professor M C Kennicutt, Director Sustainable Development, Texas A & M University, College Station, USA

Dr H Shimamura (resigned April 2005), National Institute of Polar Research (NIPR), Japan

Dr Zhanhai Zhang (from July 14 2005), Chinese Polar Research Institute, Shanghai, China

SCAR Secretariat

Executive Director

Dr C P Summerhayes (E-mail: cps32@cam.ac.uk)

Executive Secretary (retired June 18, 2005)

Dr P D Clarkson

Executive Officer (started June 1, 2005)

Dr Marzena Kaczmarska (mik24@cam.ac.uk)

SCAR Chief Officers

Standing Scientific Groups

Geosciences

Professor A Capra, DIASS Department, Polytechinc of Bari, Viale del Turismo n.8, 74100 – Taranto, Italy

Life Sciences

Dr A H L Huiskes, Netherlands Institute of Ecology, Unit for Polar Ecology, PO Box 140, 4400 AC Yerseke, Netherlands

Physical Sciences

Dr J Turner, British Antarctic Survey, High Cross, Madingley Road, Cambridge CB3 0ET, United Kingdom.

SCAR Standing Committees

Antarctic Treaty System

Professor D W H Walton, British Antarctic Survey, High Cross, Madingley Road, Cambridge CB3 0ET, United Kingdom.

