WP **14**

Agenda Item: 2.3.7

Person Responsible: Terry Wilson

EXCOM 2013

Barcelona, Spain 22/23rd July 2013

Solid Earth Response and influence on Cryospheric Evolution

Executive Summary

Title: ***Solid Earth Response and influence on Cryospheric Evolution (SERCE)***

Authors: Terry Wilson

Introduction/ Background:
The Solid Earth Response and influence on Cryospheric Evolution (SERCE) SRP targets new understanding of solid earth – cryosphere interactions at a crucial time in earth history when global change is driving changes in mass balance of the polar ice sheets. SERCE promotes integration of new earth science data sets into modeling of ice mass balance, ice dynamics, and solid earth responses to mass change.

Important Issues or Factors:

- Success of initial SERCE activities = indicator of timeliness of this SRP focus
- Steering Committee membership
- Planned activities requiring support

Recommendations/Actions and Justification:

- Suggestions for, and approval of, SERCE steering committee
- Approval of budget requests; required to implement programme plans
- Advice on ensuring bi-polar participation in appropriate planned activities

Expected Benefits/Outcomes:

- Finalizing the Steering Committee will achieve critical mass, appropriate diversity, and energy to plan and implement SERCE activities
- Funding will ensure SERCE activities are implemented appropriately and successfully
- Establishing the path for SCAR-IASC (and other) collaboration will aid in realization of the integrated bi-polar science that the SERCE programme requires

Partners:
SERCE will seek international partners to leverage each activity. Partners that have been identified in initial planning are:

- IASC Cryosphere Working Group
- Upper Mantle Dynamics and Quaternary Climate in Cratonic Areas (DynaQlim) – an International Lithosphere Progamme group
- International Association of Geodesy
- EGU Training School funding scheme
- U.S. National Science Foundation (training schools)
- APECS

Budget Implications:
Funding of $25,000 for 2014 and $20,000 for 2015 are requested to support SERCE activities.

Solid Earth Response and influence on Cryospheric Evolution

1. Rationale for the Programme

The Solid Earth Response and influence on Cryospheric Evolution (SERCE) scientific research programme aims to advance understanding of the interactions between the solid earth and the cryosphere to better constrain ice mass balance, ice dynamics and sea level change in a warming world. This objective will be accomplished through integrated analysis and incorporation of geological, geodetic and geophysical measurements into models of glacial isostatic adjustment (GIA) and ice sheet dynamics. The programme is designed to synthesize and integrate the extensive new geological and geophysical data sets obtained during and subsequent to the International Polar Year with modeling studies, in a timeframe to contribute to IPCC AR6. SERCE will provide the international collaborative framework and scientific leadership to investigate systems-scale solid earth – ice sheet interactions across Antarctica and relate these results to global earth system and geodynamic processes. A series of expert workshops and thematic symposia improved data-modeling integration anf will propel the science of solid earth – cryosphere interactions beyond the current state of knowledge. The SERCE programme will conduct major efforts in capacity building, training and public outreach using complementary strategies to achieve technical capacity via information exchange, analytical capacity via training schools, engagement of new polar researchers via thematic science sessions, and public outreach via the world-wide web.

2. Important Issues or Factors

i) Suggested Steering Committee

- Terry Wilson, Ohio State University, Columbus, Ohio, USA Convenor, Geodesy, Crustal Deformation
- *Pippa Whitehouse, University of Durham, Durham, U.K. Glacial isostatic adjustment modelling.
  - *Liaison: SCAR-IASC ISMASS group*
- Matt King, University of Tasmania, Hobart, Australia Polar geodesy
  - *Liaison: International Association of Geodesy*
  - *Leader: EU COST Action on GIA (ended)*
- *Stefania Danesi, INGV, Bologna, Italy Cryoseismology
- Masaki Kanao, National Institute of Polar Research, Japan. Seismology, geodynamics.
- Markku Poutanen, Finnish Geodetic Institute, Finland. Geodesy, geodynamics
  - *Liaison: International Lithosphere Programme, DynaQlim Project*
- Yves Rogister, University of Strasbourg, France. Gravity, geodesy, GIA.
- *Samantha Hansen, University of Alabama, USA Deep earth seismology

  ** Early-Career researchers*

Ex-Officio Members – Liaisons to other groups

Francisco Navarro	IASC Cryosphere Working Group
Michael Bentley	PAIS (Holocene)
?	AntClim[21]
?	APECS / Outreach

ii) Outline of Implementation Plan including explicit milestones and expected scientific outcomes, and stating what is going to be achieved by when and if possible by whom

The SERCE SRP aims to:

1. Coordinate key disciplinary studies aimed at advancing understanding of the interactions between the solid earth and the cryosphere and implement expert workshops to bring researchers in these studies together to facilitate interdisciplinary outcomes.
2. Communicate and coordinate with other international groups investigating solid earth – ice sheet interactions.
3. Work with SCAR action/expert groups and research programmes to promote interdisciplinary science on ice sheet mass balance and sea level change, and new, interdisciplinary applications of geophysical data.
4. Use the SCAR-IASC international framework to improve access to polar geodetic and geophysical data, and to provide an international framework for maintaining, and potentially augmenting, the remote autonomous observational infrastructure established by the POLENET consortium.
5. Increase capacity through provision of technological 'best practices', open data access, and research training relevant to SERCE science.
6.

YEAR	WORKSHOP/SYMPOSIA	THEME SESSION	TRAINING	OUTREACH
2012	Earth Structure/Modeling	Earth – Cryo. Interactions SCAR OSC AGU		Logo Initiate Web site
2013	*Reconciling Observations and Models of Elastic and Viscoelastic Deformation due to Ice Mass Change*			Complete Web site
2014		Earth – Cryo. Interactions EGU SCAR OSC	GIA Training School	Training Video on web
2015	Data archiving & exchange GIA/GNSS Velocity Frame	Earth – Cryo. Interactions ISAES AGU	Autonomous Systems	Training Video on web
2016	Crustal motion rates: GPS vs GIA on laterally-varying earth	Earth – Cryo. Interactions EGU SCAR OSC	Cryoseismology Training School	Training Video on web

3. Outputs/Deliverables

i) Symposia and Workshops Sponsored/Co-Sponsored:

1. **SCAR Open Science Conference, Portland, USA, July, 2012: Thematic Science Session**
2. **SCAR meetings, Portland, USA, July, 2012: Expert workshop on assimilation of earth structure in GIA modelling; general open meeting for SERCE scientists**
3. **AGU, San Francisco, December, 2012**: ***Interactions Between The Solid Earth And Cryosphere***, Thematic Session. Convenors: Terry Wilson, Rick Aster, Douglas Wiens. Selected as a 'Hot Topic' by AGU program committee. 11/25 presentations by student/early-career researchers (44%). See 'Appendix A'.
4. **Ilullissat, Greenland 30 May - 2 June 2013, Ilulissat, Greenland:** ***Reconciling Observations and Models of Elastic and Viscoelastic Deformation due to Ice Mass Change*** **(http://wwwx.dtu.dk/Subsites/iag.aspx) See 'Appendix B'.**

   Co-Sponsors of this symposium were:
   - National Space Institute, Denmark (DTU Space)
   - Scientific Committee on Antarctic Research (SCAR) - Solid Earth Response and influences on Cryospheric Evolution Scientific Programme (SERCE) (provided the majority of travel funds for

students, early-career scientists, SCAR nation scientists)
- International Union of Geodesy and Geophysics (IUGG)
- International Lithosphere Program (ILP)
- Upper Mantle Dynamics and Quaternary Climate in Cratonic Areas (DynaQlim)
- EGU (student travel funds)
- NSF (travel funds for U.S. scientists)

This symposium attracted 60 scientists from across the globe, and gave the SERCE programme a significant profile beyond initial SCAR participants. It achieved two key parts of SERCE strategy: organizing meetings at the core of cross-disciplinary problems, and finding partners to co-fund activities in order to achieve the breadth and critical mass required to address the problems.

ii) Special Issue *'Lithosphere – Cryosphere Interactions'* to be published by the EGU open access journal ***Solid Earth***; paper submissions in the April – December, 2013, period. The editorial team for this issue includes C. Pascal (Ruhr Univ., Bochum), V. Klemann (GFZ, Potsdam), M. Poutanen (Finnish Geodetic Institute), and B. Vermeersen (TU Delft). These individuals are leaders of the DynaQlim ILP project and participants in SERCE. SERCE scientists have been invited to contribute papers to the volume.

iii) Education and Outreach Activities:

1. SERCE logo designed by consultant Megan Berg.
2. SERCE website design contracted to consultant Megan Berg.

4. Budgetary Implications

Expenditures

Of the original budget of $20,000:

1. $15k was spent on travel support for the Ilulissat symposium (payment to DTU, Denmark)
2. $5k has been allocated for logo and web site development.
    a. $220 has been billed for logo design.
    b. A contract for web site design by Megan Berg is in place; the remainder of the allocated funds are earmarked for contract payments.

An additional allocation of $5,000 was made to SERCE. These funds also were spent on travel support for the Ilulissat symposium (payment to DTU, Denmark).

Budget Request

2014:

This is a major year for SERCE, with thematic sessions/steering committee meetings planned for EGU and SCAR OSC, as well as our first 'training school' planned for September, 2014. Of these activities, support is *most important* for the training school. Funding to support the venue for the training school and travel for U.S. instructors and student/early career participants has been secured from the U.S. National Science Foundation (POLENET award to T. Wilson). To ensure that this is an *international* meeting, funds are needed from SCAR, and will also be sought from partner science programmes and from the EGU training school funding program.

Funding requests for these activities:

1. EGU: it is assumed that steering committee members will find their own funding to attend this meeting.

2. SCAR OSC / Steering Committee meeting: $5k is requested for travel support for SERCE steering committee members to attend.
3. GIA Training School:
    a. $5k is requested for travel support for non-U.S. instructors to participate.
    b. $15k is requested for travel support for students/early-career scientists and researchers from SCAR nations with limited research funding.

Total request: $25,000.

2015:

A key event for SERCE is the International Symposium on Antarctic Earth Sciences, planned for Goa, India. A thematic SERCE science session and a steering committee meting will be held at the ISAES meeting. SERCE will also plan a capacity-building activity for ISAES, which will provide a venue where typically all SCAR nations send earth scientists. The principal capacity-building activity will be a workshop demonstrating current technologies for autonomous geophysical instrument systems, and best practices for assembling and operating these systems at sites remote from research stations. SERCE will seek partnership (and, hopefully, additional funding) from the UNAVCO and IRIS/PASSCAL facilities, serving the GPS and seismic communities, respectively, to implement this workshop. To complement this technical workshop, we will organize an additional session on data management, archiving, and sharing, with the aim of identifying location and contact person, and negotiating access where necessary, for data from all Antarctic national sources.

Funding permitting, an expert workshop on establishing a '*Common Reference Frame for Comparison of GIA Models and GNSS Crustal Velocity Fields*' will be organized during 2015. Support for this activity will be sought from partner science programmes, using the successful strategy for the 2013 Greenland symposium.

Funding requests for these activities:

1. ISAES meeting: $15,000 requested for travel support for steering committee and workshop participants.
2. Expert workshop: $5,000 requested for travel support for workshop participants.

Total request: $20,000.

5. Future Plans

1. SERCE website content produced, website goes live: end 2013
2. Propose Solid Earth – Cryosphere session, EGU, Vienna, April 27 – May 2, 2014; ad hoc steering committee meeting.
3. Plan and implement Training School: *Glacial Isostatic Adjustment Training School*, Ohio State University Stone Laboratory, Gibralter Island (Lake Erie), Ohio. September , 2014.
4. Thematic Session/Steering Committee meeting: SCAR Open Science Conference, Auckland, New Zealand, 25 – 29 August, 2014
5. Thematic Session/Steering Committee meeting: SCAR International Antarctic Earth Science Symposium, Goa, India, 2015.
6. Convene 'expert workshop' on '*Common Reference Frame for Comparison of GIA Models and GNSS Crustal Velocity Fields*' in 2015.

Appendices

Appendix A: List of Presentations, SERCE Thematic Session, AGU, December, 2012

Appendix B: Final Programme of SERCE-sponsored symposium, Ilulissat, Greenland

AGU 2012, SESSION T33: INTERACTIONS BETWEEN THE SOLID EARTH AND CRYOSPHERE

WEDNESDAY, DECEMBER 05, 2012

T33I. T33I. Interactions Between the Solid Earth and Cryosphere I

View Session Details

Convener(s): Terry Wilson (Ohio State Univ), Richard Aster (New Mexico Inst Mining & Tech) and Douglas Wiens (Washington University)
1:40 PM - 3:40 PM; 308 (Moscone South)

