



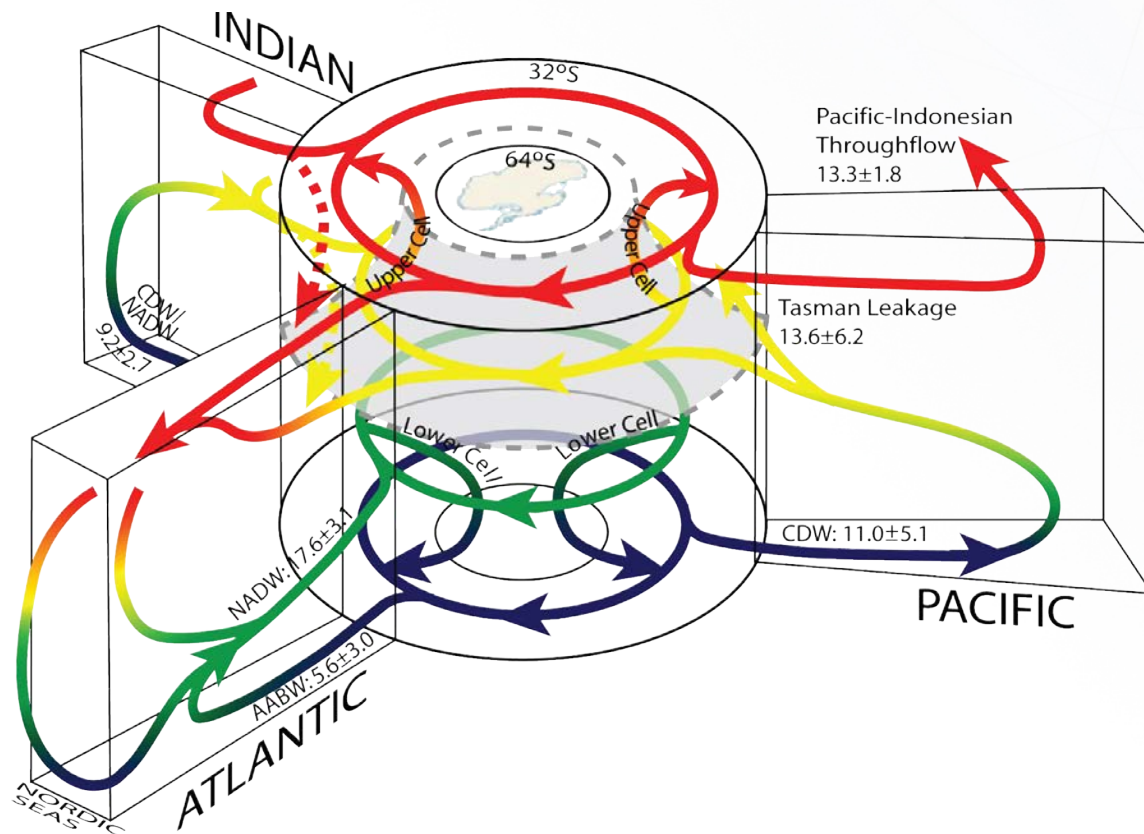
The Southern Ocean Observing System

Louise Newman, Mike Meredith, Oscar Schofield

On behalf of the SOOS community



The Southern Ocean matters – for science and society



- Connects all ocean basins
- Site of key water mass formation
- Drives global ocean circulation
- Significant drawdown of CO₂
- Effects global sea level
- Has unique, vulnerable ecosystems

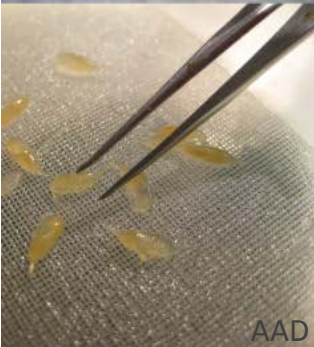
Lumpkin and Speer 2007

The Southern Ocean is changing...

- Regional warming
- Decreased salinity in upper and abyssal ocean
- Basin-wide acidification
- Regional decreases in sea ice
- Shifts in ecosystems

Need to monitor and understand the changes in order to predict future changes, and mitigate impacts.

