KARTHAUS-2011 / GLACIERS AND ICE SHEETS IN THE CLIMATE SYSTEM
Provisional programme, March 2011

Exercises and computer projects

The 36 participants are divided into 12 teams. In the first part of the afternoon, 6 teams do exercises, supervised by the teacher indicated in the programme. Meanwhile, the other 6 teams work on computer projects. In the second half of the afternoon the teams switch. A particular team of 3 students works on the same project during the entire course, guided by a teacher. At the end of the course there will be 15-minute presentations on the outcome of the projects.

Lecturers: Th. Blunier, M. van den Broeke, C. Buizert, D. Dahl-Jensen, A. Fowler, R. Giesen, H. Gudmundsson, A. Jenkins, G. Milne, T. Moelg, J. Oerlemans, A. Stroeven, R. van de Wal, F. Paul, A. Vieli

Excursion: J. Abermann, M. Kuhn

Tuesday 13

Afternoon	**Arrival / check-in**
19:30	DINNER

Wednesday 14

09:00 – 09:30	Welcome / practical announcements *(Oerlemans)*
09:30 – 10:20	Continuum mechanics-I *(Gudmundsson)*
10:20 – 10:40	coffee break
10:40 – 11:30	Continuum mechanics-II *(Gudmundsson)*
11:40 – 12:40	5-min presentations by students
13:00	LUNCH
14:00 – 16:00	Exercises for all groups *(Gudmundsson)*
16:00 – 16:30	coffee break
16:30 – 17:30	5-min presentations by students
19:30	DINNER
21:00 – 22:00	5-min presentations by students

Thursday 15

08:30 - 09:20	Commonly used approximations in ice flow modelling *(Gudmundsson)*
09:30 - 10:20	Ice as a material, rheology *(Dahl-Jensen)*
10:20 - 10:40	coffee break
10:40 - 11:30	Polar meteorology *(Van den Broeke)*
11:40 - 12:40	The mass budget of the Greenland and Antarctic ice sheets *(Van den Broeke)*
13:00	LUNCH
14:00 – 15:30	Exercises for all groups *(Dahl-Jensen)*
15:30 - 16:00	coffee break
16:00 - 17:30	Exercises for all groups *(Van den Broeke)*
19:30	DINNER

Friday 16

08:30 - 09:20	Thermodynamics *(Dahl-Jensen)*
09:30 - 10:20	Analytical ice-sheet models *(Oerlemans)*
10:20 - 10:40	coffee break
10:40 - 11:30	Introduction to geodynamics *(Milne)*
11:40 - 12:30	Interaction between ice sheets and the solid earth *(Milne)*
12:45	LUNCH
14:00 - 15:30	Group II: exercises *(Milne)* / Group I: computer projects
15:30 - 16:00	coffee break
16:00 - 17:30	Group I: exercises *(Milne)* / Group II: computer projects
19:30	DINNER
21:30	Special evening lecture: **xxxxx**

Saturday 17

08:30 - 09:20	What can we learn from glacial rebound? *(Milne)*
09:30 - 10:20	Geophysical methods in glaciology I *(Eisen)*
10:20 - 10:40	coffee break
10:40 - 11:30	Geophysical methods in glaciology II *(Eisen)*
11:40 - 12:30	Sliding *(Fowler)*
12:45	LUNCH
14:00 – 14:50	Glacier hydrology *(Fowler)*
15:00 – 15:30	History of glaciological research at Hintereisferner *(Kuhn)*
15:30 – 16:00	Introduction to the excursion *(Abermann)*

19:30	DINNER

Sunday 18 **Excursion to the glaciers of the Oetztal Alps** *(Abermann, Kuhn)*

Monday 19

08:30 - 09:20	Introduction to glacial geomorphology *(Stroeven)*
09:30 - 10:20	Basal processes and geomorphology *(Fowler)*
10:20 - 10:40	coffee break
10:40 - 11:30	Geomorphology and mapping of paleo-ice sheets *(Stroeven)*
11:40 - 12:30	Overview of numerical methods in glacier modeling *(Vieli)*
12:45	LUNCH
14:00 - 15:30	Group I: exercises *(Fowler)* / Group II: computer projects
15:30 - 16:00	coffee break
16:00 - 17:30	Group II: exercises *(Fowler)* / Group I: computer projects
19:30	DINNER

Tuesday 20

08:30 - 09:20	Tidewater glaciers *(Vieli)*
09:30 - 10:20	Mapping glaciers from space *(Paul)*
10:20 - 10:40	coffee break
10:40 - 11:30	Interaction of ice shelves with the ocean-I *(Jenkins)*
11:40 - 12:30	Interaction of ice shelves with the ocean-II *(Jenkins)*
12:45	LUNCH
14:00 - 15:30	Group II: exercises *(Jenkins)* / Group I: computer projects
15:30 - 16:00	coffee break
16:00 - 17:30	Group I: exercises *(Jenkins)* / Group II: computer projects
19:30	DINNER

Wednesday 21

08:30 – 09:20	Interaction of ice shelves with the ocean-III *(Jenkins)*
09:30 – 10:20	Densification of firn *(Buizert)*
10:20 – 10:40	coffee break
10:40 – 11:30	Diffusion of gases and stable isotopes of water in the firn *(Buizert)*
11:40 – 12:30	Ice cores I *(Blunier)*
12:45	LUNCH
	Afternoon free
19:30	DINNER

Thursday 22

08:30 - 09:20	Ice cores II *(Blunier)*
09:30 - 10:20	The microclimate of glaciers *(Oerlemans)*
10:20 - 10:40	coffee break
10:40 - 11:30	Tropical glaciers and climate dynamics *(Moelg)*
11:40 - 12:30	Modeling glacier mass balance *(Giesen)*
12:45	LUNCH
14:00 - 15:30	Group II: computer projects
15:30 - 16:00	coffee break
16:00 - 17:30	Group I: computer projects
19:30	DINNER

Friday 23

08:30 - 09:20	Inverse modelling *(Gudmundsson)*
09:30 - 10:20	The response of glaciers to climate change *(Oerlemans)*
10:20 - 10:40	coffee break
10:40 - 11:30	Computer projects (computers for Group I)
11:40 - 12:30	Computer projects (computers for Group II)
12:45	LUNCH
14:00 - 15:30	Presentation of computer projects (6x)
15:30 - 16:00	coffee break
16:00 - 17:30	Presentation of computer projects (6x)
17:30 - 18:00	Discussion
19:30	DINNER

Saturday 24 **Departure**

Computer projects

The organizing committee will make a proposal about the distribution of students over the projects. The list will be posted on the first day of the course. Some (limited) changes can then be made before the projects start on friday.
A number of Mac's will be available in a local network. Participants may also bring their own laptops. We will have a wireless net to have ties with the outside world. Practice has shown that these ties are not very fast.

GROUP I:

Project 1: Remote sensing I *(Paul)*
Project 2: Sea level and geodynamics *(Milne)*
Project 3: Mass balance modelling *(Moelg)*
Project 4: Inverse modelling *(Gudmundsson)*
Project 5: Ice shelf – ocean interaction I *(Jenkins)*
Project 6: Geophysical methods *(Eisen)*

GROUP II:

Project 7: Ice/firn cores I *(Buizert)*
Project 8: Ice/firn cores II *(Buizert)*
Project 9: Remote sensing II *(Paul)*
Project 10: Glacier flow model *(Giesen)*
Project 11: Glacial geomorphology *(Stroeven)*
Project 12: Polar meteorology *(Van den Broeke - Giesen)*