SCAR Executive Committee Meeting 2017
Brno, Czech Republic, 31 July - 2 Aug 2017

PAIS
2016-2017 Report

Report Author(s): Laura De Santis and Tim Naish

Summary of activities from 2016-17 and any other important issues or factors (<150 words):

Past Antarctic ice sheet and climate modelling new papers have contributed with significant progress over the past year. Several cruises have been carried out by many Nations also with the aim to collect site survey for IODP expeditions 373, 374, 379 scheduled for 2018-2020 and for the other submitted – revised proposals for drilling the Antarctic margin post-2020. PAIS provides grants to students and early career scientists from Antarctic programs developing countries (Chile, Denmark, Ukraine) for attending the PAIS conference. PAIS recruited Pamela Santibañez from Instituto Antártico Chileno INACH, Mathieu Casado (LSCE and LIPhy, France) and Adam Campbell (Otago Univ., NZ) as APECS representative in the PAIS steering committee.

We ask the permission to use other PAIS funds, (ca. 15.000 US $ in addition to those that were already allocated to the conference) for allowing more students and early career scientists to attend the conference.

Recommendations that EXCOM and Scientific Group Chief Officers should consider (if any): Please indicate if approval is necessary or if they are just asked to note information.

We believe that the PAIS conference would benefit from the large participation of motivated young scientists to better plan the future Geoscience program after PAIS.
We’ve received many requests for travel grants from young scientists and students from many countries to attend the PAIS conference that we are not able to fully satisfy with the PAIS allocated funds, also considering other funding resources. Therefore, we ask the permission to use other PAIS funds, (ca. 15,000 US $ in addition to those that were already allocated to the conference) for allowing more students and early career scientists to attend the conference. The funds are available because PAIS has carried forward all remaining 2016 funds into 2017 to support this major meeting. The 2017 budget for PAIS is $21,000 giving presently a total of 41,057 $. In the case that we use ca. 35,000 $ for the PAIS conference we will still have funds for supporting other initiatives before the end of 2017, if there are requests. We have not received any request for other conferences or schools this year yet.
Progress and Plans:

Major Activities and Significant Progress from the past year (<500 words):

Past Antarctic ice sheet and climate modelling have contributed with significant progress over the past year. Galeotti et al. (2016) have shown that the Antarctic ice sheet reached a continental size when atmospheric CO2 dropped below 600 ppm at the end of Oligocene. Gasson et al. (2016) show that under Miocene interglacial conditions (CO2 at ~ 500 ppm), the WAIS collapses but the EAIS remains almost completely glaciated. In the Miocene the bathymetry should have been necessarily shallower, which is supported by the few existing seismic reconstructions for this periods. Bart et al. (2016) shows that the Ross Sea continental shelf morphology influences the way the ice sheet flows. Regional climate and ice sheet simulations of the mid-Pliocene by Scherer et al. (2016) suggests that several major drainage basins (Wilkes, Aurora, Amery, George V) might have been ice free. Gasson et al. (2016) calculate that during the mid-Pliocene, the AIS might have lost no more than 13 m SLE (cf. 15 - 20 m SLE suggested so far). DeConto and Pollard (2016) carried out projections up to 2500, tuning the model to mid-Pliocene and Last interglacial sea-level rise. Their results suggest a maximum contribution of 15 m SLE by 2500 in the worst case and that the impact of the warming ocean is one of the main factors driving collapse in the future. Colleoni et al (2016) suggests that the development of the Pacific cold tongue through the Plio/Pleistocene transition strengthened the influence of teleconnections (supported by proxies) and led to a rearrangement of the moisture flux pathways over Antarctica being particularly favorable to the EAIS re-expansion after the warm mid-Pliocene.

A new analysis of the Dome Fuji ice core in Antarctica shows a high degree of climate instability within glacial periods with intermediate temperatures (Kawamura et al., 2017 Science Advances). This instability was attributed primarily to global cooling caused by a reduced greenhouse effect. Moreover, snow accumulation effects on gravity measurements are evaluated for detecting GIA at the Syowa Station, East Antarctica.

