The Polar CLIMATE **SvalGlac** Project
Sensitivity of Svalbard Glaciers to Climate Change
Scientific Steering Committee Meeting
10 October 2010: 9.00-11.30 AM
in Gdynia at the Maritime University
Minutes

1. **Welcome and Introduction**

The SC Meeting was chaired by Jacek Jania – Coordinator and Francisco Navarro – Co-Coordinator.
The Coordinator welcomed everyone to the meeting and asked for round table presentation of participants: Partners, Associated Partners and observers.

Participants:
Jacek Jania, **Poland** (PI) – Coordinator, Joanna Szafraniec – Coordination Office Scientific Secretary, Piotr Głowacki – Research Team Leader and Mariusz Grabiec - Project Researcher, WG Leader;
Francisco Navarro, **Spain** (PI) – Co-Coordinator;
Daniela Mansutti **Italy** (PI);
Dieter Scherer, **Germany** (PI), Christoph Schneider – Research Team Leader Marco Möller - Project Researcher, Roman Finkelnburg - Project Researcher;
Friedrich Obleitner, **Austria** (PI), Florian Karner - Project Researcher;
Veijo Pohjola, **Sweden** (PI)
John Moore, **Finland** (PI), Martina Schäfer – Project Researcher;
Emilie Beaudon,
Tõnu Martma, **Estonia** (Representative of PI, Project Researcher;)
Jon Ove Hagen, **Norway** (PI) – Associated Partner,
Robert McNabb, **USA** (Representative of PI) – Associated Partner

Observers: Antoine Kies, Krzysztof Makowski, Krystyna Kozioł, Tadeusz Pastusiak.

2. **Adoption of the agenda**

Proposed agenda (Appendix 1) and the aim of the meeting were presented and accepted by Members of the Steering Committee.

3. **Reports on project progress and field work in 2010 – National Representatives**

Spain field activity – Francisco Navarro:

- Field activity of the Russian-Spanish team in the spring time of 2010 (28 March-21 April 2010) in Barentsburg area.
- Participants: Yury Macheret (Science leader), Ivan Lavrentiev (reponsible for logistics), Evgeny Vasilenko and Francisco Machío (responsible for equipment and fieldwork).
- Scientific/technical objectives: new GPR equipment testing (VIRL-7) and full radio-echo sounding of Vestre/Austre Gronfjordbreen and Tavlebreen.
- Logistics: support by Barentsburg research station (Russ. Acad. Sc.), and partly Arcticugol, 2 snowmobiles for fieldwork.
- Total length of GPR profiles: ~197 km.
- VIRL7 GPR equipment tests on **Aldegondabreen** on 6/04/2010.
- **Tavlebreen**, 8 and 12/04/2010 – VIRL6/VIRL7 20 MHz, Ramac/GPR 100 & 200 MHz.

Length of GPR profiles: total: 33.5 km, VIRL 6/7: 8.5 km, Ramac 100: 18 km, Ramac 200: 7 km.
- **Vestre/Austre Gronfjordbreen**, 14 and 16/04/2010, VIRL6 20 MHz, Ramac/GPR 100 MHz. Length of profiles: total: 163 km, VIRL 6: 53 km (Austre) and 65 km (Vestre), Ramac 100: 45 km.

http://svalglac.eu/reports.htm

Italy activity – Daniela Mansutti:
- Collection of papers from literature on the study of subglacial lakes in polar regions.
- Collection of the existing mathematical models for ice dynamics in the cases of temperate, cold and polythermal ice with focus on the temperate case.
- Study of the accumulation/ablation law at the air/ice interface (dependence of parameters from climate/other local factors).
- Study of the interaction between sliding at the ice/bedrock interface and ice/water phase transition.
- Computational code: construction of the logical (nested) structure of the blocks, choice of thevisualization tool, treatment of irregular boundaries within discretization of the differential system of equations, etc.
- Italian team: Daniela Mansutti, Edoardo Bucchignani, Alessandro Forieri, Maria M. Cerimele, Sauro Succi, Giuseppe Pontrelli.

http://svalglac.eu/reports.htm

Norway – Jon Ove Hagen:
Norwegian team provided data from Austfonna – continuation of fieldwork in spring 2010 (with support from the Norwegian research Council to the IPY Glaciodyn project and the EU-project Ice2Sea); maintained network of mass balance stakes over the ice cap, maintained three Automatic Weather Stations, measured by GPS elevation profiles across the ice cap and measured the snow distribution, maintained ten continuous GPS stations along the flow line of two fast-flowing outlets from the ice cap.