Supports the need for sustained, and internationally coordinated observations of the Southern Ocean



The Southern Ocean Observing System

- Many (mono-disciplinary) programmes in SO research, all with individual infrastructure, data routes etc. SOOS will connect across disciplines and programmes to ensure a coordinated approach to observing the SO.
- Sponsored by SCAR (Scientific Committee on Antarctic Research) and SCOR (Scientific Committee on Oceanic Research)
- *SOOS Initial Science and Implementation Strategy* – developed by SCAR/SCOR Expert Group on Oceanography and the SCAR/CLIVAR/CliC Southern Ocean Panel.
- International Project Office opened August 2011, hosted by the Institute for Marine and Antarctic Studies (University of Tasmania), with additional support from the Australian Antarctic Division.



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Who would use SOOS and SOOS products?

- Research community
- Resource managers (e.g., CCAMLR)
- Policy makers (when to act? Consequences of not acting?)
- IPCC
- Local planners (sea-level rise)
- Antarctic tourism
- Shipping operators
- Weather and climate forecasters
- Educators





MISSION: To establish a *multidisciplinary* system to deliver the *sustained* observations of the Southern Ocean that are needed to address key challenges of *scientific* and *societal* relevance, including climate change, sea-level rise and the impacts of global change on marine ecosystems.

B. Wallis AAD



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Scientific Steering Committee

SCIENTIFIC STEERING COMMITTEE MEMBERS			
Name	Affiliation	Email	Role
Stephen Ackley	Uni. of Texas San Antonio, USA	Stephen.Ackley@utsa.edu	SSC Member
Parli Venkateswaran Bhaskar	National Centre for Antarctic & Ocean Research, India	bhaskar@ncaor.org	SSC Member
Angelika Brandt	Uni of Hamburg, Germany	ABrandt@zoologie.uni-hamburg.de	SSC Member
Daniel Costa	University of California, USA	costa@ucsc.edu	SSC Member
Kim Finney	Australian Antarctic Division	Kim.Finney@aad.gov.au	SSC Member, Data Manager
Alberto Naveira Garabato	National Oceanographic Centre, UK	acng@noc.soton.ac.uk	SSC Member
Jiping Liu	Chinese Academy of Sciences	jliu@lasg.iap.ac.cn	SSC Member
Mauricio Mata	Fed Uni. Of Rio Grande, Brazil	mauricio.mata@furg.br	SSC Member
Michael Meredith	British Antarctic Survey, UK	mmm@bas.ac.uk	Co-Chair, POGO ex-officio
Steve Rintoul	CSIRO, Australia	Steve.Rintoul@csiro.au	SSC Member
Oscar Schofield	Rutgers University	oscar@marine.rutgers.edu	Co-Chair, SSC Member
Sebastiaan Swart	Uni. of Cape Town, South Africa	seb.swart@gmail.com	SSC Member
Bronte Tillbrook	CSIRO, Australia	Bronte.Tillbrook@csiro.au	SSC Member
Anna Wahlin	Uni. of Gothenburg, Sweden	Anna.wahlin@gvc.gu.se	SSC Member

EX-OFFICIO MEMBERS			
Name	Affiliation	Email	Role
Tosca Ballerini	Mediterranean Institute of Oceanography, France	tosca.ballerini@univ-amu.fr	APECS Ex-officio
Andrew Constable	Australian Antarctic Division	Andrew.Constable@aad.gov.au	ICED-Sentinel Ex-officio
Mike Sparrow	SCAR Secretariat	mds68@cam.ac.uk	SCAR Ex-officio
Ed Urban	SCOR Secretariat	ed.urban@scor-int.org	SCOR Ex-officio

Membership:

- Expertise
- Scientific standing
- Programmatic connections
- National representation



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Science Themes

Key science challenges identified as most pressing issues, both scientifically and societally - to be addressed by the SOOS:

- 1) Role of Southern Ocean in global freshwater and heat balance
- 2) Stability of Southern Ocean overturning circulation
- 3) Stability of Antarctic ice sheet and future contribution to sea-level rise
- 4) Future of Southern Ocean carbon uptake
- 5) Future of Antarctic sea ice
- 6) Impacts of global change on Antarctic ecosystems



Achieving the mission...

Many international/national programmes involved in Southern Ocean observations. SOOS will work with these to:

- Design and implement SO observing system
- Advocate and guide development of new technologies
- Unify current observation efforts and leverage further resources
- Integrate / communicate – between nations, international and national projects, and across traditional disciplinary boundaries
- Facilitate and develop a data system with seamless access to essential data and data products

Design and implement a SO Observing System

End goal is a sustained, coherent, multidisciplinary observing system.

- Design optimal sampling plans for all variables
- Need quantified targets (number/frequency of required observations)

Some have already been defined, others lag behind.

- Determination of stage of readiness of EOVs and platforms
- Identification of gaps in knowledge and observations

Example of SOOS development: Southern Ocean Ecosystems

Many physical components are well developed.

Ecosystem is a challenge due to species diversity and system complexity. Work is required to identify key components of an ecosystem that **must** be monitored, how often, and where.

Southern Ocean Sentinel project working to address this – supported by SOOS. Sentinel will contribute to design of SOOS and is connecting physical variables with biological variables in a seamless way.

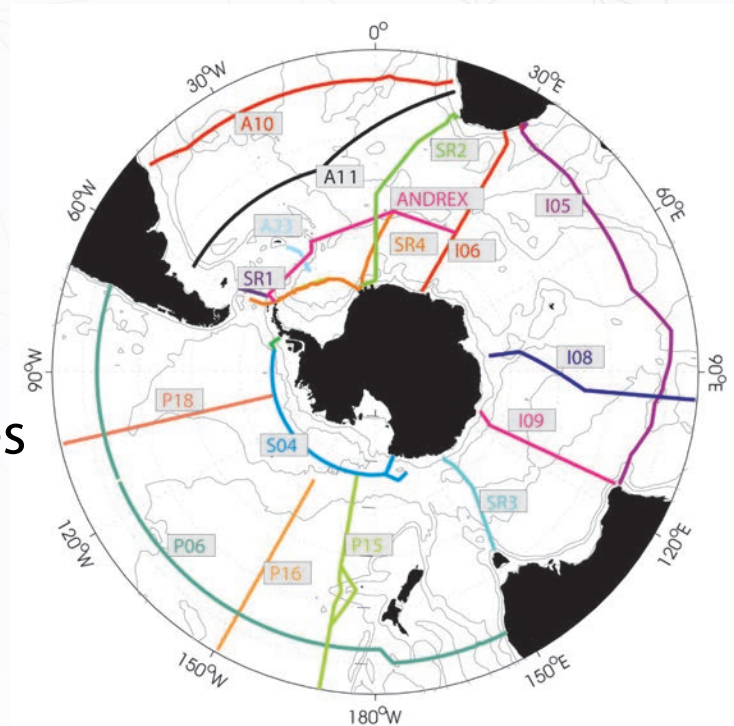
SOOS proposal for SCOR Working Group with involvement of GOOS - to identify biological parameters/variables that require monitoring on a global scale.



Unify current efforts and leverage resources: Examples

Hydrographic sections

- Addition of biological sensors
- National “ownership” of sections by countries not yet involved (Korea, China etc)
- Extension of sections through the sea ice



Extension of the SOOP

- Deployments from fishing vessels through collaboration with CCAMLR
- Deployments from tourist vessels, through collaboration with IAATO

Delivering the outputs

Key goal: develop a unified Southern Ocean data portal to enable easy access to relevant data and data products. This requires investment, but the scientific and societal return would be significantly greater.

Data Management Sub-Committee = representatives from international, national and programmatic data centres.

- Tasked with developing the data policy
- Identifying data products to provide and infrastructure required
- Advocate for data contributions



More information?

SOOS Website = www.soos.aq

Contact SOOS International Project Office:

Louise Newman (Executive Officer) newman@soos.aq

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