Several marine cruises have been carried out in the 2016-17 field season related to PAIS:

- The EUROFLEETS – Antarctic ice Sheet Stability from continental Slope process investigation (ANTSSS) project, led by Jenny Gales (NOC, UK), in the Ross Sea on RV OGS Explora (Ross Sea), within the Italian PNRAfunded Antarctic cruise programme and the Italian PNRA projects Ocean DYnamics from the Sediment drifts of the ross SEA (ODYSSEA), led by M. Rebesco (OGS, Italy) West Antarctic Ice Sheet History from Slope Processes – Eastern Ross Sea (WHISPERS) led by L. De Santis (OGS), Glacial Evolution in the north-western Ross Sea, offshore North Victoria Land (GLEVORS), led by C. Sauli (OGS) and F. Colleoni (CMCC, Italy), in the Ross Sea on RV OGS Explora (Ross Sea). The main objectives of the EUROFLEETS-ANTSSS and of
the PNRA cruise were to acquire new geophysical data including seismic, also as site survey for the IODP Exp. 374, sub-bottom profiler and multibeam echosounder data from an underexplored area of the outer shelf and slope along the southeastern slope of the Ross Sea and near the Victoria Land coast. Further objectives were to collect oceanographic data from this region, including Conductivity Temperature Depth (CTD), Acoustic Doppler Current Profiler (ADCP), Lowered-ADCP, Expendable Bathythermograph (XBT) and turbidity data.

- R/V Investigator survey in the Western Wilkes Land, Sabrina Coast, led by L. Armand and P. O’Brien (Macquarie University, AUS). Multibeam, subbottom, seismic data, piston core and CTD data were collected from the continental slope and rise with the aim to understand the interaction of the Totten Glacier and its ice drainage basin with the Southern Ocean during periods of warming and ice sheet retreat.

- Expedition PS104 on RV Polarstern (MeBo drilling in the Amundsen Sea) led by Karsten Gohl (AWI), employed a multi-barrel seabed MARUM-MeBo70 drill device for the first time to drill unconsolidated sediments and consolidated sedimentary rocks from an Antarctic shelf with core recoveries between 7 and 76%. Three sites were located on the inner shelf of Pine Island Bay from which soft sediments deposited at very high sedimentation rates in isolated small basins were recovered from drill depths of up to 36 m below seafloor. Six sites were located on the middle shelf of the eastern and western embayment. Drilling at five of these sites recovered consolidated sediments and sedimentary rocks from dipping strata spanning ages from Late Cretaceous to Miocene.

- The Antarctic Circumpolar Expedition (ACE) on RV Akademic Treshnikov, led by the Swiss Polar Institute, visited a number of the sub-Antarctic Islands. Two projects were relevant to the PAIS community. First, Liz Thomas led a team that collected several shallow ice cores, from islands including Balleny, Peter, South Georgia and Bouvet. Second, Dominic Hodgson led a team that drilled into coastal lakes and peat bogs. Both these projects are using aerosols to track past changes in the circumpolar westerly winds. These will uncover past mixing and ventilation of the Southern Ocean, which determines the efficiency of the ocean CO2 sink. The winds can also be linked to changes in the ocean currents that drive warm water onto the Antarctic continental shelf where it can cause basal melting of ice shelves.

A range of teams from a variety of nations continue their work onshore to extract geological records of past Antarctic Ice Sheet behaviour from nunataks and ice-free areas. There are also some new programmes ongoing to drill below the ice to retrieve subglacial bedrock and sediment which will start to yield results in the next few years.

Major Future Initiatives and Actions, including rough timeline, for at least the next 2 years (<500 words):
Several other marine cruises are scheduled for the next two years, like the R.V. Hakuho-maru cruise in the Southern Ocean is planned in 2018-2019 season. This cruise is especially targeted for site surveys for IODP proposal 918 (PePSI-SO). The Spanish National Program has a cruise scheduled (January-February 2018) to collect Sparker, TOPAS and sediments from the South Orkney Microcontinent and the Ona Basin.

IODP scheduled drilling activities in the next two years include Exp. 374 (2018) and 379 (2019), as shown by figure 1 and now include Expedition 382, from the proposal led by Michael Weber in Iceberg Alley combined with the drilling on the South Falkland Slope Drift (proposed through an APL). Proposal 732 in the Antarctic Peninsula, led by J. Channell, will possibly be drilled after 2020, as well as the Mission Specific Platform expedition 373, in the George V Land coast, led by Trevor Williams and Carlota Escutia.

The scope is to present recent results that address still open questions in understanding the sensitivity of the Antarctic Ice Sheet and its contribution to past and future sea level and climate change. The conference will serve as well as a forum to discuss future research directions for PAIS, and the submission of a proposal to SCAR for a programme to succeed PAIS. We received up to 200 abstracts (15 from invited speakers) from 17 countries (the agenda will be published soon online), we have got requests for 14
workshops and side meetings to be held during the conference and about 130 scientists/students have already registered. I

We have received 44 applications for travel grants from early career and students to attend the conference (4 from Australia, 2 from Brazil, 1 from Chile, 21 from Europe, 4 from India, 1 from Rep. S. Korea, 8 from NZ, 5 from USA). We hope to be able to help all of them, at least partially.

PAIS is organizing the session “Arctic and Antarctic past ice sheet dynamics and paleoclimate evolution” for the upcoming conference at POLAR 2018 http://www.polar2018.org/cr-cryosphere.html. The session is listed under the Cryosphere category as well as Geology, Geophysics, Solid Earth.

