

## Report to CLIVAR SSG-19

Panel or Working Group: CLIVAR/CliC/SCAR Southern Ocean Panel

---

### 1. Contributions to developing CLIVAR science and fit, where appropriate, to the CLIVAR imperatives

---

#### *Seventh Meeting of the Southern Ocean Panel*

- Presentations and discussions relevant to imperative 1 (improved atmosphere and ocean component models of Earth System Models), frontier 1 (anthropogenic climate change), frontier 2 (decadal variability, predictability and prediction), and frontier 3 (intra-seasonal and seasonal predictability and prediction)

#### *Ocean observing system*

- Involvement in SOOS – final SOOS design plan published
- Engagement with other observation initiatives e.g. DIMES (Diapycnal and Isopycnal Mixing Experiment in the Southern Ocean), SOBOM (Southern Ocean Biogeochemical Observations and Modelling) programme

#### *Capacity building*

- Reporting on initiatives through Exchanges 58.
- Early career researchers invited to and presented at SOP7.
- Communication to the broad community through poster cluster on “Southern Ocean at WCRP Open Science Conference.
- The discussions from the 7<sup>th</sup> meeting of SOP will feed into the further development of the Southern Ocean vision document. The three themes covered in the meeting – Southern Ocean carbon, atmospheric processes over the Southern Ocean, and Southern Ocean physics – will add an additional dimension to the vision document.

---

**2. Briefly list any specific areas of your panel's activities that you think would contribute to the WCRP Grand Challenges as identified by the JSC at its most recent meeting<sup>1</sup>**

---

*Provision of skillful future climate information on regional scales*

- Close engagement with WGOMD on SO modeling activities (e.g. joint Hobart panel meeting Feb 2013)
- Evaluation and synthesis of CMIP5 model projections spanning atmosphere, oceans, sea-ice

*Regional sea level rise*

- Ongoing input on the role of the southern hemisphere cryosphere on sea level
- 2013 workshop being co-organised with WGOMD on sea level rise, amongst other topics

*Cryospheric response to climate change*

- Activities towards the development of SOOS
- 2013 workshop will also focus on ocean/ice-shelf interaction, and ice sheets
- SOP7 addressed Southern Ocean physics (and ice)

*Improved understanding of the interactions of clouds, aerosols, precipitation, and radiation and their contributions to climate sensitivity*

- Atmospheric processes over the Southern Ocean was one of the key topics of SOP7.

*Past and future changes in water availability (with connections to water security and hydrological cycle)*

*And*

*Science underpinning the prediction and attribution of extreme events*

- Focus on atmospheric processes over the Southern Ocean during SOP7 highlighted e.g. SAM influencing precipitation/drought events in Southern Hemisphere regions

---

<sup>1</sup>

1. Provision of skillful future climate information on regional scales (includes decadal and polar predictability)
2. Regional sea-level rise
3. Cryosphere response to climate change (including ice sheets, water resources, permafrost and carbon)
4. Improved understanding of the interactions of clouds, aerosols, precipitation, and radiation and their contributions to climate sensitivity
5. Past and future changes in water availability (with connections to water security and hydrological cycle)
6. Science underpinning the prediction and attribution of extreme events

- Support extending the observing under ice, for better cryosphere predictions, glacial ice melt processes

---

### **3. Key science questions that you anticipate your community would want to tackle in the next 5-10 years within the context of a more ocean-atmosphere orientated CLIVAR (1-3 suggestions)**

---

The Southern Ocean Panel, together with the wider community, has developed a *Vision for Climate Variability Research in the Southern Ocean-Ice-Atmosphere System*, which lists imperatives, frontiers, and research directions for the Southern Ocean.

The key science questions that emerged from this document are:

1. What is the future of Antarctic ice? Including sea ice, ice shelves, and land ice.
2. What is the impact of acidification? And how will the Southern Ocean store of CO<sub>2</sub> change in the future?
3. How will the ongoing projected trend in the SAM impact on air-sea heat, moisture, and carbon fluxes, and what will be the impact on Southern Hemisphere regional climate?
4. What is the future of the Antarctic continental margin?