1:40 PM - 1:55 PM	T33I-01. Geodetic observations of accelerating ice loss in Greenland *(Invited)* *Michael G. Bevis; Shfaqat A. Khan; Abel K. Brown; Eric C. Kendrick; John M. Wahr; Per Knudsen; Michael J. Willis; Tonie M. van Dam* View Presentation
1:55 PM - 2:10 PM	T33I-02. The combined use of GPS horizontal and vertical crustal motion measurements to study mass loss from glaciers in southeast Greenland *(Invited)* *John M. Wahr; Shfaqat A. Khan; Tonie M. van Dam; Lin Liu; Michiel R. van den Broeke* View Presentation
2:10 PM - 2:25 PM	T33I-03. The delayed mantle response to the present-day mass changes *Valentina R. Barletta; Andrea Bordoni* View Presentation
2:25 PM - 2:40 PM	T33I-04. GIA Modeling with 3D Rheology and Recent Ice Thickness Changes in Polar Regions *(Invited)* *Wouter Van Der Wal; Patrick P. Wu* View Presentation
2:40 PM - 2:55 PM	T33I-05. Glacial cycles drive variations in the production of oceanic crust *Richard F. Katz; John W. Crowley; Charles H. Langmuir* View Presentation
2:55 PM - 3:10 PM	T33I-06. Crust and Upper Mantle Structure of Antarctica from Rayleigh Wave Tomography *Douglas A. Wiens; David S. Heeszel; Xinlei Sun; Julien A. Chaput; Richard C. Aster; Andrew Nyblade; Sridhar Anandakrishnan; Terry J. Wilson; Audrey D. Huerta* View Presentation
3:10 PM - 3:25 PM	T33I-07. CRUSTAL THICKNESS ACROSS WEST ANTARCTICA FROM POLENET *Julien A. Chaput; Richard C. Aster; Andrew Nyblade; Douglas A. Wiens; Xinlei Sun; Audrey D. Huerta; Terry J. Wilson; Samantha E. Hansen; Sridhar Anandakrishnan* View Presentation
3:25 PM - 3:40 PM	T33I-08. Geophysical constraints on the controls for outlet-glacier velocity variability *(Invited)* *Meredith Nettles* View Presentation

THURSDAY, DECEMBER 06, 2012

T41B. T41B. Interactions Between the Solid Earth and Cryosphere II Posters

View Session Details

Convener(s): Terry Wilson (Ohio State Univ), Richard Aster (New Mexico Inst Mining & Tech) and Douglas Wiens (Washington University)
8:00 AM - 12:20 PM; Hall A-C (Moscone South)