PAIS would like to establish a PAIS Summer school (following the successful Williams and Kulhanek’s workshop held at TAMU on May 2016). We plan discussing this during the PAIS conference in Trieste.

PAIS will keep contributing to the ECORD Urbino Summer school and to any other school and conference (e.g. the AGU and EGU meetings) related to PAIS, upon request.

Please list any new outputs and deliverables (including publications and products that your group feels are part of your achievements):

Unfortunately, we have not been able to organize an efficient and comprehensive way to collect all articles related to PAIS. We are working on this. Meanwhile we list here below some recent publications that some of the steering committee members are aware of:


Lindeque et al., PPP, 2016 (seismostratigraphy of Ross Sea - Amundsen Sea transect)

Lindeque et al., G3, 2016 (sediment thickness grids of RS-AS-BS sector)


State dependence of climatic instability over the past 720,000 years from Antarctic ice cores and climate modeling Dome Fuji Ice Core Project Members (corresponding authors: Kawamura, K., Motoyama, H. and Abe-Ouchi, A.), *Science Advances, 3*, e1600446 DOI: 10.1126/sciadv.1600446


If your Expert/Action Group produces data, please report any new data generated and links to inclusions to the Antarctic Master Directory, etc.
The Antarctic cruises generated geophysical data (multichannel and single channel seismic, subbottom and multibeam) and sediment cores that will be stored at the Antarctic Seismic Data Library System and in the National core repositories.
Budget

Planned use of funds for 2017 and 2018

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<th>Month/Year (MM-YY)</th>
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<td>37000</td>
<td>Laura De Santis</td>
<td><a href="mailto:Idesantis@inogs.it">Idesantis@inogs.it</a></td>
</tr>
<tr>
<td>12/2017</td>
<td>AGU fall meeting- PAIS steering committee meeting</td>
<td>4000</td>
<td>Tim Naish</td>
<td><a href="mailto:Timothy.Naish@vuw.ac.nz">Timothy.Naish@vuw.ac.nz</a></td>
</tr>
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<td>04/2018</td>
<td>EGU meeting-- PAIS steering committee meeting</td>
<td>3000</td>
<td>Laura De Santis</td>
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<td>06/2018</td>
<td>SCAR-OSC-PAIS steering committee meeting</td>
<td>5000</td>
<td>To be defined</td>
<td><a href="mailto:Timothy.Naish@vuw.ac.nz">Timothy.Naish@vuw.ac.nz</a></td>
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<td>07/2018</td>
<td>PAIS Summer School</td>
<td>10000</td>
<td>Denise Kulhanek</td>
<td><a href="mailto:kulhanek@iodp.tamu.edu">kulhanek@iodp.tamu.edu</a></td>
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<td>08/2018</td>
<td>ECORD Summer school</td>
<td>3000</td>
<td>Rob DeConto</td>
<td><a href="mailto:deconto@geo.umass.edu">deconto@geo.umass.edu</a></td>
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</table>

Briefly describe what the funds will be used for and what the desired results are:

The 2017 funds will be used for supporting students, early career scientists and invited speakers to attend the PAIS conference. The rest of the 2017 funds will be used by PAIS steering committee members to attend the AGU 2017 fall meeting (as part of travel expenses), during which a PAIS steering committee meeting will be held.

The 2018 funds will be used for supporting PAIS steering committee members, students and early career scientists to attend EGU, SCAR-OSC and AGU meetings, during which a PAIS steering committee meeting will be held. Some funds will also be allocated for students attending the ECORD Summer school in Urbino.
In addition, we plan to organize a PAIS Summer school at Texas AM University – IODP repository (College Station, TX, USA), following the successful workshop held on May 2016, by Trevor Williams and Denise Kulahek et al. The school will last 4-5 days during which students will look at the IODP sediment cores collected from Antarctic margins and will attend classes about scientific questions addressed by PAIS, methodologies employed (geophysical surveys and deep and shallow drilling/coring) and scientific gaps to be targeted in future projects. A good plan for funding from PAIS and possibly other sources for student and for the experts attendance would be discussed at the PAIS conference.

Funding for workshops upon request

Provide an estimate on the % of the budget to be used for support of early career researchers:

2017: 35% for travel grants to attend the PAIS conference (Including PhD students)

2018: 35% for travel grants to attend meetings and schools (Including PhD students)

Provide an estimate on the % of the budget to be used for support of scientists from countries with developing Antarctic programmes (as listed here: http://www.scar.org/finances/contributions):

2017: we provide grants to students and early career scientists from Chile, Denmark, Ukraine for attending the PAIS conference. The percentage respect to the 2017 PAIS budget is 5%.

