

# KARTHAUS-2008 / GLACIERS AND ICE SHEETS IN THE CLIMATE SYSTEM PROGRAMME, status 10 July 2008

## Exercises and computer projects

The 36 participants are divided into 12 teams. In the first part of the afternoon, 6 teams do regular exercises, provided and 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:** D. Dahl-Jensen, H. Fischer, A. Fowler, A. Jenkins, H. Gudmundsson, K. Lambeck, J. van den Berg, M. Helsen, T. Moelg, O. Eisen, M. van den Broeke, R. van de Wal, G. Kaser, J. Oerlemans

### Tuesday 9

Afternoon	Arrival / check-in
19:30	DINNER

### Wednesday 10

09:00 – 09:30	Welcome / practical announcements ( <i>Oerlemans, Kaser</i> )
09:30 – 10:20	Ice in the climate system - an introduction ( <i>Oerlemans</i> )
10:20 – 10:40	coffee break
10:40 – 11:30	Continuum mechanics-I ( <i>Gudmundsson</i> )
11:40 – 12:30	Continuum mechanics-II ( <i>Gudmundsson</i> )
12:45	LUNCH
14:00 – 16:00	Exercises for all groups ( <i>Gudmundsson</i> )
16:00 – 16:30	coffee break
16:30 – 17:30	5-min presentations by students
19:30	DINNER

### Thursday 11

08:30 - 09:20	Plane shearing flow ( <i>Gudmundsson</i> )
09:30 - 10:20	Ice as a material, rheology ( <i>Dahl-Jensen</i> )
10:20 - 10:40	coffee break
10:40 - 11:30	Analytical ice-sheet models ( <i>Oerlemans</i> )
11:40 - 12:40	5-min presentations by students
13:00	LUNCH
14:00 - 15:30	Group I: exercises ( <i>Dahl-Jensen</i> ) / Group II: computer projects
15:30 - 16:00	coffee break
16:00 - 17:30	Group II: exercises ( <i>Dahl-Jensen</i> ) / Group I: computer projects
19:30	DINNER
21:00 - 22:00	5-min presentations by students

### Friday 12

08:30 - 09:20	Thermodynamics of ice sheets ( <i>Dahl-Jensen</i> )
09:30 - 10:20	Introduction to geodynamics ( <i>Lambeck</i> )
10:20 - 10:40	coffee break
10:40 - 11:30	Interaction of ice shelves with the ocean-I ( <i>Jenkins</i> )
11:40 - 12:30	Interaction of ice shelves with the ocean-II ( <i>Jenkins</i> )
12:45	LUNCH
14:00 - 15:30	Group II: exercises ( <i>Jenkins</i> ) / Group I: computer projects
15:30 - 16:00	coffee break
16:00 - 17:30	Group I: exercises ( <i>Jenkins</i> ) / Group II: computer projects
19:30	DINNER
21:30	<u>Special lecture:</u> <i>Jakob Abermann</i> (Mass changes of the Oetztal glaciers)

### Saturday 13

08:30 - 09:20	Interaction between ice sheets and the solid earth ( <i>Lambeck</i> )
09:30 - 10:20	What can we learn from glacial rebound? ( <i>Lambeck</i> )
10:20 - 10:40	coffee break
10:40 - 11:30	Interaction of ice shelves with the ocean-III ( <i>Jenkins</i> )
11:40 - 12:30	Extra-terrestrial ice ( <i>Dahl-Jensen</i> )
12:45	LUNCH
14:00 - 14:50	Sliding ( <i>Fowler</i> )
15:00 - 15:50	<u>Special lecture:</u> <i>Michael Kuhn</i> (History of glaciological research on Hintereisferner)
19:30	DINNER

**Sunday 14****Excursion to the glaciers of the Oetztal Alps** (*Abermann, Kaser, Kuhn*)**Monday 15**

08:30 - 09:20	Glacier hydrology ( <i>Fowler</i> )
09:30 - 10:20	Basal processes and geomorphology ( <i>Fowler</i> )
10:20 - 10:40	coffee break
10:40 - 11:30	Geophysical methods in glaciology I ( <i>Eisen</i> )
11:40 - 12:30	Geophysical methods in glaciology II ( <i>Eisen</i> )
12:45	LUNCH
14:00 - 15:30	Group I: exercises ( <i>Fowler</i> ) / Group II: computer projects
15:30 - 16:00	coffee break
16:00 - 17:30	Group II: exercises ( <i>Fowler</i> ) / Group I: computer projects
19:30	DINNER

**Tuesday 16**

08:30 - 09:20	Numerical modelling of ice sheets and ice shelves I ( <i>Van de Wal</i> )
09:30 - 10:20	Numerical modelling of ice sheets and ice shelves II ( <i>Van de Wal</i> )
10:20 - 10:40	coffee break
10:40 - 11:30	Ice cores: an introduction ( <i>Fischer</i> )
11:40 - 12:30	Stable water isotopes in ice: new results from old ice ( <i>Fischer</i> )
12:45	LUNCH
14:00 - 15:30	Group II: exercises ( <i>Eisen</i> ) / Group I: computer projects
15:30 - 16:00	coffee break
16:00 - 17:30	Group I: exercises ( <i>Eisen</i> ) / Group II: computer projects
19:30	DINNER

**Wednesday 17**

08:30 - 09:20	Aerosol in ice: key to paleoenvironmental changes ( <i>Fischer</i> )
09:30 - 10:20	Inverse modelling ( <i>Gudmundsson</i> )
10:20 - 10:40	coffee break
10:40 - 11:30	Polar meteorology ( <i>Van den Broeke</i> )
11:40 - 12:30	The mass budget of the Greenland and Antarctic ice sheets ( <i>Van den Broeke</i> )
12:45	LUNCH
	Afternoon free
19:30	DINNER

**Thursday 18**

08:30 - 09:20	The microclimate of glaciers ( <i>Oerlemans</i> )
09:30 - 10:20	Tropical glaciers ( <i>Kaser</i> )
10:20 - 10:40	coffee break
10:40 - 11:30	Gases in ice cores: The past atmosphere ( <i>Fischer</i> )
11:40 - 12:30	Ice sheets in the Pleistocene ( <i>Van de Wal</i> )
12:45	LUNCH
14:00 - 15:30	Group I: exercises ( <i>Van de Wal</i> ) / Group II: computer projects
15:30 - 16:00	coffee break
16:00 - 17:30	Group II: exercises ( <i>Van de Wal</i> ) / Group I: computer projects
19:30	DINNER

**Friday 19**

08:30 - 09:20	Cenozoic history of the Antarctic ice sheet ( <i>Van de Wal</i> )
09:30 - 10:20	The response of glaciers to climate change ( <i>Oerlemans</i> )
10:20 - 10:40	coffee break
10:40 - 11:30	Ice sheets, greenhouse warming and sea level ( <i>Van den Broeke</i> )
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 20****Departure**