8:00 AM - 8:00 AM	T41B-2581. 3D Lithosphere structure of the Antarctic plate and its implications on the plate evolution *Meijian An; Douglas A. Wiens; Yue Zhao; Mei Feng; Andrew Nyblade; Masaki Kanao; Yuansheng Li; Alessia Maggi; Jean-Jacques Lévêque* View Presentation
8:00 AM - 8:00 AM	T41B-2582. Estimates of Crustal Structure in Antarctica from S-Wave Receiver Functions *Cristo Ramirez; Andrew Nyblade; Samantha E. Hansen; David S. Heeszel; Douglas A. Wiens; Sridhar Anandakrishnan; Richard C. Aster; Audrey D. Huerta; Patrick Shore* View Presentation
8:00 AM - 8:00 AM	T41B-2583. Characterising Antarctic and Southern Ocean Lithosphere with Magnetic and Gravity Imaging of East Antarctic Rift Systems. *Alan P. Vaughan; Nicholas J. Kusznir; Fausto Ferraccioli; Tom A. Jordan; Michael E. Purucker; Alexander (Sasha) V. Golynsky; Irina Rogozhina* View Presentation
8:00 AM - 8:00 AM	T41B-2584. Residual topography and lithospheric structure of the Antarctic continent *Irene Molinari; Alexey Baranov; Stefania Danesi; Andrea Morelli* View Presentation
8:00 AM - 8:00 AM	T41B-2585. Dynamic topography over the Antarctic continent *Lester Anderson; Fausto Ferraccioli; Graeme Eagles; Bernhard M. Steinberger; Jeroen E. Ritsema* View Presentation
8:00 AM - 8:00 AM	T41B-2586. Characterization of lithospheric mantle of West Antarctica using mantle xenoliths from 1.4 Ma basalts of the Fosdick Mountains: Proposed research and preliminary results *Seth C. Kruckenberg; Christine S. Siddoway* View Presentation
8:00 AM - 8:00 AM	T41B-2587. Subglacial volcanic seismicity in Marie Byrd Land detected by the POLENET/ANET seismic deployment *Amanda C. Lough; Catherine G. Barcheck; Douglas A. Wiens; Andrew Nyblade; Richard C. Aster; Sridhar Anandakrishnan; Audrey D. Huerta; Terry J. Wilson* View Presentation
8:00 AM - 8:00 AM	T41B-2588. Volcanic rocks and subglacial volcanism beneath the West Antarctic Ice Sheet in the West Antarctic Rift System, (WAIS) from aeromagnetic and radar ice sounding - Thiel Subglacial Volcano as possible source of the ash layer in the WAISCORE *John C. Behrendt* View Presentation
8:00 AM - 8:00 AM	T41B-2589. Intraplate volcanism off South Greenland: Caused by glacial rebound? *Gabriele Uenzelmann-Neben; Daniela N. Schmidt; Frank Niessen; Ruediger H. Stein* View Presentation
8:00 AM - 8:00 AM	T41B-2590. Assessing the triggerability of glacier (icequake) seismicity *Jacob I. Walter; Zhigang Peng; Slawek M. Tulaczyk; Shad O'Neel; Jason M. Amundson* View Presentation
8:00 AM - 8:00 AM	T41B-2591. Modern Horizontal Crustal Motions in Victoria Land, Antarctica: Influence of Heterogeneous Earth Structure on Solid Earth Deformation *Stephanie A. Konfal; Terry J. Wilson; Michael G. Bevis; Eric C. Kendrick; Michael J. Willis* View Presentation
8:00 AM - 8:00 AM	T41B-2592. Vertical and horizontal surface displacements near Jakobshavn Isbræ driven by melt-induced and dynamic ice loss *Shfaqat A. Khan; Karina Nielsen; John M. Wahr; Michael G. Bevis; Lin Liu; Giorgio Spada; Tonie M. van Dam* View Presentation
8:00 AM - 8:00 AM	T41B-2593. Crustal uplift due to ice mass variability on Upernavik Isstroem, west Greenland *Karina Nielsen; Shfaqat A. Khan; Niels Korsgaard; Kurt Henrik H. Kjaer; John M. Wahr; Michael G. Bevis; Leigh A. Stearns; Lars H. Timm* View Presentation
8:00 AM - 8:00 AM	T41B-2594. Delineation of subglacial bedrock structure in glaciated regions using DEMs derived from stereoscopic satellite imagery: An example of the Land Glacier catchment, West Antarctica *Alexander.robertson M. Robertson; Ashley Contreras; Christine S. Siddoway; Matt Gottfried; Claire Porter* View Presentation
8:00 AM - 8:00 AM	T41B-2595. Use of stereoscopic satellite imagery for 3D mapping of bedrock structure in West Antarctica: An example from the northern Ford Ranges *Ashley Contreras; Christine S. Siddoway; Claire Porter; Matt Gottfried* View Presentation
8:00 AM - 8:00 AM	T41B-2596. Iceberg drift trajectory follows sea-floor spreading features *Sarah U. Neuhaus; Douglas R. MacAyeal* View Presentation
8:00 AM - 8:00 AM	T41B-2597. Geological structures deduced from airborne geophysical surveys around Syowa Station, Antarctica *Yoshifumi Nogi; Wilfried Jokat; Kazuya Kitada; Daniel Steinhage* View Presentation

International Symposium:
Reconciling Observations and Models of Elastic and Viscoelastic Deformation due to Ice Mass Change

30 May - 2 June 2013, Ilulissat, Greenland

Co-sponsors:
National Space Institute, Denmark (DTU Space)

Scientific Committee on Antarctic Research (SCAR)
- Solid Earth Response and influences on Cryospheric Evolution Scientific Programme (SERCE)

International Union of Geodesy and Geophysics (IUGG)

International Lithosphere Program (ILP)

Upper Mantle Dynamics and Quaternary Climate in Cratonic Areas (DynaQlim)

30 May 2013 (Thursday)	
17:00-18:00	Registration and reception

31 May 2013 (Friday)	**Presenter**	**Title**
08:30-08:35	Niels Andersen	Welcome
08:35-08:40	Matt King	Welcome
08:40-08:45	Terry Wilson	SCAR SERCE intro
08:45-08:50	Shfaqat Abbas Khan	Information

Session 1: Observations of present-day changes in glaciers and ice sheets and solid Earth response.
Convenors: Ingo Sasgen and Tavi Murray

Time	Presenter	Title
08:45-09:10	***(invited)*** **John Wahr, Michael Bevis, Shfaqat A. Khan, Tonie van Dam, Isabella Velicogna, Bert Wouters, Jan H. van Angelen, and Michiel van den Broeke**	**Can GRACE data be used to predict GPS crustal displacements in Greenland and Antarctica caused by the Earth's response to present-day mass variability?**
09:10-09:35	***(invited)*** **Michael Bevis, Shfaqat A. Khan, Abel Brown, John Wahr, Finn Bo Madsen, Eric Kendrick, Michael Willis**	**Greenland ice mass rates and accelerations: Implications from the crustal displacements recorded by GNET**
09:35-09:50	**Shfaqat A. Khan, John Wahr, Michael Bevis, Kurt Kjær and Michiel van den Broeke**	**Mass balance of the Greenland Ice Sheet during 2003-2012**
09:50-10:15	***(invited)*** **Kurt H. Kjær, K K. Kjeldsen, A. A. Bjørk, S A. Khan, N J. Korsgaard, S Funder, N K. Larsen, B Vinther, C S. Andresen, A J. Long, S A. Woodroffe, E S Hansen and J Olsen**	**Mass Loss of the Southern Greenland Ice Sheet since the Little Ice Age Maximum**
10:15-10:45	**Coffee Break**	
10:45-11:10	***(invited)*** **T. van Dam, O. Francis, and J. Wahr**	**Absolute Gravity versus Surface Uplift Observations in Greenland**

11:10-11:25	Manfred Stober, Jörg Hepperle, Paul Rawiel and Roman Wössner	Long-term GNSS investigations in changes of mass balance and ice dynamics in the Paakitsoq area (West Greenland)
11:25-11:40	Lin Liu, Shfaqat A. Khan, Masato Furuya, Michael Bevis, Howard Zebker	Accelerated ice mass loss of Upernavik Isstrom in 2010 from GPS bedrock uplift and SAR offset tracking measurements
11:40-11:55	(*invited*) Bert Wouters, Ingo Sasgen, Xavier Fettweis, Shfaqat A Khan, Michael Bevis, John Wahr, Jan v Angelen, Michiel v den Broeke	GPS signatures of the melt event 2012 in Greenland
11:55-12:10	Yuning Fu, Jeff Freymueller, and Donald Argus	Comparisons between GPS-measured and GRACE-modeled horizontal seasonal loading deformation
12:10-12:25	Keven Roy, Richard Peltier, Donald Argus and Rosemarie Drummond	ICE-6G (VM5a): A Geodetically Refined Global Model of Ice-Earth-Ocean Interactions
12:25-13:30	Lunch Break	
13:30-13:45	Matt King, Rory Bingham, Philip Moore, Pippa Whitehouse, Mike Bentley, Glenn Milne	Rates and patterns of Antarctic ice mass change from GRACE RL05 data
13:45-14:00	N. Schoen, V.R. Barletta, A. Bordoni	High resolution present-day ice changes and associated bedrock displacements over the West Antarctic Ice Sheet
14:00-14:15	Andrew Hooper, Amandine Auriac, Anneleen Oyen, Karsten Spaans, Freysteinn Sigmundsson, Peter Schmidt, Björn Lund, Matt King	High-resolution constraints on the response to ice load changes in the Antarctic Peninsula and Iceland, using radar interferometry
14:15-14:30	Michael J. Willis, Valentina R. Barletta, Andrew K. Melkonian, Matthew E. Pritchard, Claudio Berti and Joan Ramage	Ice Volume Loss and Predicted Crustal Motion Response at the Southern Patagonian Icefields, South America.
14:30-14:45	Halfdan Kierulf	Elastic Earth response due to present day ice mass changes in Svalbard
14:45-15:15	Coffee Break	
15:15-15:30	Wenliang Zhao, Falk Amelung, Tim Dixon, Shimon Wdowinski	Glacial Rebound Due to Present Day Ice Loss on Barnes Ice Cap Observed by Synthetic Aperture Radar Interferometry
15:30-15:45	Alexander Jarosch, Guðfinna Aðalgeirsdóttir, Amandine Auriac, Helgi Björnsson, Sverrir Guðmundsson, Sigrún Hreinsdóttir, Andy Hooper, Tómas Jóhannesson, Björn Lund, Eyjólfur Magnússon, Benedikt G Ófeigsson, Finnur Pálsson, Peter Schmidt, Freysteinn Sigmundsson, Erik Sturkell	Use of glacial isostatic rebound history to constrain changes in ice volume in Iceland since the Little Ice Age
15:45-16:05	Discussion	
16:05-16:30	8 poster presentations – 3 min each – max 2 slides Ashley Morris et al. Dynamic mass loss from Northwest Greenland, 1991-2011 Karina Nielsen et al. Vertical and horizontal surface displacements near Jakobshavn Isbræ driven by melt-induced and dynamic ice loss	