2018: we expect that some of the scientists and students from developing Antarctic programs countries who will attend the PAIS conference will continue to be involved in PAIS activities. We will stimulate it by supporting them with funds to attend further meetings and schools, and hopefully they will express interest and will mature the ability to have an active role in the future program beyond PAIS

We recently recruited Pamela Santibañez from Instituto Antártico Chileno INACH, as APECS representative in the PAIS steering committee. Pamela has a Ph.D. in Ecology and Environmental Sciences. She’ll get funds from PAIS in 2017 and 2018 and in the future to attend meetings related to her activity for PAIS

Linkages

Please describe any direct support you receive for your activities beyond SCAR (eg. Funds from another organization for a workshop):
The International Ocean Discovery Program IODP [http://www.iodp.org/] is providing an enormous support for the PAIS drilling expeditions in Antarctica both in terms of offshore and shore-based science and communication-outreach programs and for pre-cruise work and meetings.

We received funds for the PAIS 2017 conference from:
- Antarctic Research Centre, Victoria University of Wellington, [http://www.victoria.ac.nz/antarctic/about]
- Istituto Nazionale di Oceanografia e di Geofisica Sperimentale OGS [http://www.ogs.trieste.it/]
- International Centre for Theoretical Physics [https://www.ictp.it/]
- Italian Ministry of Research - Programma Nazionale delle Ricerche in Antartide PNRA [http://www.pnra.it/it]
- IODP-ECORD Italy [http://www.iold-italia.cnr.it/index.php/it/]
- IACS-IUGG [http://www.cryosphericsciences.org/support.html]
- IAPSO [http://iapso.iugg.org]

In addition, Rob DConto has a still pending proposal to get some support from the NSF for covering travel expenses for US students, early career scientists and invited speakers.

Please list any major collaborations your group has with other SCAR groups and with organisations/groups beyond SCAR:

PAIS is very much linked to some activities carried out by SERCE, AntClim21 and AntEco. Several scientists belonging to these programs are going to be involved in the PAIS conference, they submitted abstracts and have been invited to provide keynote talks. A workshop will be held seeking to link the marine and the ice core records.

PAIS is also strongly linked to IODP, SOOS and ISMASS searching for evidence and data to understand the COP 21 +2°C tipping point of both Greenland and Antarctica. These programs aim to investigate processes at different scale with the aim to estimate rates of changes of the cryosphere, global sea level and ocean circulation, possibly leading to irreversible environmental changes.

**Outreach and Capacity Building**

Please describe any outreach, communication and capacity building activities that your group participates in. Also provide information on activities that demonstrate effectiveness as a network. (coordinating
activity for your discipline/topic, i.e. mailing list and diversity of scientists involved) (<250 words):

PAIS has created and is maintaining a new web page http://www.scar-pais.org/ in addition to the SCAR web page http://www.scar.org/srp/pais with the help of new APECS representatives in the PAIS steering committee Mathieu Casado (France) and Pamela Santibañez (Chile). In the new web page we are hosting scientific news with small description of PAIS related articles. We also post here video and images of expeditions related to PAIS.

PAIS is supporting the planning of new data-acquisition missions using emerging technologies by making available funds for workshops and meetings (e.g. the subcommittee PRAMSO meeting during the SCAR-OSC 2016 and the IODP-ECORD-USSSP workshop on May 2016);

PAIS is encouraging data sharing and integration of spatially targeted transect data with modelling studies by promoting the free use and exchange of data from the Antarctic Data Library System that stores all existing multichannel seismic data collected by all Nations from the Antarctic margins;

PAIS is initiating/expanding cross linkages among Antarctic research communities by engaging IODP and other projects like the FP7-EU/EUROFLEETS and IPICS projects.

As part of SCAR’s Capacity Building efforts, such as the Fellowships and Visiting Professor Awards, we are looking for people from all the SCAR groups to form a ‘review panel’ so if applications in your field are submitted we have people to contact to help assess relevant applications. Please list one or more people (name and email address) from your Group who would be willing to serve as reviewers for the next few years.

Laura De Santis Idesantis@inogs.it
Florence Colleoni <florence.colleoni@cmcc.it>
Perhaps there will be more, after the PAIS conference, where we will promote such activity.

Membership

Leadership

<table>
<thead>
<tr>
<th>Role</th>
<th>First Name</th>
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<th>Affiliation</th>
<th>Country</th>
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<th>Date Started</th>
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<tr>
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### Other members

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<td>van Putte</td>
<td>Royal Belgium Institute for Natural Sciences</td>
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<tr>
<td>Leanne</td>
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<td>Macquarie University</td>
<td>Australia</td>
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**Requests to the Secretariat:**
If there are specific administrative tasks you would like help with such as your webpages, mailing list, online meeting tools, etc., please include them below: