

SCAR, WCRP and Global Change Research in the Antarctic Region

**MEMORANDUM OF UNDERSTANDING (MOU)
BETWEEN
THE WORLD CLIMATE RESEARCH PROGRAMME
AND
THE SCIENTIFIC COMMITTEE ON ANTARCTIC RESEARCH
ON COSPONSORSHIP OF
THE CLIMATE AND CRYOSPHERE PROJECT,
THE SOUTHERN OCEAN IMPLEMENTATION PANEL AND
THE INTERNATIONAL PROGRAMME FOR ANTARCTIC BUOYS**

1. The Parties

The parties to this MoU are the World Climate Research Programme (WCRP) and the Scientific Committee on Antarctic Research (SCAR) of the International Council for Science (ICSU).

1.1 World Climate Research Programme

The World Climate Research Programme (WCRP) was established in 1980, under the joint sponsorship of the World Meteorological Organization (WMO) and the International Council for Science (ICSU), and has also been sponsored by the Intergovernmental Oceanographic Commission (IOC) of UNESCO since 1993. A WMO/ICSU/IOC Joint Scientific Committee (JSC) has the responsibility of formulating the overall scientific concepts and goals of the WCRP, as well as organizing the required international co-ordination of research efforts. The Joint Planning Staff for WCRP provides day-to-day planning and organizational support to the Programme. The Director of the WCRP manages the Programme.

The two major objectives of the WCRP are to determine the extent to which climate can be predicted and the extent of human influence on climate. To achieve these objectives the WCRP promotes essential research into understanding the basic behaviour of the physical climate system, and its relation to the broader Earth system and the needs of society, in particular:

- to observe and measure changes in the atmosphere, oceans, land and cryosphere;
- to improve the existing knowledge and understanding of global and regional climate variability and change, and of the mechanisms responsible;
- to assess the evidence of significant trends in global and regional climates;
- to develop and improve numerical models capable of simulating and assessing the predictability of the climate system over a wide range of space and time scales and suitable for operational predictions;

- to investigate the sensitivity of the climate system to natural and human-induced forcings and to estimate the changes resulting from specific disturbing influences.

1.2 Scientific Committee on Antarctic Research

The Scientific Committee on Antarctic Research (SCAR) is an interdisciplinary body of ICSU. It was established as a Special Committee on Antarctic Research to continue the international coordination of Antarctic scientific activities that had begun during the ICSU-led International Geophysical Year of 1957-58. The decision-making organs of SCAR are the Meeting of Delegates and the Executive Committee. The day-to-day operations of SCAR are supported by its Secretariat headed by the Executive Director. SCAR's remit covers Antarctic and the surrounding Southern Ocean including the Antarctic Circumpolar Current south of the Subantarctic Front.

The principal objectives of SCAR are:

- to initiate, develop, and co-ordinate leading edge scientific activity 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;
- to promote the incorporation of Antarctic science in education at all levels;
- to communicate scientific information to the public.

2. Rationale for the MoU

The WCRP and SCAR share common goals in seeking to observe, understand, and predict climate variability and change in the Antarctic region, including the Southern Ocean. Through this MoU, the WCRP and SCAR aim to share corresponding efforts and resources and avoid duplication. This will be achieved through SCAR co-sponsoring the following activities of the WCRP: the Climate and Cryosphere (CliC) core project, the CLIVAR/CliC Southern Ocean Implementation Panel and the WCRP International Programme for Antarctic Buoys.

2.1 Climate and Cryosphere (CliC) Project

CliC was established as a core project of the WCRP in March 2000. CliC addresses the entire cryosphere (i.e., snow cover, sea-, lake- and river- ice, glaciers, ice sheets, ice caps and ice shelves, permafrost and frozen ground) and its relation to climate. A major part of CliC activity is naturally concentrated in the polar areas including the Antarctic. The Scientific Steering Group of CliC has the responsibility of formulating the overall scientific concepts and goals of the project, as well as organising the required international co-ordination of research efforts. The CliC International Project Office (CIPO) provides day-to-day planning and organisational support to the project. The CIPO director reports to the Director of the WCRP.

The principal goal of CliC is:

To assess and quantify the impacts that climatic variability and change have on components of the cryosphere and the consequences of these impacts for the climate system, and to determine the stability of the global cryosphere.

In order to achieve this goal CliC has the supporting objectives to:

- enhance the observation and monitoring of the cryosphere and the climate of cold regions in support of process studies, model evaluation, and detection of change;
- improve understanding of the physical processes and feedbacks through which the cryosphere interacts within the climate system;
- improve the representation of cryospheric processes in models to reduce uncertainties in simulations of climate and predictions of climate change;
- facilitate assessment of changes in the cryosphere and their impact, and to use this information to aid the detection of climate change.

