KARTHAUS-2005 / GLACIERS AND ICE SHEETS IN THE CLIMATE SYSTEM PROGRAMME

Exercises and computer projects

The participants are divided into 12 groups. In the first part of the afternoon, 6 groups do regular exercises, provided and supervised by the teacher indicated in the programme. Meanwhile, the other 6 groups work on computer projects. In the second half of the afternoon the groups switch. A particular group 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 of the outcome of the projects.

Tuesday 13

Afternoon	**Arrival / check-in**
19:00	DINNER

Wednesday 14

09:00 – 09:30	Welcome / practical announcements *(Oerlemans / Kaser)*
09:30 – 10:20	Continuum mechanics-I *(Gudmundsson)*
10:20 – 10:40	coffee break
10:40 – 11:30	Continuum mechanics-II *(Gudmundsson)*
11:40 – 12:30	The microclimate of glaciers *(Oerlemans)*
12:45	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
19:00	DINNER

Thursday 15

08:30 - 09:20	Introduction to glacial geomorphology *(Stroeven)*
09:30 - 10:20	Studying internal layering by radar I *(Miller)*
10:20 - 10:40	coffee break
10:40 - 11:30	Polar meteorology *(Reijmer)*
11:40 - 12:40	5-min presentations by students
13:00	LUNCH
14:00 - 15:30	Group I: exercises *(Oerlemans)* / Group II: computer projects
15:30 - 16:00	coffee break
16:00 - 17:30	Group II: exercises *(Oerlemans)* / Group I: computer projects
19:30	DINNER
21:00 - 22:00	5-min presentations by students

Friday 16

08:30 - 09:20	Rheology / simple flows (plane shear) *(Dahl-Jensen)*
09:30 - 10:20	Thermodynamics of ice sheets *(Dahl-Jensen)*
10:20 - 10:40	coffee break
10:40 - 11:30	Analytical models of ice sheets *(Oerlemans)*
11:40 - 12:30	Geodynamics - introduction *(Lambeck)*
12:45	LUNCH
14:00 - 15:30	Group II: exercises *(Dahl-Jensen)* / Group II: computer projects
15:30 - 16:00	coffee break
16:00 - 17:30	Group I: exercises *(Dahl-Jensen)* / Group I: computer projects
19:30	DINNER

Saturday 17

08:30 - 09:20	Sliding *(Fowler)*
09:30 - 10:20	Studying internal layering by radar II *(Miller)*
10:20 - 10:40	coffee break
10:40 - 11:30	Mass balance modelling *(Greuell)*
11:40 - 12:30	Ice cores: overview *(Mulvaney)*
12:45	LUNCH
14:00 - 14:50	Interaction between ice sheets and the solid earth *(Lambeck)*
15:00 - 15:50	What can we learn from glacial rebound? *(Lambeck)*
15:50 - 16:15	coffee break
16:15 - 18:00	exercises for all groups *(Lambeck)*
19:30	DINNER

Sunday 18   **Excursion to the glaciers of the Oetztal Alps** *(Kaser)*

Monday 19

08:30 - 09:20	Glacier hydrology *(Fowler)*
09:30 - 10:20	Basal processes and geomorphology *(Fowler)*
10:20 - 10:40	coffee break
10:40 - 11:30	Numerical modelling of ice sheets and ice shelves-I *(Payne)*
11:40 - 12:30	Numerical modelling of ice sheets and ice shelves-II *(Payne)*
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
19:00	DINNER
21:00-21:45	**Evening lecture**

Tuesday 20

08:30 - 09:20	Interaction of ice shelves with the ocean-I *(Jenkins)*
09:30 - 10:20	Interaction of ice shelves with the ocean-II *(Jenkins)*
10:20 - 10:40	coffee break
10:40 - 11:30	Ice cores: dating *(Dahl-Jensen)*
11:40 - 12:30	Ice cores: isotopes *(Dahl-Jensen)*
12:45	LUNCH
14:00 - 15:30	Group I: computer projects / Group II: free
15:30 - 16:00	coffee break
16:00 - 17:30	Group II: computer projects / Group I: free
19:00	DINNER

Wednesday 21

08:30 – 09:20	Extra-terrestrial ice *(Dahl-Jensen)*
09:30 – 10:20	Tropical glaciers *(Kaser)*
10:20 – 10:40	coffee break
10:40 – 11:30	The mass balance of the Greenland and Antarctic ice sheets *(Reijmer)*
11:40 – 12:30	Geomorphology and mapping of paleo-ice sheets *(Stroeven)*
12:45	LUNCH
14:00 – 14:50	Remote sensing-overview *(Greuell)*
15:00 – 15:50	Remote sensing-optical sensors *(Greuell)*
19:00	DINNER
21:00-21:45	**Evening lecture** by *Dorthe Dahl-Jensen*: Highlights from NGRIP

Thursday 22

08:30 - 09:20	Ice cores: chemistry *(Mulvaney)*
09:30 - 10:20	Ice cores: gases *(Mulvaney)*
10:20 - 10:40	coffee break
10:40 - 11:30	Inverse modelling *(Gudmundsson)*
11:40 - 12:30	Simple models of glaciers *(Oerlemans)*
12:45	LUNCH
14:00 – 14:50	The response of glaciers to climate change *(Oerlemans)*
15:00 – 15:50	Ice streams *(Payne)*
15:50 - 16:20	coffee break
16:20 - 18:00	Group I & II: computer projects
19:00	DINNER

Friday 23

08:30 - 09:20	Numerical modelling of the Antarctic ice sheet *(Payne)*
09:30 - 10:20	Cenozoic history of the Antarctic ice sheet *(Stroeven)*
10:20 - 10:40	coffee break
10:40 - 12:30	Computer projects: preparation of presentations
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
19:00	DINNER

Saturday 24   **Departure**

Short presentations by the students

Students are asked to give a brief summary of their research project. Since we have ~36 students, this goes out of control easily. We will therefore be VERY STRICT: 5 minutes is the maximum time for a presentation.

Computer projects

The organising 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 (very limited) changes can then be made before the projects start on thursday.
A number of Mac's will be available in a local network. Participants may also bring their own laptops. We hope to have a wireless net with substantial capacity to have some ties with the outside world.

Group 1:   Ice shelf - ocean interaction I *(Jenkins)*

Group 2:   Ice shelf - ocean interaction II *(Jenkins)*

Group 3:   Inverse modelling *(Gudmundsson)*

Group 4:   Ice-sheet model I *(Payne)*

Group 5:   Ice-sheet model II *(Payne)*

Group 6:   Atmospheric boundary-layer over an ice sheet I *(Reijmer)*

Group 7:   Glacial geomorphology *(Stroeven)*

Group 8:   Dating of an ice core *(Dahl-Jensen)*

Group 9:   Mass-balance model *(Greuell)*

Group 10:   Analysing an ice core *(Mulvaney)*

Group 11:   Mass balance of tropical glaciers *(Kaser)*

Group 12:   Modelling jokulhlaups *(Fowler)*