	Alessandra Borghi et al. Using the seasonal signal in GPS data to assess solid Earth elastic parameters at regional scale **Andrew Lloyd et al. Upper Mantle Structure Beneath the Whitmore Mountains, WARS, and Marie Byrd Land from Body-Wave Tomography** **Samantha E. Hansen Mantle Structure beneath Antarctica from Adaptively Parameterized P-wave Tomography** **Antony Memin et al Secular variations of geodetic observations at NyÅlesund, Svalbard, Norway** **Stephanie A. Konfal et al. Understanding the influence of heterogeneous earth structure on observations of GIA in Victoria Land, Antarctica using POLENET GPS data** **Matt King et al. Crustal motion in the southern Antarctic Peninsula (Palmer Land) from GPS**
16:30-17:30	**Poster viewing in poster hall – refreshment are served**
18:00-20:00	**Social dinner**

1 June 2013 (Saturday)

Session 2: Glacial Isostatic Adjustment (GIA) on a heterogeneous Earth: Going beyond 1D Maxwell Earth models.
Convenors: Wouter van der Wal and Glenn Milne

08:30-08:45	**Jacqueline Austermann, Jerry X. Mitrovica, Konstantin Latychev, Glenn A. Milne**	**The influence of high viscosity slabs on post-LGM sea-level change: the case of Barbados**
08:45-09:00	**Volker Klemann, Zdeněk Martinec**	**Lateral variations in lithosphere structure – Impact on GIA response**
09:00-09:25	***(invited)* Trine Dahl-Jensen**	**Large scale structure in the Greenland subsurface**
09:25-09:40	**Glenn A. Milne, Martin Wolstencroft, Konstantin Latychev, Jerry Mitrovica and Joseph Kuchar**	**Exploring the influence of more realistic Earth models on Greenland GIA predictions**
09:40-09:55	**Meredith Nettles**	**Seismic constraints on the crust and upper-mantle structure of Greenland**
09:55-10:25	**Coffee Break**	
10:25-10:40	**Hom Nath Gharti and Jeroen Tromp**	**Simulation of glacial isostatic adjustment using a spectral-element method coupled with an innite-element approach**
10:40-10:55	**David Al-Attar and Jeroen Tromp**	**Adjoint sensitivity kernels for GIA**
10:55-11:20	***(invited)* Douglas Wiens, David Heeszel, Xinlei Sun, Andrew Lloyd, Andrew Nyblade, Sridhar Anandakrishnan, Richard C. Aster, Julien Chaput, Audrey Huerta, Terry Wilson**	**New Antarctic Seismic Structure Models and Implications for Glacial Isostatic Adjustment**
11:20-11:35	**Geruo A, John Wahr, Shijie Zhong**	**Computations of the viscoelastic response of a 3-D compressible Earth to surface loading: an application to Glacial Isostatic Adjustment in Antarctica**
11:35-11:50	**Wouter van der Wal, Auke Barnhoorn, Patrick Wu**	**GIA model with composite rheology and 3D temperature variations applied to polar regions**

11:50-12:10	**Discussion**
12:10-12:20	**Shfaqat Abbas Khan + trip guide fieldtrip information**
12:15-13:15	**Lunch Break**
13:15-17:00	**Fieldtrips (#1 Boat trip, #2 Walk to UNESCO World Heritage Site)**

Boat trip


Walk to UNESCO World Heritage Site


2 June 2013 (Sunday)

Session 4: Reconciling models and observations of GIA
Convenors: Pippa Whitehouse and Terry Wilson

08:30-08:45	**Per-Anders Olsson, Jonas Ågren, Hans-Georg Scherneck**	**Investigation of different methods to handle the direct attraction from sea level variations in GIA modelling of the surface gravity change**
08:45-09:00	**Reinhard Dietrich, Axel Ruelke, Andreas Groh, Heiko Ewert, Ralf Rosenau, Mirko Scheinert**	**Vertical crustal deformations in West Greenland caused by ice mass changes at different time scales**
09:00-09:25	**(*invited*) Giorgio Spada**	**Modeling glacial and post-glacial rebound in Greenland**
09:25-09:40	**Gabriella Ruggieri and Giorgio Spada**	**Uncertainty of the GIA-induced crustal movements in Greenland**
09:40-09:55	**Lecavalier Benoit, Glenn Milne, Leanne Wake, Matthew Simpson, Kristian K. Kjeldsen, Svend Funder, Sarah Woodroffe,**	**Calibrating a model of the Greenland ice sheet from the last glacial maximum to present**