Austria activities in 2010 (Mass and energy balance of Kongsvegen glacier) – Friedrich Obleitner, Florian Karner, Florian Bilgeri (Institute of Meteorology and Geophysics, Innsbruck University, Austria):
- Feb 2010: formal start of project.
- Mar 2010: participate in IASC workshop and 1st SVALGLAC meeting (07Mar2010, Obergurgl, Austria).
- Mar – Apr 2010: preparation of Kongsvegen field work.
- 16Apr – 02May 2010: perform Kongsvegen fieldwork (see below).
- May – July 2010: reanalysis of existing data 2003 – 2009 pilot studies on the use of multisource meteorological data for mass balance modeling.
- 02 – 07 May 2010: participation at EGU General Assembly 2010, Vienna, Austria.
- Aug 2010: begin PhD project (Florian Karner).
- Sep 2010: continue development of Kongsvegen data base, participate in 24th International Polar Meeting of the German Society of Polar Research 06 Sep 2010, Obergurgl, Austria.
- Develop a project specific homepage: http://imgi.uibk.ac.at/iceclim/Polar_research.

Austrian field activity "Mass and energy balance of Kongsvegen glacier" – Friedrich Obleitner:
- Objectives: develop input and verification data for computation of energy and mass balance of the glacier, install a spatially distributed network of meteorological and glaciological measurements along the glacier.

- Timetable: reanalyze existing datasets and develop measurement concepts (February / March 2010), develop instrumentation (March / April 2010), organize transport of equipment and field measurement logistics (April 2010), perform field work (16 April 2010 until 02 May 2010).
- Participants: Florian Karner (Innsbruck University), Florian Bilgeri (Innsbruck University), Jack Kohler (Norwegian Polar Institute, Tromsoe).
- Results: measurement setup at Kongsvegen glacier: AWS (Automatic Weather Station), EBS (Energy Balance Station), Automatic Camera, Thermistor String. For further details (about locations and parameters) see: http://svalglac.eu/reports.htm

Finland – John Moore:

- Modelling of the snow drifting processes (lack of energy information in model) – first in the Scharffenbergbotnen area in Antarctica with respect to the formation of blue ice areas and then also in the Vestfonna area – to improve the understanding of the mass balance, and hence fresh-water flux from the ice caps on Svalbard.

Sweden – Veijo Pohjola:

- field activity at Lomonosovfonna and Vestfonna – GPS survey (Nordenskioldbreen) to predict mean velocities (C. Tijm-Raijner), radar profiles (R. Peterssen), temperature changes (AWS);
- modelling of the climate change in the future;
- the Nordenskioldbreen recession;
- improve model – ice thickness by radar measurements in 2010 + GPS data;
- needed drilling;
- modelling of atmospere parameters;
- needed ice volume measurements, especially in NE Spitsbergen (lack of data);
- needed short-time interval meassure of velocities – very important to predict diurnal cycle of velocity (comment).

Estonia – Tõnu Martma:

- equipment – TC/EA (High Temperature Conversion Elemental Analyzer) with liquid injector to ice core studies (needed only 0,002 ml of water as a sample) and the Picarro Isotopic Water Analyzer, L2120;
- monitoring program on Lomonosovfonna/Nordenskiöldbreen together with colleagues from Norwegian polar institute and from Utrecht University – spring field activity; the network of 11 GPS stations, and the automatic weather station was maintained, a number of snow pits were sampled and made a bedrock mapping using radio- echo sounding.