---

### **4. Cooperation with other WCRP projects, outside bodies (e.g. IGBP) and links to applications**

---

The CLIVAR/CliC/SCAR Southern Ocean Region Panel acts as an intersection between WCRP CLIVAR, WCRP CliC and the Scientific Committee on Antarctic Research, which is an interdisciplinary committee of the International Council for Science. The link with SCAR is particularly prevalent with the development of the Southern Ocean Observing System.

The panel is building on links with the carbon community; the 7<sup>th</sup> meeting of the Southern Ocean panel had three 'themes', one of which was *Southern Ocean Carbon*, lead by Dr Nicole Lovenduski who joined the panel in 2010. During this session the panel heard about a variety of initiatives from invited speakers with expertise in this field.

The panel is also developing links with SPARC/DynVar; Edwin Gerber was an invited speaker at SOP7, and was highly engaged in the discussions. Ed also agreed to attend the WCRP Polar Climate Predictability Initiative as a representative of SOP, to communicate current activities in the Southern Ocean.

---

### **5. Workshops/meetings held**

---

The seventh meeting of the Southern Ocean panel was held in Boulder, Colorado, USA, 19-21 October 2011. The meeting convened experts from three key areas of Southern Ocean research – Southern Ocean carbon, atmospheric processes over the Southern Ocean, and Southern Ocean physics – with the overarching objective to generate an overview of current understanding in these three main areas. Under s Each of the three themes, invited speakers highlighted to the panel key open questions and discussed gaps in our current understanding. This will ultimately feed into the vision document being developed by the panel: A Vision for Climate Variability Research in the Southern Ocean-Ice-Atmosphere System.

---

## **6. New activities being planned, including timeline**

---

### *SOBOM Program*

The proposal for a Southern Ocean biogeochemical observations and modeling (SOBOM) program was presented to SOP at the last SOP meeting in Boulder, October 2011. The proposal is for an NSF Science and Technology Center, comprising three themes:

1. Observations;
2. Modeling; and
3. Outreach.

### *Review Paper*

A review paper on the state of the southern climate system is currently being developed by co-authors.

### *Panel Meeting/Workshop*

See below.

---

## **7. Workshops / meetings planned**

---

The eighth meeting of the Southern Ocean panel is scheduled to take place in Hobart, Australia, 21-22 February 2013. This will follow a 3-day workshop, being organized by WGOMD and SOP (18-20 Feb).

The workshop will focus on sea-level rise, ocean/ice-shelf interaction, and ice sheets.

---

## **8. Issues for the SSG**

---

## Annex A

---

### Proforma for CLIVAR Panel and Working Group requests for SSG approval for meetings

---

Requests should be made through D/ICPO ([Catherine.beswick@noc.ac.uk](mailto:Catherine.beswick@noc.ac.uk)), against the following headings:

**1. Panel or Working Group:**

CLIVAR/CLiC/SCAR Southern Ocean Region Implementation Panel

**2. Title of meeting or workshop:**

Annual panel meeting and workshop on sea-level rise, ocean/ice-shelf interaction, and ice sheets (workshop joint with WGOMD).

**3. Proposed venue:**

Hobart, Australia

**4. Proposed dates:**

Workshop: 18-20 Feb 2013

Panel meeting: 21-22 Feb 2013

**5. Proposed attendees, including likely number:**

Panel members, Southern Ocean Observing System Project Office representative, International CLIVAR Project Office representative, SOBOM representative, CLiC representative, local researchers with Southern Ocean interests (20-25 participants).

**6. Rationale, motivation and justification, including: relevance to CLIVAR themes & JSC cross cutting topics and any cross-panel/working group links and interactions involved:**

Joint session with WGOMD

**7. Specific objectives and key agenda items:**

Panel meeting: SOBOM, AA2k climate history, key Southern Ocean initiatives (input from national representatives)

Workshop: sea-level rise, ocean/ice-shelf interaction, ice sheets

**8. Anticipated outcomes (deliverables):**

Panel meeting report

**9. Format:**

Workshop: 3-day

Panel meeting: 2-day

**10. Science Organising Committee (if relevant)**

Workshop: SOP and WGOMD panel members

Panel meeting: SOP panel members

**11. Local Organising Committee (if relevant)**

Local contact: Simon Marsland, CSIRO

**12. Proposed funding sources and anticipated funding requested from WCRP**

Requested funding from WCRP: \$20k

Additional support will be requested from SCAR