CliC activities are organized along four major project areas comprising:

- Terrestrial cryosphere and hydrometeorology of cold regions
- Glaciers, ice caps and ice sheets, and their relation to sea level
- High-latitude oceans and the marine cryosphere
- Integrated interactions between the cryosphere and global climate

CliC carries out its activities through working groups and panels, rapporteurs, and co-operation with partners.

2.2 CLIVAR/CliC Southern Ocean Implementation Panel

The WCRP Climate Variability and Predictability (CLIVAR) project is concerned with the natural variability and predictability of the coupled climate system and the changes in response to natural processes and human influences. It started in 1995. The CLIVAR Scientific Steering Group (SSG) has the responsibility of formulating the overall scientific concepts and goals of the project, as well as organising the required international co-ordination of research efforts. The International CLIVAR Project Office (ICPO) provides day-to-day planning and organisational support to the project. The ICPO director reports to the Director of the WCRP.

The specific objectives of CLIVAR are:

- to describe and understand the physical processes responsible for climate variability and predictability on seasonal, interannual, decadal, and centennial time-scales, through the collection and analysis of observations and the development and application of models of the coupled climate system, in cooperation with other relevant climate-research and observing programmes;
- to extend the record of climate variability over the time-scales of interest through the assembly of quality-controlled paleoclimatic and instrumental data sets;
- to extend the range and accuracy of seasonal to interannual climate prediction through the development of global coupled predictive models;
- to understand and predict the response of the climate system to increases of radiatively active gases and aerosols and to compare these predictions to the

observed climate record in order to detect the anthropogenic modification of the natural climate signal.

The CLIVAR/CliC Southern Ocean Implementation Panel was formed by CLIVAR and CliC in 2002. It reports to the CLIVAR and CliC SSGs and has two Co-Chairs representing CLIVAR and CliC, respectively. The ICPO provides day-to-day planning and organisational support to the panel. The terms of reference of the panel are:

- To design a strategy to assess climate variability and predictability of the coupled ocean-atmosphere-ice system in the Southern Ocean region.
- To develop and refine an implementation plan for the Southern Ocean region, which defines the process studies, sustained observations, and model experiments needed to meet the objectives of CLIVAR and CliC.
- To work in concert with relevant CLIVAR panels (e.g. regional panels, numerical experimentation groups), CliC Panels (e.g. DMIP, OPP, NEG) and other groups (e.g. Ocean Observation Panel for Climate, Argo Science Team) to integrate Southern Ocean observations with those in neighbouring regions to ensure the objectives of CLIVAR/CliC are met and resources are used efficiently.
- To enhance interaction between the meteorology, oceanography, cryosphere, biogeochemistry and paleoclimate communities with an interest in the climate variability of the Southern Ocean region.
- To serve as a forum for the discussion and communication of scientific advances in the understanding of climate variability and change in the Southern Ocean region.
- To work with the CLIVAR and CliC data systems on issues related to distribution and archiving of Southern Ocean observations.
- To advise the CLIVAR and CliC SSGs on progress achieved towards implementation.

2.3 WCRP International Programme for Antarctic Buoys

The WCRP International Programme for Antarctic Buoys (IPAB) aims to establish and maintain a network of drifting buoys in the Antarctic sea-ice zone. The programme was formally established in 1994. IPAB builds upon co-operation among agencies and institutions with Antarctic and Southern Ocean interests to develop and maintain an optimum observational network for near-surface meteorological and oceanographic data within the Antarctic sea-ice zone, using drifter buoys and other appropriate data collection systems. The operational area of the Programme is south of 55 degrees South latitude, that region of the Southern Ocean and Antarctic marginal seas within the maximum seasonal sea-ice extent. IPAB has a strong research component, and is endorsed as a self-sustaining project of the WCRP. It reports to the JSC for WCRP through the CliC project. The decision making body in IPAB is the meeting of its Participants. In between the Participants meetings the IPAB is steered by the Executive Committee. A Chair heads the Committee. An IPAB Coordinator provides support to the programme. The IPAB objectives are to:

- support research in the region related to global climate processes;

- provide real-time operational meteorological data for numerical weather forecast centres;
- establish a basis for on-going monitoring of atmospheric and oceanic climate in the Antarctic sea-ice zone.

3. The Agreement

This agreement is bilateral between WCRP and SCAR. It does not preclude the parties agreeing to similar MoUs with other programmes.

3.1 Co-sponsorship of the Climate and Cryosphere (CliC) project and cooperation between WCRP and SCAR in studies of the Antarctic and its role in climate

By virtue of this MoU, the WCRP Climate and Cryosphere (CliC) project is renamed as the WCRP/SCAR Climate and Cryosphere (CliC) project. It remains a core project of the WCRP. The goals and objectives of the WCRP CliC project fully encompass the scientific interests of SCAR. These goals and objectives remain unchanged for the WCRP/SCAR CliC project.

