



**XXXII SCAR Delegates' Meeting**  
**Portland, USA, 23-25 July 2012**

Agenda Item: 5.4.2  
Person Responsible: M Sparrow

# **The Ice Sheet Mass Balance and Sea Level (ISMASS) Group**



## Executive Summary

**Title:** The Ice Sheet Mass Balance and Sea Level (ISMASS) Group

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**Introduction/ Background:** The mass balance of a glacier or ice sheet is the net balance between the mass gained by snow deposition, and the loss of mass by melting (either at the glacier surface or under the floating ice shelves or ice tongues) and calving (production of icebergs). A negative mass balance means that a glacier is losing mass, and, for grounded glaciers and ice sheets, this mass loss directly contributes to sea level rise. This is the major reason why it is important to have accurate estimates of the mass balance of glaciers and ice sheets.

**Important Issues or Factors:** The ISMASS Expert Group is now a joint group of SCAR and IASC. An interim steering committee has been appointed and a workshop planned for the 14<sup>th</sup> of July in Portland (sponsored by an ICSU grant plus contributions from SCAR and partners). This workshop will plan the way ahead for ISMASS (see Appendices 3 and 4)

**Expected Benefits/Outcomes:** SCAR and IASC leadership in a science area with high societal impact (sea level rise)

**Partners:** ICSU, IASC plus IACS, WCRP/CliC, IGS and others.

**Budget Implications:** Funds have been requested from SSG-PS

# Ice Sheet Mass Balance and Sea Level (ISMASS)

## 1. Rationale for the Group

In 1993 the Global Change in Antarctica (GLOCHANT) Group of Specialists (GoS), a SCAR initiative, established a task group on "Antarctic ice sheet mass balance and sea-level" (ISMASS) to address the requirements for a coordinated international approach to resolving the role of the Antarctic ice sheet in sea-level change. The group was established under the chairmanship of Professor Charles Bentley and ISMASS held their first meeting at Cambridge in conjunction with the Fifth International Symposium on Antarctic Glaciology (VISAG), in 1993. With the re-organisation of SCAR and the dissolution of GLOCHANT, ISMASS became an Expert Group of the SCAR Physical Sciences Standing Scientific Group (SSG).

During the SCAR/IASC Open Science Conference in St. Petersburg, Russia, July 2008, an ISMASS workshop was held, in which it became evident that a bi-polar perspective was desirable for ISMASS. This led to conversations with researchers from the Arctic research community and the drafting of new terms of reference for ISMASS.

## 2. Report on Progress

During the Buenos Aires SCAR Meeting, it was decided to substitute the individual chairmanship of ISMASS, held by Kees van der Veen (USA), by a collegial chairmanship held by an interim Steering Committee (SC), formed by Kees van der Veen (USA), Christina Hulbe (USA) and Francisco Navarro (Spain), until the restructuring of ISMASS (with the involvement of the International Arctic Science Committee, IASC) became effective. During the Buenos Aires Meeting, this SC completed the new Terms of Reference for ISMASS (Appendix 2), initially drafted by Kees van der Veen.

The main progress since Buenos Aires meeting can be summarized as follows:

- 1) The new Terms of Reference for ISMASS, which consider this Expert Group as a joint SCAR-IASC group, were presented by Francisco Navarro to the new Cryosphere Working Group of the restructured IASC (IASC-CWG), during its meeting in Potsdam, Germany, 11-13 January 2011. The Terms of Reference were approved by the IASC-CWG (13-01-2012), and later endorsed by the IASC Council. Francisco Navarro, also a Spanish representative in IASC-CWG, was appointed as contact person within IASC concerning ISMASS-related matters.
- 2) During the IASC-CWG meeting it was suggested that ISMASS be also extended to the International Association of Cryospheric Sciences (IACS). ISMASS SC agreed and forwarded the proposal to IACS President, Ian Allison. However, the IACS Bureau, during its business meetings held within IUGG General Assembly in Melbourne, 28 June-7 July 2011, declined such a co-sponsorship of ISMASS, though expressed their willingness to support particular ISMASS-related activities upon request, and appointed Cecilie Rolstad as contact person within IACS concerning ISMASS-related matters.
- 3) During the SERCE/POLNET meeting held within ISAES Edinburgh, July 2011, Francisco Navarro gave a presentation on ISMASS, and subjects of common interest to both SERCE/POLNET and ISMASS were discussed.
- 4) During 2011 and 2012, e-mail contacts with PACE PPG members have also been maintained, regarding subjects of common interest to both PACE and ISMASS.
- 5) On 6-7 October 2011 in Utrecht, The Netherlands, the first IASC-CWG meeting in which ISMASS acted as a joint group SCAR-IASC was held. Francisco Navarro gave a presentation on the ISMASS activities since the previous CWG meeting (January 2011).
- 6) During the Fall of 2011, the membership of the Interim Steering Committee of ISMASS was modified, to reflect the current co-sponsorship by SCAR-IASC, and also the involvement/support by the World Climate Research Programme/Climate and Cryosphere Project (WCRP/CliC), jointly supported by SCAR, IASC and the WCRP. The new Interim Steering Committee is formed by Frank Pattyn (SCAR), Francisco Navarro (IASC and SCAR) and Edward Hanna (WCRP/CliC).