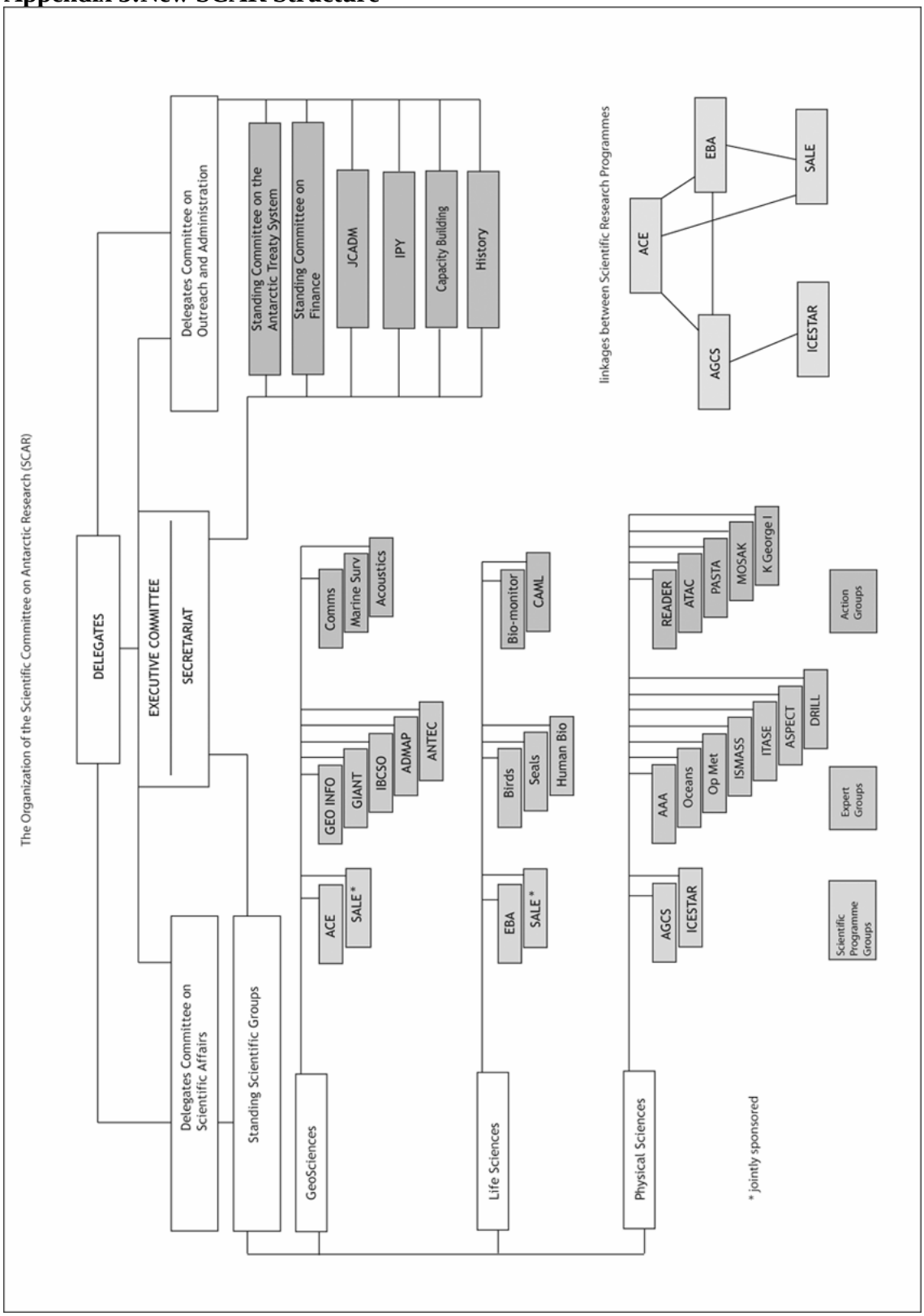
Finance

Professor M C Kennicutt, Director Sustainable Development, Texas A & M University, College Station, TX 77843–1112, United States

SCAR–COMNAP Joint Committee on Antarctic Data Management

Dr T de Bruin, Royal Netherlands Institute for Sea Research (NIOZ), PO Box 59, 1790 AB Den Burg, Texel, The Netherlands

Appendix 3:New SCAR Structure



List of constituent sub-groups in the SCAR Organization

Delegates Committee on Scientific Affairs

Standing Scientific Group on Geosciences

Expert Groups on:
- Geographic Information
- Geodetic Infrastructure for Antarctica
- International Bathymetric Chart of the Southern Ocean
- Antarctic Digital Magnetic Anomaly Project
- Antarctic Neotectonics

Standing Scientific Group on Life Sciences

Expert Groups on:
- Birds
- Seals
- Human Biology and Medicine

Standing Scientific Group on Physical Sciences

Expert Groups on:
- Antarctic and Astronomy and Astrophysics
- Oceanography of the Southern Ocean
- Operational Meteorology
- Ice Sheet Mass Balance and Sea Level
- International Trans-Antarctic Scientific Expedition
- Antarctic Sea-Ice Processes and Climate
- Ice drilling technology

Scientific Research Programmes

- Antarctic Climate Evolution
- Antarctica and the Global Climate System
- Evolution and Biodiversity in the Antarctic

Other sub-groups

- Standing Committee on the Antarctic Treaty System
- Standing Committee on Finance
- Joint Committee on Antarctic Data Management

Delegates Committee on Outreach and Administration

Action Groups on:
- Communications and Outreach
- Marine geophysical surveying
- Marine Acoustic Technology

Action Groups on:
- Bio-monitoring of Human Impacts
- Census of Antarctic Marine Life

Action Groups on:
- Reference Antarctic Data for Environmental Research
- Antarctic Tropospheric Aerosols and their Role in Climate
- Plateau Astronomy Site Testing in Antarctica
- Modelling and Observational Studies of Antarctic Katabatics
- Scientific Coordination on King George Island

- Inter-hemispheric Conjugacy Effects in Solar-Terrestrial and Aeronomy Research
- Subglacial Antarctic Lake Environments

- Capacity Building
- International Polar Year 2007–09
- History of Scientific Research in Antarctica

Appendix 4

The SCAR Scientific Research Programmes relevant to Oceanography

Antarctic Climate Evolution (ACE)

ACE will use palaeoclimate and ice sheet modelling investigations, integrated with terrestrial and marine geological and geophysical evidence, to study the climate and glacial history of Antarctica. Over the past 34 million years changes in climate have led to considerable spatial and temporal fluctuations in ice volume that have driven significant changes in global sea-level. Determining the scale and rapidity of the response of ice masses and associated sea ice to climate forcing is essential to understand the processes of climate change in the region, and to underpin estimates of the likely magnitudes and directions of future change.