The CliC SSG will include twelve members. At least two of them will be considered as representatives of the SCAR community. CliC SSG Chair will continue reporting to the WCRP JSC. A report by CliC SSG will be presented to the SCAR Meeting of Delegates.

SCAR activities in the area of climate studies will be considered as contributing to the goals of CliC. WCRP activities related to the Antarctic will be considered as contributing to the goals of SCAR. Both types of such activities will be considered as inputs to CliC.

WCRP datasets related to the Antarctic will be made available to SCAR, and the SCAR datasets related to climate studies will be made available to WCRP, for the benefit of both parties and wider communities, with due regard to protection of intellectual property rights. As much as possible, both parties will try to coordinate their data management activities.

Both WCRP and SCAR will promote the coordinated establishment, development and maintenance of long-term climate observations in the Antarctic. They will promote modelling efforts to synthesise observations, enhance the representation of the Antarctic in climate models and improve the studies of impact of climate change on the Antarctic.

3.2 Co-sponsorship of the Southern Ocean Implementation Panel and cooperation between WCRP and SCAR in studies of the Southern Ocean and its role in climate

By virtue of this MoU, the CLIVAR/CliC Southern Ocean Implementation Panel is renamed to CLIVAR/CliC/SCAR Southern Ocean Implementation Panel. The Panel membership will be modified to take into account the interests of SCAR. New terms of reference, based on proposals by the Panel, will be considered and agreed by CLIVAR, CliC and SCAR. The Panel will have two Co-Chairs nominated by mutual agreement of the CLIVAR, CliC and SCAR. The Panel will report to CLIVAR SSG, CliC SSG and the biennial SCAR Delegates meeting.

The Panel will work to design a strategy to assess the climate variability and predictability of the coupled ocean-atmosphere-ice system in the Southern Ocean region, to develop and refine an implementation plan for the Southern Ocean region, which defines the process studies, sustained observations, and model experiments needed to meet the objectives of WCRP and SCAR, to work in concert with relevant WCRP, SCAR, and other groups to integrate Southern Ocean observations with those in neighbouring regions to ensure the WCRP/SCAR objectives are met and resources are used efficiently. The Panel is expected to enhance interaction among the meteorology, oceanography, cryosphere, biogeochemistry and paleoclimate communities with an interest in the climate variability of the Southern Ocean region and to serve as a forum for the discussion and communication of scientific advances in the understanding of climate variability and change in the Southern Ocean region. CLIVAR, CliC, WCRP as a whole and SCAR are expected to jointly work on data systems and issues related to distribution and archiving of Southern Ocean observations.

3.3 Co-sponsorship of the International Programme for Antarctic Buoys and cooperation between WCRP and SCAR in sea-ice buoy observations in the Antarctic Sea-Ice Zone

By virtue of this MoU, the WCRP International Programme for Antarctic Buoys is renamed as the WCRP/SCAR International Programme for Antarctic Buoys. The goals and objectives of the Programme remain unchanged.

The Chair of the Programme will report to the WCRP through the CliC SSG and will report to the SCAR Meeting of Delegates directly or through the SCAR Secretariat.

WCRP will continue to encourage climate research organizations to be involved with sea-ice buoy observations in the Southern Ocean sea-ice zone while SCAR will encourage the corresponding participation of SCAR members. Both parties will contribute to the design and implementation of a Southern Ocean contribution to the Global Ocean Observing System.

4. Financial Implications of the Agreement

Each party to this agreement will generally be responsible for the costs of their own activities, but this does not preclude one party meeting the costs of the other if they so wish. Actual financial contributions to the activities of the CliC SSG, Southern Ocean Implementation Panel, and International Programme for Antarctic Buoys and other implications of this MoU will be considered and agreed by representatives of the Parties. They may be changed in accordance with the Parties requirements without any effect on the substance of this Agreement.

5 Duration, Revision and Termination of this MoU

This MoU remains in force for 5 years, at which time it should be reviewed for possible extension. The MoU may be revised at any time by mutual agreement between the WCRP and SCAR. The CliC SSG, the Southern Ocean Implementation Panel, or a meeting of Participants of the International Programme for Antarctic Buoys may propose alterations to the MoU.

This MoU may be terminated at any time by one or other of the parties by exchange of letters between the Director of the WCRP on the one hand and the Executive Director of SCAR on the other. The CliC SSG, the Southern Ocean Implementation Panel, or a meeting of Participants of the International Programme for Antarctic Buoys may propose cancelling the MoU.

Signed

Signed

David Carson
Director, WCRP

Colin Summerhayes
Executive Director, SCAR

Date

Date