



**Antarctic Treaty
Consultative Meeting XXXV**

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The Southern Ocean Observing System (SOOS)

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Introduction

The Southern Ocean is a fundamental part of the Earth system. It forms a vital connection between the major ocean basins and the upper and lower layers of the global ocean. The Southern Ocean strongly influences global climate, biogeochemical cycles and the functioning of ecosystem^{1,2,3,4}. The rapid changes being experienced by the Southern Ocean have profound ramifications for the future of the planet. These changes include large-scale warming that exceeds global averages, including several “hotspots” of regional warming^{5,6}. The upper and lower limbs of Southern Ocean overturning have freshened due to changes in hydrological cycles and ice melt⁵. The rate at which the Southern Ocean draws down anthropogenic carbon dioxide from the atmosphere has likely weakened⁴. Acidification is underway with far reaching implications for marine species and populations⁷. The climatic changes are already impacting Southern Ocean ecosystems⁸. There is a critical need to observe and understand the Southern Ocean, as it remains one of the most under-studied regions of the world. Sustained observations will be needed to detect, interpret and understand the on-going physical, chemical and biological changes and to predict what the future holds.

The Southern Ocean Observing System (SOOS) was launched in August 2011 with the mission to coordinate and expand the efforts of all nations that gather data from the Southern Ocean. A specific aim is to develop a coherent and efficient observing system that will deliver the observations required to address key scientific and societal challenges. The SOOS will focus its efforts on collecting data that will address six scientific challenges:

- 1) The role of the Southern Ocean in the planet’s heat and freshwater balance;
- 2) The stability of the Southern Ocean overturning circulation;
- 3) The role of the ocean in the stability of the Antarctic Ice Sheet and its future contribution to sea-level rise;
- 4) The future and consequences of Southern Ocean carbon uptake;
- 5) The future of Antarctic sea ice;
- 6) Impacts of global change on Southern Ocean ecosystems.

The objectives of the SOOS are to:

- Design and implement a comprehensive and multi-disciplinary observing system for the Southern Ocean
- Advocate and guide the development of new observation technologies
- Unify existing observation efforts and leverage further resources
- Effectively integrate and coordinate national and international projects and programmes, across traditional disciplinary boundaries and between nations
- Facilitate and develop a data system that provides seamless access to essential data products for the Southern Ocean

Sponsorship, Endorsement, and Support

The SOOS is a joint initiative of the Scientific Committee on Antarctic Research (SCAR) and the Scientific Committee on Oceanic Research (SCOR) and is endorsed by the Partnership for Observations of the Global Ocean (POGO), and the Climate Variability and Predictability (CLIVAR) and Climate and Cryosphere (CliC) projects of the World Climate Research Programme.

The SOOS was launched in August 2011 with the opening of the International Project Office (IPO), which is hosted by the Institute for Marine and Antarctic Studies (IMAS), University of Tasmania, Australia. The hosting is confirmed for a 5-year period and includes the salary of an Executive Officer. The Australian Antarctic Division has also provided some support for office costs for the 2011/2012 financial year. The

SOOS IPO is physically located within the offices of the Australian Integrated Marine Observing System (IMOS), which provides in-kind support for the IPO. Discussions are currently underway with the Australian Ocean Data Network (AODN) and IMOS e-marine Information Infrastructure (both similarly located with IMOS) for in-kind use of the AODN Data Portal infrastructure in development of the SOOS Southern Ocean Data Network. SCAR and SCOR both provide support for the annual SOOS Scientific Steering Committee meeting.

Activities and Milestones

Organisation and development of SOOS leadership, governance and policies:

The SOOS Scientific Steering Committee (SSC) was proposed from a pool of international nominees by the Co-Chairs, Dr. Michael Meredith (British Antarctic Survey) and Mr. John Gunn (Australian Institute of Marine Science) and the Executive Officer, Dr. Louise Newman, and approved by SCAR and SCOR. The 15 SSC members cover broad disciplinary and geographic representation. Several ex-officio representatives were also selected. The first SSC meeting was held in Feb 2012 (Salt Lake City, Utah). Following the meeting, John Gunn stepped down from the Co-Chair position due to a change in his employment and Dr. Oscar Schofield (Rutgers University, USA) was selected as the new Co-Chair. The next SSC meeting will be held in China in April/May 2013 alongside a topical SOOS workshop. SOOS Governance and Terms of Reference, SSC Governance and Terms of Reference, and the SOOS Endorsement Policy were developed and officially approved by the SSC.

Communicating the SOOS to stakeholders:

The SOOS *Initial Science and Implementation Strategy* was published (download from www.soos.aq). The SOOS Communication Strategy was developed and approved by the SSC. The SOOS corporate identity was developed and numerous SOOS publications were produced. The SOOS was presented at national and international meetings by the Executive Officer, SSC members, Co-Chairs and ex-officio representatives. The SOOS website is under development (www.soos.aq) and a Facebook page has been set up. Connections were made to several important international science programmes of key relevance to the SOOS.

Implementation of SOOS science activities:

The SOOS Data Management Sub-Committee (DMSC) was developed, along with the draft SOOS Data Management Policy, DMSC Terms of Reference, and DMSC workplan. The first DMSC meeting will take place alongside the SCAR Open Science Meeting in July 2012. A proposal was submitted to the Census of Marine Life Cosmos funding call, to support biological activities (unsuccessful). Proposals are also currently being prepared for a SCOR Working Group, and a Framework 7 activity. An Under Ice workshop is being organised in collaboration with Argo, towards development of an international strategy for observations under ice (sea ice and shelf ice). The workshop will be held on the 22 October 2012 in Hobart, Australia. The SOOS will engage with and support a number of development activities and meetings during 2012, including Sentinel, FRISP, ASPeCT, etc, and will use these to progress the detailed design of the observing system and steps to its implementation.

References

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