ACE will promote the exchange of data and ideas between research groups focusing on the evolution of Antarctica's climate system and ice sheet. It will encourage scientific exchange between modellers and data gatherers, facilitating the development of relevant projects and the testing of hypotheses. The main function of the programme is to acquire and compile "ground truth" geoscience data and to use these to develop a suite of palaeoclimate models for significant periods of climate change throughout Cenozoic times up to and including the Holocene. Data access and data sharing will be encouraged to facilitate the data syntheses needed for enhancing palaeoclimate models. Numerical modelling is an essential component, and will address:

1. ice sheet modelling;
2. coupled ice-sheet, climate and ocean modelling; and
3. coupled ice sheet and sediment modelling to address the interaction between ice sheets, water and deformable sediment at the interface between ice and bedrock.

The broad outcomes will be:

1. a quantitative assessment of the climate and glacial history of Antarctica;
2. identification of the processes that govern Antarctic climate change and those that feed back around the globe;
3. improvements in the ability to model past climate changes in Antarctica; and
4. documented case studies of past changes against which models of future change can be tested.

ACE will promote new drilling programmes to expand the necessary database. These will include the activities of the Integrated Program for Ocean Drilling (IPOD) in deep

water, the shallow drilling (SHALDRIL) programme on land, and the ANDRILL programme on the ice shelves. Among other things the programme will examine the terrestrial record of landscape evolution; the influence of tectonics on the behaviour of the ice sheet; and the influence of palaeo-seaways, such as the opening of the Drake Passage, on climate.

ACE and AGCS have complementary interests in Quaternary studies of Antarctica, so a joint Action Group manned by both programmes will be established to run a Quaternary sub-programme.

Antarctica and the Global Climate System (AGCS)

AGCS will investigate the nature of the atmospheric and oceanic linkages between the climate of the Antarctic and the rest of the Earth system. The linkages between the different elements of the Antarctic climate system are highly non-linear and it is necessary to understand the behaviour of and interactions between the atmospheric, oceanic and cryospheric elements of the system if past change is to be explained and we are to have confidence in future predictions. A study of this kind has only recently become feasible with the advent of sufficient high-resolution *in-situ* data and ice core records, and the development of numerical modeling tools to the point where they can represent realistically the closely coupled atmosphere-ocean processes that control long-term climate variability.

The work requires a combination of modern, instrumented records of atmospheric and oceanic conditions, and the climate signals held within ice cores, to understand fully past and future climate variability and change in the Antarctic as a result of natural and anthropogenic forcing. AGCS will focus on the last 6,000 years, since the mid-Holocene warm period, and will develop forecasts to 100 years in the future. Records that capture abrupt climate change over the past few glacial/interglacial cycles will also be studied, in association with the ACE programme (see below).

AGCS will use existing deep and shallow ice cores, satellite data, the output of global and regional coupled atmosphere-ocean climate models, and in-situ meteorological and oceanic data to understand how signals of tropical and mid-latitude climate variability reach the Antarctic, and high latitude climate signals are exported northwards. It will emphasize synthesis and integration of existing data sets and model outputs, although some new ice core and oceanographic data will be collected.

AGCS will contain four closely linked themes reflecting significant gaps in our knowledge:

1. *Decadal time scale variability in the Antarctic climate system*, to investigate ocean-atmosphere coupling and the role of the El Niño-Southern Oscillation in modulating the Antarctic climate;

2. *Global and regional climate signals* in shallow and deep ice cores, to establish better quantitative relationships between ice core data and measures of tropical, mid- and high latitude climate variability;
3. *Natural and anthropogenic forcing on the Antarctic climate system*, including the production of regional-scale estimates of expected climate change over Antarctica during the next 100 years, to be able to distinguish natural variability from anthropogenic activity and to understand how global climate change will be expressed in the Antarctic; and
4. *The export of Antarctic climate signals*, to examine how climate changes in the Antarctic can influence conditions at more northerly latitudes

The research will be carried out in an interdisciplinary way through a close collaboration between meteorologists, climatologists, glaciologists, oceanographers and ice chemists, who will integrate observational and modelling activities.