- 7) The main focus of ISMASS since then has been the organization of a kick-off workshop of the renewed ISMASS, to be held on 14 July 2012 in Portland, Oregon, just before the SCAR Business Meetings and Open Science Conference. The work has focused on:
- Setting the aims (Appendix 3) and preliminary agenda for the meeting (Appendix 4).
  - Getting the financial support to the workshop. The workshop is co-organized by SCAR, IASC and WCRP (each contributing with 4,000 €), with coordinating support from CliC and the Association of Polar Early Career Scientists (APECS). It is also co-sponsored by the International Glaciological Society (IGS), contributing with 1,000 GBP, and IACS, contributing with 1,000 USD. A strong support has been received from ICSU, that has awarded 30,000 € through an ICSU grant.
  - Setting up a workshop website and announcing the workshop through the Cryolist and the bulletins/newsletters/websites of the organizers and sponsors:  
<http://www.climate-cryosphere.org/en/events/2012/ISMASS/Home.html>
  - Appointing six invited speakers with backgrounds covering the disciplines involved.

### **3. Future Plans**

The future plans over the next two years will be discussed and set during the mentioned kick-off workshop (right before the SSG-PS business meeting of 15 July 2012).

### **4. Budgetary Implications**

The requested budget over the next two years will be discussed on 14 July and presented to SSG-PS on 15 July 2012, though it is expected a total budget of ca. 5,000-6,000 USD.

### **Appendix 1: Membership**

Until the kick-off ISMASS workshop to be held on 14 July 2012, the membership of the group is limited to its Interim Steering Committee, formed by

- Frank Pattyn, [fpattyn@ulb.ac.be](mailto:fpattyn@ulb.ac.be),
- Francisco Navarro, [francisco.navarro@upm.es](mailto:francisco.navarro@upm.es),
- Edward Hanna, [E.Hanna@Sheffield.ac.uk](mailto:E.Hanna@Sheffield.ac.uk).

### **Appendix 2: Terms of Reference for ISMASS**

1. To assess the status of research on interactions between Ice Sheets and the Climate System and to identify gaps in current understanding requiring process studies, sustained and targeted campaign-based observations, and model experiments. ISMASS will serve SCAR, IASC and other organizations as a source of knowledge on these issues, and will propose directions for future research in this area.
2. To facilitate and serve as a forum for the evaluation and promotion of scientific understanding of ice sheet models for both Antarctica and Greenland, in particular with respect to their contributions to global sea level rise, and to make such information readily available to scientists, policy makers, and the public at large.
3. To keep track of the status of Ice Sheet research and observations made by various scientific organizations such as the World Glacier Monitoring Service (WGMS), Global Land Ice Measurements from Space (GLIMS), Climate and Cryosphere (CliC), International Association of Cryospheric Sciences (IACS) and liaise with them to ensure that respective activities contribute as much as possible to the objectives of SCAR and IASC.

4. To facilitate interactions between all disciplines (e.g. atmospheric, oceanographic, cryospheric, biochemical, and paleoclimate) with an interest in interactions between Ice Sheets and Climate, initially focusing on rapid response to modern ocean and atmosphere forcings.
5. To work in concert with relevant SCAR and IASC panels and other groups to integrate Ice Sheet observations and modeling into corresponding global and regional activities and to ensure that the objectives of SCAR and IASC are met and resources used most efficiently.
6. To work with appropriate agencies on issues related to the distribution and archiving of Ice Sheet observations.
7. To help attract a new generation of scientists into the field of Ice Sheet and Polar Research.