	Antony Long, Philippe Huybrechts, Lev Tarasov, Arthur Dyke	
09:55-10:10	Isabella Velicogna, Tyler Sutterley, Eric Rignot, Michiel van den Broeke, Beata Csatho, John Wahr, Glen Milne, Erik Ivins	Evaluate glacial isostatic adjustment models using Ice mass balance estimates from GRACE, InSAR, altimetry, and regional atmospheric climate model output
10:10-10:40	Coffee Break	
10:40-10:55	Anneleen M. Oyen, Andy Hooper, Matt King	Observing ice load change-induced bedrock uplift in the Antarctic Peninsula by means of radar interferometry
10:55-11:10	J. Näränen, J. Mäkinen, S. Nyberg, H. Koivula, and M. Poutanen	Absolute gravity and CGPS measurements in Dronning Maud Land – signatures of Glacial Isostatic Adjustment, contemporary ice load, and close-field snow attraction
11:10-11:25	Terry Wilson, Michael Bevis, Eric Kendrick, Stephanie Konfal, Ian Dalziel, Robert Smalley, Michael Willis, David Heeszel, Douglas Wiens	*In Situ* Observational Constraints on GIA in Antarctica
11:25-11:40	Pippa Whitehouse, Mike Bentley, Matt King, Glenn Milne, Grace Nield, Phil Moore, Rory Bingham	GIA modelling in Antarctica: where do we go from here?
11:40-11:55	Natalya A. Gomez, David Pollard, Jerry X. Mitrovica	A coupled ice sheet – sea level model applied to Antarctica through the last 40,000 years
11:55-12:20	(*invited*) Lev Tarasov	Quantifying and reducing uncertainty in deglacial ice sheet evolution
12:20-12:40	Discussion	
12:40-13:40	Lunch Break	

Session 3: Cryospheric Deformation in Low Viscosity Regions
Convenors: Erik R. Ivins, Jeff Freymueller and Mark Tamisiea

13:40-13:55	Ove C. D. Omang	Do late Holocene ice-mass variations explain the "extra" uplift and gravity change observed in Ny-Ålesund, Svalbard?
13:55-14:10	V.R. Barletta, A. Bordoni , J. Nilsson, L. S. Sørensen	Viscoelastic uplift rates in SE-Greenland and Iceland caused by ice changes since Little Ice Age.
14:10-14:25	Giorgio Spada and Francesco Mainardi	Modeling low-viscosity and transient rheology layers in a global Earth
14:25-14:40	Jeffrey T. Freymueller, Yan Hu, Yuning Fu, Anthony Arendt	Estimating Earth Rheology from Measurements of GIA in Southeast Alaska Under Changing Present-day Ice Melting
14:40-15:05	(*invited*) Andreas Groh, Heiko Ewert, Mirko Scheinert, Mathias Fritsche, Axel Rülke, Andreas Richter, Ralf Rosenau, Reinhard Dietrich	Glacial Isostatic Adjustment over the Amundsen Sea Sector, West Antarctica – geodetic observations versus model predictions

15:05-15:35	**Coffee Break**	
15:35-15:50	**Grace Nield, Valentina Barletta, Andrea Bordoni, Matt King, Pippa Whitehouse, Peter Clarke, Eugene Domack**	**Estimation of Antarctic Peninsula rheology from viscoelastic modelling constrained by GPS observations**
15:50-16:05	**C.K. Shum, Zhenwei Huang, Chungyen Kuo, Junyi Guo, Jianbin Duan, Patrick Wu**	**Role of Seafloor Glacial Isostatic Adjustment Process in the Present-Day Sea-Level Budget Closure**
16:05-16:20	**Hannes Konrad, Ingo Sasgen, Malte Thoma, Volker Klemann, Klaus Grosfeld, and Zdeněk Martinec**	**Ice sheet and ice shelf simulations with a fully coupled ice sheet – solid Earth model**
16:20-16:35	**Shijie Zhong**	**A Unified Framework for Numerical Modeling Earth's Viscoelastic Response to Surface Loads at Regional and Global Scales**
16:35-16:55	**Discussion**	
16:55-17:00	**Closing**	