Several international organisations were integral in the development of SOOS, POGO was one of these.

**Governance and Support**

### Parent Organisations
- SCOR
- SCAR

### Endorsing Programmes
- POGO
- CMAR
- CICL

### Sponsors
- IMAS
- UTAS
- TPAC
- NASA
- Integrated Marine Observing System
- Australian Antarctic Division
- Department of Sustainability, Environment, Water, Population and Communities
WHY SOOS?
The Southern Ocean is important to the earth’s metabolism and climate

The Southern Ocean is central to the circulation of the ocean

- Exchange heat and freshwater with other basins
- Atmosphere - deep ocean connection
  - anthropogenic CO₂ uptake
  - oxygen supply to deep ocean
  - nutrient source for biological production north of 30°S
- Unique and vulnerable ecosystems

Lumpkin and Speer 2007
The Southern Ocean is changing rapidly ....

- Regional warming (fastest winter warming on Earth)
- Decreased salinity in upper and abyssal ocean
  - Basin-wide acidification
  - Changes in sea ice
  - Shifts in ecosystems

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

Need for sustained and internationally coordinated observing system for the Southern Ocean

Southern Ocean Observing System (SOOS)

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.
Science Themes

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

SOOS aims to work with the many international/national programmes involved in the region to:

- Design and implement a SO observing system
- Advocate and guide the application of new technologies
- Unify current observation efforts and leverage further resources
- Integrate / communicate – between nations and programs and disciplines
- Facilitate and develop a data system for access to essential data and products
Towards Integration and the Vision

- **Themes 1 and 2 (circulation, heat, freshwater):** CLIVAR-SOP, SO-Argo, DIMES

- **Theme 3 (Ice Sheet):** FRISP, IceBridge, ISMASS

- **Theme 4 (Carbon):** SOCAT, IOCCP, SOCOM, OAICC, FOO

- **Theme 5 (Sea Ice):** ASPeCT, IPAB, SOBP

- **Theme 6 (Biology):** ICED, SCAR-AntERA, SCAR-AntEco, SO-CPR, GOOS Biology WG, IMBER
International cooperation works: IPY

- CASO
- SASSI
- CAML
- ARGO
- MEOP
- SOOS

Who will use SOOS?

- Researchers
- Resource managers (e.g. CCAMLR)
- Policy makers
- IPCC
- Local planners (sea-level rise)
- Antarctic tourism operators
- Shipping operators
- Weather and climate forecasters
- Educators
SOOS progress

- SOOS: a coordinated approach across national programs

- SOOS Initial Science and Implementation Strategy 2011 (Rintoul et al., 2011)

- International Project Office in Hobart, Australia (since end 2011)
  Hosted by the Institute for Marine and Antarctic Studies (U. Tas)

- The vision of SOOS has been more clearly defined
  (Meredith et al., 2013)

- 2nd SSC Meeting + Asia w’shop (May 2013, Shanghai)
  Progress in scientific work themes (knowledge gaps & way forward)

SOOS 20-year vision paper...

The vision for a Southern Ocean Observing System
Michael P Meredith1, Oscar Schofield2, Louise Newman3, Ed Urban4 and
Michael Sparrow5

Clarification of vision has enabled ID of steps required to achieve vision:
- What are the advances in technology required?
- What activities need to be coordinated?
- What needs to be initiated now, in 2 years, or in 10?
- What is the infrastructure and required funding?
Advances required in:
- Cyberinfrastructure
- Modelling
- Observation technologies

- Mixture of autonomous and non-autonomous platforms, combined with remote sensing.
- Data relayed in real time
- Assimilating models produce state estimates of parameters
- Model error fields used to re-task autonomous platforms

The above vision is **many years away** but we need to be strategic in working towards it. It needs to be a **fully international system** with separate nations contributing hard assets to work under common objectives. This needs to be **carefully structured** so that each nation gains tangible benefit from its involvement.