A key deliverable will be the production of regional and Antarctic-wide climate predictions covering the next 100 years.

Evolution and Biodiversity in the Antarctic (EBA): the response of life to change.

A major challenge facing humankind is the management of the Earth System to ensure a sustainable human future. Managing the environment requires understanding the functioning of all parts of the Earth System in the context of both natural and anthropogenic change. That understanding must encompass Antarctica and the Southern Ocean and their biota, including knowledge of the way in which life has evolved in those environments, and the ways in which it is likely to change, which in turn demands an integrated, interdisciplinary investigation of the structure and functioning of living systems in the region.

EBA will provide a platform for the kinds of interactions amongst disciplines and researchers that are essential to understand the evolution of biodiversity in the region and the responses and contributions of that biodiversity to the Earth System. By doing so, it will fill a major void in understanding of the role of biodiversity in the Earth System.

The overall aims of EBA are to understand the evolution and diversity of life in the Antarctic, to determine how these have influenced the properties and dynamics of present Antarctic and Southern Ocean ecosystems, and to make predictions on how organisms and communities will respond to current and future environmental change. EBA will integrate work on marine, terrestrial and limnetic ecosystems in a manner never before attempted, covering an entire biome. By comparing the outcomes of parallel evolutionary processes over a range of Antarctic environments, fundamental insights can be obtained into evolution, and the ways in which life responds to change,

from the molecular to the whole organism level and ultimately to biome level. EBA will be complementary to many ongoing national programmes that cannot attempt an ambitious study individually.

Antarctic ecosystems offer unique examples of how both structure and function have evolved, and the likely responses of species and ecosystems to change induced by a wide variety of natural and anthropogenic processes, as well as the ways in which their responses feed back to influence these processes.

EBA will use a range of modern techniques and a multidisciplinary approach to explore the evolutionary history of the modern Antarctic biota, examine how modern biological diversity in Antarctica influences how present-day ecosystems function, and attempt to predict how the biota may respond to future environmental change. It will integrate the major realms of Antarctic biology into a cohesive picture for the first time, and contribute to evolutionary theory and understanding of global ecology and biological diversity. More specifically, EBA will examine:

1. The evolutionary history of the Antarctic biota.
2. Evolutionary adaptations to the Antarctic environment.
3. Patterns of gene flow within, into and out from the Antarctic, and their consequences for population dynamics.
4. Patterns and diversity of organisms, ecosystems and habitats in Antarctica, together with the ecological and evolutionary processes that control these.
5. The impact of past, current and predicted environmental change on biodiversity and the consequences for Antarctic marine, freshwater and terrestrial ecosystem function.

The programme will integrate research across a wide variety of fields, from functional genomics and molecular systematics to ecosystem science and modelling, and will draw on and contribute information to a wide rage of related fields, such as climate modelling and tectonics.

Appendix 5

SCAR's Action and Expert Groups connected to Oceanography

Geosciences SSG

Action Group on "Acoustics in the Marine Environment": to consider the effects on marine mammals of noise created by marine scientific activities (such as echo-sounding and airgun surveys).

Action Group on "Marine Survey Coordination": to develop mechanisms for improved communication about planned marine surveys within the Antarctic community.

Expert Group on "International Bathymetric Chart of the Southern Ocean" (**IBCSO**): to act as the steering group for production of a revised chart of the bathymetry of the Southern Ocean, in conjunction with the IHO and GEBCO.

Life Sciences SSG

Action Group on "Best Practices for Conservation": to review and establish current best practices for conservation in an Antarctic context.

Action Group on Biological Monitoring: to organize a workshop on this topic, in order to produce a (set of) protocol(s) for biological monitoring activities for environmental management purposes.

Action Group for the "Census of Antarctic Marine Life" (**CAML**): to act as a scientific steering committee for the Southern Ocean component of the global CoML programme.

Expert Group on: "Birds": to provide long-term data on avian populations in the region; to encourage, coordinate and support research on seabirds; to contribute to their conservation; and to provide scientific advice to SCAR.

Expert Group on "Seals": to provide information on the status of seal stocks as required by the Convention for the Conservation of Antarctic Seals (CCAS); to encourage research and information exchange on this group of animals; and to provide advice to SCAR.

Physical Sciences SSG

SCAR SCOR Expert Group on "Oceanography": - to encourage an inter-disciplinary approach to Southern Ocean observations, modelling and research, recognizing the inter- dependence of physical, chemical and biological processes in the ocean at present and in the past; to facilitate coordination initially between the physical oceanographic

research groups currently active and those planning research in the Southern Ocean; to identify historical and reference data set of value to researchers, focusing initially on physical oceanography data; to encourage the exchange of information with operational agencies.

Expert Group on "Operational Meteorology in the Antarctic": to liaise with WMO over observing standards, the use of new data/model fields and weather forecasting in the Antarctic; to maintains links with COMNAP/SCALOP; and to provide scientific advice to WMO on Antarctic meteorology.

Expert Group on "Ice Sheet Mass Balance and Sea Level" (**ISMASS**): to understand the relationship between Ice Sheet Mass Balance and Sea Level, by determining the present accumulation rate over the entire ice sheet and measuring ice thickness and velocities at the grounding zone of the ice sheet and glaciers.

Appendix 6

List of Acronyms

AAA	Antarctic and Astronomy and Astrophysics
ACE	Antarctic Climate Evolution
ADMAP	Antarctic Digital Magnetic Anomaly Project
AGCS	Antarctica in the Global Climate System
AGU	American Geophysical Union
ANDRILL	Antarctic Geological Drilling Project
ANTEC	Antarctic Neotectonics
ANTIME	Late Quaternary Sedimentary Record of Antarctic Ice Margin Evolution
ANTSDI	Antarctic Spatial Data Infrastructure
APTIC	Antarctic Peninsula Tropospheric-Ionospheric Coupling
ASPeCT	Antarctic Sea-Ice Processes and Climate
ATAC	Antarctic Tropospheric Aerosols and their Role in Climate
ATCM	Antarctic Treaty Consultative Meeting
CAML	Census of Antarctic Marine Life
CEP	Committee for Environmental Protection
CliC	Climate and Cryosphere Programme
CMBR	Cosmic Microwave Background Radiation
COG	Communication and Outreach
CoML	Census of Marine Life
COMNAP	Council of Managers of National Antarctic Programmes
EASIZ	Ecology of the Antarctic Sea-Ice Zone
EBA	Evolution and Biodiversity in the Antarctic
EGGI	Expert Group on Geographical Information
EGGPE	Expert Group on Permafrost and Periglacial Environments
EGU	European Geophysical Union
EoI	Expression of Interest
EVOLANTA	Evolutionary Biology of Antarctic Organisms
GIANT	Geodetic Infrastructure for Antarctica
GIS	Geographic Information Systems
GIWA	Global International Waters Assessment
GLOBEC	Global Ocean Ecosystems Dynamics
GLOCHANT	Group of Specialists on Global Change and the Antarctic
GPS	Global Positioning System
IABO	International Association of Biological Oceanography
IAG	International Association of Geodesy
IAnZone	International (Coordination of Oceanographic Research within the) Antarctic Zone

IAPSO	International Association for the Physical Sciences of the Ocean
IBCSO	International Bathymetric Chart of the Southern Ocean
ICESTAR	Inter-hemispheric Conjugacy Effects in Solar-Terrestrial and Aeronomy Research
ICSU	International Council for Science
IGOS	Integrated Global Observing Strategy
IGU	International Geographical Union
IGY	International Geophysical Year
IPA	International Permafrost Association
IPOD	Integrated Program for Ocean Drilling
IPY	International Polar Year
ISMASS	Ice Sheet Mass Balance and Sea-Level
ITASE	International Trans-Antarctic Scientific Expedition
IUBS	International Union of Biological Sciences
IUGG	International Union of Geodesy and Geophysics
IUGS	International Union of Geological Sciences
IUPAC	International Union of Pure and Applied Chemistry
IUPS	International Union of Physiological Sciences
JCADM	Joint Committee on Antarctic Data Management
MADREP	Middle Atmosphere Dynamics and Relativistic Electron Precipitation
MarBIN	Marine Biodiversity Information Network
MEDINET	Medical Network
MOSAK	Modelling and Observational Studies of Antarctic Katabatic Winds
OBIS	Ocean Biodiversity Information System
PASTA	Plateau Astronomy Site Testing in Antarctica
PPE	Permafrost and Periglacial Environments
READER	Reference Antarctic Data for Environmental Research
RiSCC	Regional Sensitivity to Climate Change in Antarctic Terrestrial and Limnetic Ecosystems
SALE	Subglacial Antarctic Lake Environments
SALEGOS	Subglacial Antarctic Lake Exploration Group of Specialists
SCALOP	Standing Committee on Antarctic Logistics and Operations
SCAR	Scientific Committee on Antarctic Research
SCOR	Scientific Committee on Oceanic Research
SHALDRIL	Shallow Drilling
SRP	Scientific Research Programme
SSG	Standing Scientific Group
SSG-G	SSG on Geosciences
SSG-LS	SSG on Life Sciences
SSG-PS	SSG on Physical Sciences
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization

URSI	Union Radio Scientifique Internationale
WMO	World Meteorological Organization

ECOR Report for SCOR meeting Cairns 2005

The Engineering Committee on Oceanic Resources (ECOR) is an international, non-governmental, professional engineering body, whose aims are:

- To provide a forum for the exchange of information and views on engineering matters relating to the exploration and exploitation of ocean resources, through ECOR publications, meetings and website.
- To promote, initiate and co-ordinate study, research and development into the exploration and exploitation of ocean resources, through ECOR standing Specialist Panels and ad hoc Working Groups.
- o advise government and intergovernmental organisations on engineering matters relating to the exploration and exploitation of ocean resources

ECOR is a member of the **International Council for Science**

COUNCIL

ECOR is managed by an international Council, in accordance with its Constitution.
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ECOR SYMPOSIUM

The ECOR Symposium is normally held every three years, at which time the Council, National Committees, Specialist Panels and Working Groups will report on their work. Papers on study, research and development relating to the environmentally sensitive exploration and exploitation of ocean resources are also presented and discussed.

ECOR Symposium 2006 will be held in London on 23 April 2006. [This is the same time as *Ocean International 2006*.]

OCEANIC ENGINEERING INTERNATIONAL

The journal *Oceanic Engineering International* is published twice per year by the Ocean Engineering Research Centre, Memorial University Newfoundland, and covers the broad interdisciplinary area of oceanic engineering. The journal contains reviews, which include summaries of ECOR working group reports; refereed full journal papers; refereed technical notes or short papers and ECOR news. Papers range from ocean instrumentation to naval architecture.

ECOR is involved in the publication of *Ocean Engineering International*. All members and subscribers to the OEI receive a free subscription to the *OEI Online.*

SPECIALIST PANELS

The following Specialist panels are active

Marine Renewable Energy
Aquaculture
Fisheries
Underwater Vehicles
Marine Archaeology

WORKING GROUPS

ECOR has one working group approved. It is concerned with options for carbon sequestration in the ocean. ECOR would welcome a nomination to this working group by SCOR.

WEB PAGES

The address is: **http://www.rina.org.uk/showarticle.pl?id=7634**

ECOR WORKING GROUP – OCEAN CARBON SEQUESTRATION

A rapid change in climate posses a risk to mankind and international agreements limit the net emissions of greenhouse gases to the atmosphere in order to mitigate this risk. It has been recognised that the ocean already contains a large amount of carbon and has the capacity to store much of the fossil carbon now being released to the atmosphere.

ECOR has agreed to form a working group of about 10 people to investigate the technical issues involved in ocean sequestration of carbon. The report would compare ocean sequestration options on a consistent basis and assist those ocean engineers wishing to commercialise ocean sequestration.

Present reviews and those underdevelopment do not take an engineering approach to risk and uncertainty. Here ECOR could provide a broadly based discussion of the choices. The three main classes of sequestration are direct injection, ocean nourishment, alkalinity shift.

Related studies: IPCC C*arbon dioxide capture and storage*, IEA GHG Project *Ocean fertilization* and *Ocean storage of CO2*, GHGT conference proceedings.
Proposed actions: raise funds, hold two workshops, produce consensus report, abstract report for technical paper in Ocean Engineering International.
Expected outcomes: Web page, interim report, presentation at ECOR symposia, paper for technical journal; report to be published eg by Cambridge University Press or by ECOR jointly with the IEA GHG project.

Duration: less than 4 years

List of working group candidate members

1. Toru Sato, Professor of Environmental Engineering, University of Tokyo
2. C S Wong, IOS Canada
3. James Orr, France
4. William D Nordhaus, Yale, USA
5. Mr A Orbi, Morocco
6. K Coale, Moss Landing, USA
7. Ian S F Jones, University of Sydney, Australia
8.
9.
10.

9.1.3 2006 General Meeting – Concepción, Chile

Universidad de Concepción
Gabinete del Rector

CONCEPCIÓN, 15 June 2005.
Rect. Nº 147-2005

Prof. Dr. Bjorn Sundby
President
Scientific Committee on Oceanic Research (SCOR)
Department of Earth and Planetary Sciences
The Johns Hopkins University
Baltimore, MD 21218
USA.-

Dear Dr. Sundby:

It is our great pleasure to confirm the offer of holding the 2006 SCOR General Meeting in Chile, at the University of Concepción, based on our original proposal in 2002 and the discussion of this proposal during the last SCOR General Meeting in Venice (Italy) in September, 2004.

The 2006 meeting (4 days) will be scheduled for the last week in October 2006 in the city of Concepción. In parallel, a 2-3 day workshop on relevant oceanography issues in the region is being planned by the academic staff at the University of Concepción, in collaboration with other national and international institutions, scientists, and graduate students. The aim of this parallel event is to provide the SCOR members with an overview of the strength and weaknesses of oceanographic education and research in Chile and neighboring countries involved in similar activities.

The University of Concepción will support the above events by providing the facilities and space for holding the SCOR General Meeting and the workshop at the University of Concepción. Other facilities will be discussed in detail with the Chilean SCOR Committee and the local organizing committees that will take the responsibility of the meetings.

We look forward to host these SCOR events during 2006.

Sincerely,

SERGIO LAVANCHY MERINO
RECTOR

Universidad de Concepción ACREDITADA 2004-2010 AUTOFINANCIADA

UNIVERSIDAD DE CONCEPCIÓN RECTOR REPÚBLICA DE CHILE

9.1.4 2007 Executive Committee Meeting

The location of 2005 SCOR meeting has not yet been determined, although there has been a preliminary expression of interest from Norway. From Peter Haugan, chair of the Norwegian SCOR Committee: "Concerning 2007, we have progressed somewhat with the planning of the science conference in Bergen that I mentioned [Polar Dynamics: Monitoring, Understanding, and Prediction], see http://www.gfi.uib.no/conference2007/info.htm. As we discussed in Paris last June, one option could be to start the SCOR meeting on Monday the 27th [of August 2007], join the conference opening reception late on the 28th and then the first day of the conference on the 29th or even more. Meeting facilities should then be in Bergen, either in the same building complex as the conference or nearby. That can be arranged. The conference will have an IPY flavor and allow opportunities to discuss and review polar and IPY activities."

Considerations for determining the locations of annual SCOR meetings are based on

1. Receiving an invitation from a National SCOR Committee. SCOR meetings can be an opportunity for national SCOR committees to meet with the SCOR Executive Committee and for the National Committee to acquaint their national oceanographic community with SCOR and its activities.
2. Confidence that the national SCOR committee will provide the necessary logistical support and financially reasonable arrangements.
3. Movement of the annual meeting to different parts of the world to bring it closer to different sets of member nations, on some kind of rotating basis.

The SCOR Executive Committee welcomes invitations from National Committees for SCOR meetings in 2005. The following list shows where and when all past annual SCOR meetings were held.