Germany – Christoph Schneider and Dieter Scherer:

Field campaign spring 2010 – German SvalGlac Partners:

- 9 – 26 May 2010.
- Participants on the spring 2010 field campaign: Roman Finkelnburg, TU Berlin, Marco Möller, RWTH Aachen University, Rebecca Möller, RWTH Aachen University, Albert Polze, TU Berlin; associated colleagues: Matthias Braun, University of Alaska Fairbanks, Regine Hock, University of Alaska Fairbanks, Veijo Pohjola, Uppsala University, Dieter Scherer, TU Berlin, Christoph Schneider, RWTH Aachen University.
- Conducted fieldwork: repair and maintenance of 1 automatic weather station – on the NW ramp of Vestfonna (~370 m asl), maintenance of 1 automatic weather station – on De Geerfonna (~240 m asl), data download at automatic weather stations, maintenance of parts of the ablation stake network on Vestfonna (8 stakes on the NW ramp between ~240 and

~370 m asl). Stakes located above the AWS (>370 m asl) could not be visited due to logistical limitations, digging of 2 snow pits at the AWS locations on Vestfonna and De Geerfonna for snow profile assessment (stratigraphy, density, temperature, hardness and grain type).

- Preliminary results:
  - Snow pack thickness at the AWS on Vestfonna (~370 m asl) was ~90 cm above glacier ice. This was more than in 2009 (~70 cm) but less than in 2008 (~110 cm).
  - Snow pack thickness at the AWS on De Geerfonna (~240 m asl) was ~120 cm above glacier ice. This was comparable to 2009 and slightly less than in 2008 (~130 cm).
  - Snow pack thickness on De Geerfonna seems to be higher than on comparable elevations on Vestfonna. It is suggested that differences are due to snow drift.
  - Due to problems with snow depth sensors and a polar bear we lost all winter 2009/2010 data at the AWS on Vestfonna and continuous snow depth data at the AWS on De Geerfonna.
  - Report on De Geerfonna AWS records: 96% of the air temperature measurements were below 0°C during this period (9/2009-4/2010) with a mean value of -9.9°C and a minimum of -33.4°C. The mean wind direction was SE (124°) with a mean wind speed of 5.9 m/s and a maximum of 25.8 m/s. The relative humidity was always above 70% with a mean of 93%. Net radiation measurements return a mean of -20.5 W/m2.

Field campaign summer 2010 – German SvalGlac Partners:

- 12 – 28 August 2010.
- Participants on the summer 2010 field campaign: Roman Finkelnburg, TU Berlin, Marco Möller, RWTH Aachen University, Christoph Schneider, RWTH Aachen University; associated colleagues: Matthias Braun, University of Alaska Fairbanks, Regine Hock, University of Alaska Fairbanks, Veijo Pohjola, Uppsala University, Dieter Scherer, TU Berlin.
- Conducted fieldwork: maintenance of 1 automatic weather station – on the NW ramp of Vestfonna (~370 m asl), maintenance and extension of 1 automatic weather station – on De Geerfonna (~240 m asl), data download at automatic weather stations, maintenance of parts of the ablation stake network on Vestfonna (8 stakes on the NW ramp between ~240 and ~370 m asl). Stakes located above the AWS (>370 m asl) could not be visited due to logistical limitations, maintenance of the ablation stake network on De Geerfonna (6 stakes between ~210 and ~270 m asl), digging of 2 snow pits at the AWS locations on Vestfonna and De Geerfonna for snow profile assessment (stratigraphy, density, temperature, hardness and grain type).
- Preliminary results:

– Fresh snow depth on Vestfonna was between ~5 cm (~240 m asl) and ~25 cm (~370 m asl) above glacier ice.
– Fresh snow depth on De Geerfonna was between ~25 cm (~210 m asl) and ~50 cm (~270 m asl) above glacier ice. Bare ice could sporadically be observed on the lower part of the glacier.
– Due to problems with snow depth sensors we lost the summer 2010 continuous snow depth data at both AWS (Vestfonna and De Geerfonna).
– Report on De Geerfonna AWS records: 58% of the air temperature measurements were above 0°C during this period (5/2010-8/2010) with a mean value of +0.8°C and a maximum of +15.9°C. The mean wind direction was N (7°) with a mean wind speed of 2.9 m/s and a maximum of 15.8 m/s. The relative humidity was always above 42% with a mean of 85%. The net radiation measurements gave a mean of 16.9 W/m2.
– Report on Vestfonna AWS records: 48% of the air temperature measurements were above

0°C during this period (5/2010-8/2010) with a mean value of -0.3°C and a maximum of +11.4°C. The mean wind direction was SE (152°) with a mean wind speed of 3.6 m/s and a maximum of 19.4 m/s. The relative humidity was always above 43% with a mean of 87%. Net radiation measurements return a mean of 22.6 W/m2.

http://svalglac.eu/reports.htm and also: Project progress

Poland – Jacek Jania:

- field activity at Hansbreen and Werenskioldbreen – 3 AWS on Hansbreen, from July 2010 – measurement at the sea level, 2 AWS on Werenskioldbreen, 2 compaigns – April and Aug/Sep 2010; assessment of Hansbreen calving – using camera recording the front position of the glacier; using sonar from „Horizont II" - elevation of ice cliff (many of Hornsund basin glaciers);
- remote sensing data;
- data analysis;
- implementation of authomatic observations;
- coordination of the project.

4. **SvalGlac web site (http://svalglac.eu/) and TU-Berlin Knowledge Base (http://www.klima.tu-berlin.de/KB/SvalGlac/impressum.php)**

Presentation both of web sites (Joanna Szafraniec, Roman Finkelnburg) was done. They are complimentary. Both are appreciated and acknowledged.

5. **ESF Polar CLIMATE reporting**

Lack of the ESF-EPB template for one-year report (not prepared yet). It will be distributed to Partners and Associated Partners when received from EPB.

6. **Places and dates of the SC meetings in 2011**

Oslo, October 2011, after/during the next IGS Nordic Branch Meeting.

7. **Working Groups – plan of activities and fieldwork in 2011 (spring and summer)**
    - Ground Penetrating Radar (GPR) – Mariusz Grabiec

Archive and recent field sounding results - data list has to be prepared. Consultations between partners on processing and interpretation on recently acquired data would be useful. Cooperation with other groups in relation to interpretation of shallow and deeper sounding profiles is recommended.

- Ice coring – Rein Vaikmäe

Polish group intend to learn drilling and sampling procedures. Shallow drilling campaign on Amundsenisen and outflow glaciers is suggested to be planned for spring 2011 or 2012.

- Remote sensing – Jacek Jania

Metadata on availability of satellite images within the SvalGlac consortium would be useful to be compiled. What we have in our archives? Selection of images from cloudless days, especially for late ablation seasons. Matthias Broun – plenty of data to use.

- Mass balance and Atmospheric Weather Stations (AWS) – Friedrich Obleitner

Next field work at Kongsvegen glacier is planned April/May 2011 and will be focused on snow investigations mainly.

- Atmosphering modeling – Dieter Scherer

Austria, Sweden, Norway, Poland, Germany, the Netherlands
Suggestion of meeting in 2011 to develop the work plan.
Preparing of manuscript of joint paper.
Discussion on validation of models has to be developed, including glaciological data.

- Modeling - dynamics – Francisco Navarro

Glacier dynamics modeling group: members – Bucchignani, Edoardo (Italy), Cerimele, Maria Mercede (Italy), Corcuera, María Isabel (Spain), Cuadrado, María Luisa (Spain), Dunse, Thorben (Norway), Forieri, Alessandro (Italy), Mansutti, Daniela (Italy), Navarro, Francisco (Spain), Otero, Jaime (Spain), Schäfer, Martina (Finland).
Italian team: 2D-modelling of Amundsenisen icefield; with focus on the free-boundary Stefan problem of melting at the ice-bed interface in the area of the suspected subglacial lake.
Spanish team: 3D full-Stokes (Elmer) modelling of dynamics of the whole Amundsenisen icefield. Aim: defining flowline geometry and boundary data to be supplied to 2D-modelling by Italian team; 2D/3D-modelling of dynamics/calving of Hansbreen.
Finnish team: present-day full-Stokes simulations (Elmer) of Vestfonna ice-cap. Next step: prognostic simulations. Next: surge-calving-toy-model of Paierlbreen?
Polish team: involved in many of the above as field data suppliers and interpretation of results.
Norwegian team (associated partner): involvement yet to be defined.
http://svalglac.eu/reports.htm

8. **Other issues**

New thematic group on snow modeling was discussed. Continuation of contacts of people interested in cooperation in this field is planned by e-mails.

Coordinator and Co-coordinator expressed thanks to participants for active participation and closed the meeting.