### **Appendix 3: Aims of ISMASS 2012 Workshop**

The main aims of this workshop are:

- 1) To assess the current knowledge of the contribution of the Antarctic and Greenland Ice Sheets to global and regional sea-level rise, taking into account ongoing and proposed projects including the ESA/NASA-supported Ice Sheet Mass Balance Inter-Comparison Exercise. The focus will be on quantifying the uncertainties, and understanding and resolving the current discrepancies among the estimates from different observational and modelling methods. New techniques will also be explored.
- 2) To analyze how model-based predictions of ice-sheet discharge contributions to sea-level changes can be improved. The emphasis will be on identifying the main shortcomings of the currently available models and suggesting improvements for the next generation of ice-sheet models. Particular attention will be given to the interactions of ice sheets and shelves with the oceans and the atmosphere.
- 3) To reach a consensus on the magnitude of the current contribution of ice-sheet surface mass balance and discharge to sea-level change, and disseminate this knowledge not only to other researchers, but to policymakers and the general public.
- 4) To analyze the feasibility of preparing updates of the estimates of the contribution of ice-sheet discharge to sea-level rise between successive IPCC reports (e.g. every two years).
- 5) To study the regional distribution of sea-level rise and its impacts on coastal areas.
- 6) To determine how the renewed SCAR-IASC joint expert group on Ice Sheet Mass Balance and Sea Level (ISMASS) should be organized to effectively meet the above objectives.

### **Appendix 4: Preliminary agenda of ISMASS 2012 Workshop**

#### **Date and venue:**

The workshop will be held on 14 July 2012, in two sessions, 8:00-12:00 and 13:00-17:00, in the same venue as the Open Science Conference

**Workshop structure:**

The workshop will be structured as a set of sessions, as described below:

*BACKGROUND SESSIONS:*

- Workshop presentation. 5 min.
- Oral presentations of about 20 min (15-18 min presentation followed by 2-5 min for questions), given by qualified specialists, on the state of the art and perspectives of the most relevant topics. The time for questions will be kept short because this session will be followed by a round table where a more detailed discussion on the addressed subjects will be held. 2 hours.

Coffee break. 25 min.

- Round table for open discussion on the most relevant subjects addressed in the overview presentations. The table will be composed of the specialists that gave the overview presentations, and will be lead by a moderator. Active participation of all workshop attendees will be encouraged. Following the round table discussion, a set of key topics to be discussed in greater detail by smaller breakout groups will be defined. 1 hour 30 min.
- Lunch break. 1 hour.

*GROUP DISCUSSION SESSIONS:*

- The workshop participants will be spilt into smaller groups (of 5-10 people) according to the key topics defined during the round table discussion session. Special attention will be paid to having both early career and more established researchers involved in the groups. Each group will appoint a leader and rapporteur and will conduct a more detailed discussion on the particular topic and elaborate a summary of conclusions regarding objectives 1-4. 1 hour 15 min.

*IDEA-SHARING AND SCIENTIFIC CONCLUSIONS SESSION:*

- All workshop participants will assemble to share the thoughts and conclusions of the breakout groups presented by the group leaders and jointly discussed, with the aim of elaborating the (preliminary) conclusions of the workshop. 45 min.

Coffee break. 20 min.

*ISMASS WORKING GROUP ORGANIZATION SESSION:*

This will consist of an open discussion, lead by the current Interim Steering Committee of ISMASS, aimed to discuss how the renewed ISMASS working group should be organized to effectively meet its proposed objectives, as defined in the terms of reference for ISMASS. This will include the appointment of a new Steering Committee (SC), with a larger membership than the present interim group, and a SC leader/chair. The composition of this SC should be geographically-, gender-, and discipline- balanced and assure a distribution in career stage to include early and, mid-career level researchers. 1 hour 30 min.

*CLOSING SESSION:*

Final session in which the workshop organizers, together with the chair of the newly appointed SC, will summarize the main outcomes of the workshop and sketch the next steps to be undertaken by the renewed ISMASS working group and partner organizations. 10 min.