Locations of Past SCOR Annual Meetings
(bold = planned meetings)

Member Nations	Place and Date
Argentina	Mar del Plata, 2001
Australia	Canberra, 1974; Hobart, 1986; Cairns, 2005
Bangladesh	
Belgium	
Brazil	Rio de Janeiro, 1997; Sao Paulo, 1978
Canada	Halifax, 1963, 1982; Victoria, 1977, 1994
Chile	**Concepción, 2006**
China-Beijing	Qingdao, 1993
China-Taipei	
Denmark	Copenhagen, 1960, 1972
Ecuador	Guayaquil, 1974
Egypt	
Finland	Helsinki, 1960
France	Brest, 1978; Marseilles, 1965; Paris, 1958, 1961, 1962, 1963, 1969, 1983; Roscoff, 1984
Germany	Hamburg, 1964; Kiel, 1980; Warnemunde, 1967, 1990
India	Goa, 1999
Israel	Jerusalem, 1967
Italy	Rome, 1965, 1966; Venice, 2004
Japan	Sapporo, 2002; Tokyo, 1970
Mexico	Acapulco, 1988; Mexico City, 1969
Monaco	Monte Carlo, 1961
Netherlands	Amsterdam, 1998; Texel, 1973
New Zealand	Hamilton, 1991
Norway	
Pakistan	
Philippines	
Poland	
Russia	Moscow, 2003
South Africa	Stellenbosch, 1975; Cape Town, 1995
Spain	Madrid, 1971
Sweden	Fiskebackskil, 1981; Goteberg, 1969, 1992
Switzerland	Zurich, 1987
Turkey	
UK	Edinburgh, 1976; London, 1962, 1970; Oban (Scotland), 1972; Southampton, 1996
USA	La Jolla, 1968; New York, 1959; Seattle, 1965, 1985; Tallahassee, 1989; Washington, D.C., 2000; Woods Hole, 1957, 1980, **2008**

9.1.5 2008 General Meeting—SCOR 50th Anniversary—Woods Hole, USA

9.2 SCOR-Related Meetings Since the 2003 SCOR Executive Committee Meeting and Planned for the Future

2005		
February 14-16	Panel on New Technologies for Observing Marine Life	Goa, India
March 7-11	GEOHAB OSM on HABs and Eutrophication	Baltimore, Maryland, USA
March 20-23	SCOR/IMAGES WG 123 Workshop on Past Ocean Circulation	Atlanta, Georgia, USA
April 18-21	WG 116 on Sediment Trap and Th-234 Methods for Carbon Export Flux Determination	Xiamen, China
April 18-22	IMBER Scientific Steering Committee Meeting	Shanghai, China
May 1-3	GEOTRACES Planning Committee	Vienna, Austria
May 30-June 1	SOLAS Scientific Steering Committee	Tokyo, Japan
June 1-3	GLOBEC Scientific Steering Committee Meeting	Rome, Italy
June 20	WG 126 on Role of Viruses in Marine Ecosytems	Santiago de Compostela, Spain
June 21-29	IOC Assembly	Paris, France
June 23-25	WG 122 on Mechanisms of Sediment Retention in Estuaries	Texel, The Netherlands
August 29-September 1	SCOR Executive Committee Meeting	Cairns, Queensland, Australia
30 August - September 4	WG 120 Conference on *Phaeocystis*: Major Link in the Biogeochemical Cycling of Climate-Relevant Elements	Haren, The Netherlands
November 7-9	WG 125 on Global Comparisons of Zooplankton Time Series	Silver Spring, Maryland, USA
5-8 December	GEOHAB OSM on Harmful Algal Blooms and Stratification	Paris, France
December	WG 124 on Analyzing the Links Between Present Oceanic Processes and Paleo-records	San Francisco, California, USA
2006		
April	WG 125 on Global Comparisons of Zooplankton Time Series	Honolulu, Hawaii, USA
18-19 May	WG 115 on Standards for the Survey and Analysis of Plankton	Plymouth, UK
June	WG 126 on Role of Viruses in Marine Ecosystems	Victoria, B.C., Canada
2007		
6-9 March	SOLAS Science 2007	Xiamen, China