

KARTHAUS-2003 / GLACIERS AND ICE SHEETS IN THE CLIMATE SYSTEM

36 students are admitted to the course

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.

Six computers are available (Macintoshes), connected in a small local network with a few printers. 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 9

Afternoon	Arrival / check-in
19:00	DINNER

Wednesday 10

09:00 - 09:30	Welcome / practical announcements (<i>Oerlemans / Kaser</i>)
09:30 - 10:20	Continuum mechanics-I (<i>Gudmundsson</i>)
10:20 - 10:40	coffee break
10:40 - 11:30	Continuum mechanics-II (<i>Gudmundsson</i>)
11:40 - 12:30	Ice and climate - an introduction (<i>Oerlemans</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
19:00	DINNER

Thursday 11

08:30 - 09:20	Rheology / simple flow (plane shear) (<i>Gudmundsson</i>)
09:30 - 10:20	Thermodynamics of ice sheets (<i>Van de Wal</i>)
10:20 - 10:40	coffee break
10:40 - 11:30	Remote sensing-overview (<i>Greuell</i>)
11:40 - 12:40	5-min presentations by students
13:00	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
21:00 - 22:00	5-min presentations by students

Friday 12

08:30 - 09:20	Remote sensing-optical sensors (<i>Greuell</i>)
09:30 - 10:20	Sliding (<i>Fowler</i>)
10:20 - 10:40	coffee break
10:40 - 11:30	Analytical models of ice sheets (<i>Oerlemans</i>)
11:40 - 12:30	Polar meteorology (<i>Reijmer</i>)
12:45	LUNCH
14:00 - 15:30	Group I: exercises (<i>Oerlemans</i>) / Group II: computer projects
15:30 - 16:00	coffee break
16:00 - 17:30	Group II: exercises (<i>Oerlemans</i>) / Group I: computer projects
19:30	DINNER

Saturday 13

08:30 - 09:20	Numerical modelling of ice sheets and ice shelves-I (<i>Payne</i>)
09:30 - 10:20	Numerical modelling of ice sheets and ice shelves-II (<i>Payne</i>)
10:20 - 10:40	coffee break
10:40 - 11:30	Mass balance modelling (<i>Greuell</i>)
11:40 - 12:30	Coupling of atmosphere-ocean-ice sheet models (<i>Pollard</i>)
12:45	LUNCH
14:00 - 14:50	Ice cores: overview (<i>Mulvaney</i>)
15:00 - 15:50	Geodynamics - introduction (<i>Lambeck</i>)
19:30	DINNER

Sunday 14**Excursion to the glaciers of the Oetzal Alps****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	Interaction between ice sheets and the solid earth (<i>Lambeck</i>)
11:40 - 12:30	What can we learn from glacial rebound? (<i>Lambeck</i>)
12:45	LUNCH
14:00 - 15:30	Group I: exercises (<i>Lambeck</i>) / Group II: computer projects
15:30 - 16:00	coffee break
16:00 - 17:30	Group II: exercises (<i>Lambeck</i>) / Group I: computer projects
19:00	DINNER
21:00-21:45	Evening lecture by <i>C Hofstede</i> : On skis to the South Pole

Tuesday 16

08:30 - 09:20	Interaction of ice shelves with the ocean-I (<i>Jenkins</i>)
09:30 - 10:20	Interaction of ice shelves with the ocean-II (<i>Jenkins</i>)
10:20 - 10:40	coffee break
10:40 - 11:30	The mass balance of the Antarctic ice sheet (<i>Reijmer</i>)
11:40 - 12:30	The mass balance of the Greenland ice sheet (<i>Van der Wal</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
19:00	DINNER

Wednesday 17

08:30 - 09:20	The response of glaciers to climate change: analytical models (<i>Oerlemans</i>)
09:30 - 10:20	Tropical glaciers (<i>Kaser</i>)
10:20 - 10:40	coffee break
10:40 - 11:30	Inverse modelling (<i>Gudmundsson</i>)
11:40 - 12:30	Ice cores: isotopes (<i>Van de Wal</i>)
12:45	LUNCH
14:00	Excursion
19:00	DINNER
21:00-21:45	Evening lecture by <i>B Stauffer</i> : Deep drilling at Dome C (EPICA)

Thursday 18

08:30 - 09:20	Ice cores: chemistry (<i>Mulvaney</i>)
09:30 - 10:20	Ice cores: gases-I (<i>Stauffer</i>)
10:20 - 10:40	coffee break
10:40 - 11:30	Ice cores: gases-II (<i>Stauffer</i>)
11:40 - 12:30	The response of glaciers to climate change: numerical modelling (<i>Oerlemans</i>)
12:45	LUNCH
14:00 - 15:30	Group I: exercises (<i>Stauffer</i>) / Group II: computer projects
15:30 - 16:00	coffee break
16:00 - 17:30	Group II: exercises (<i>Stauffer</i>) / Group I: computer projects
19:00	DINNER

Friday 19

08:30 - 09:20	The Cenozoic history of the Antarctic ice sheet (<i>Pollard</i>)
09:30 - 10:20	Quaternary ice ages (<i>Pollard</i>)
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 20**Departure**

Computer projects

- Group 1: Ice shelf - ocean interaction I (*Jenkins*)
- Group 2: Ice shelf - ocean interaction II (*Jenkins*)
- Group 3: Ice-flow model (*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: Atmospheric boundary-layer over an ice sheet II (*Reijmer*)
- Group 8: Analysing an ice core (*Mulvaney*)
- Group 9: Mass-balance model (*Greuell*)
- Group 10: Ice-sheet thermodynamics (*Van de Wal*)
- Group 11: Mass balance of tropical glaciers (*Kaser*)
- Group 12: Sliding (*Fowler*)