

## KARTHAUS-2002 / ICE SHEETS AND GLACIERS IN THE CLIMATE SYSTEM

### 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 (mainly 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.

You may express a preference for a computer project (send an email to the convenor). Unless you are a real starter, it is advised that you participate in a project that is not within your own specialty.

Students are invited to bring a few overhead sheets describing their research project (not compulsory). A few short sessions will be arranged to accommodate student's presentations.

### Tuesday 10

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

### Wednesday 11

09:00 - 09:30	Welcome / practical announcements ( <i>Oerlemans / Kaser</i> )
09:30 - 10:20	Continuum mechanics-I ( <i>Dahl-Jenssen, Mayer</i> )
10:20 - 10:40	coffee break
10:40 - 11:30	Continuum mechanics-II ( <i>Dahl-Jenssen, Mayer</i> )
11:40 - 12:30	Polar Meteorology-I ( <i>Van den Broeke</i> )
12:45	LUNCH
14:00 - 16:00	Exercises for all groups ( <i>Dahl-Jenssen, Mayer</i> )
16:00 - 16:30	coffee break
16:30 - 17:30	Preparation for the computer projects
19:00	DINNER

### Thursday 12

08:30 - 09:20	Polar Meteorology-II ( <i>Van den Broeke</i> )
09:30 - 10:20	Remote sensing - overview ( <i>Rott</i> )
10:20 - 10:40	coffee break
10:40 - 11:30	Rheology / simple flow (plane shear) ( <i>Dahl-Jenssen</i> )
11:40 - 12:30	Analytical models of glacier-climate interactions I ( <i>Oerlemans</i> )
12:45	LUNCH
14:00 - 15:30	Group I: exercises ( <i>Van den Broeke</i> ) / Group II: computer projects
15:30 - 16:00	coffee break
16:00 - 17:30	Group II: exercises ( <i>Van den Broeke</i> ) / Group I: computer projects
19:00	DINNER

### Friday 13

08:30 - 09:20	Mass balance of the Antarctic ice sheet ( <i>Van den Broeke</i> )
09:30 - 10:20	Analytical models of glacier-climate interactions II ( <i>Oerlemans</i> )
10:20 - 10:40	coffee break
10:40 - 11:30	Remote sensing - (In)SAR ( <i>Rott</i> )
11:40 - 12:30	Remote sensing - optical sensors ( <i>Greuell</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
19:00	DINNER

## Saturday 14

08:30 - 09:20	Numerical modelling of ice sheets and ice shelves-I ( <i>Mayer</i> )
09:30 - 10:20	Numerical modelling of ice sheets and ice shelves-II ( <i>Mayer</i> )
10:20 - 10:40	coffee break
10:40 - 11:30	Sliding ( <i>Fowler</i> )
11:40 - 12:30	Glacier hydrology ( <i>Fowler</i> )
12:45	LUNCH
14:00 - 14:50	Ice cores: overview / from firn to ice ( <i>Mulvaney</i> )
15:00 - 15:50	Glacier mass balance modelling ( <i>Greuell</i> )
19:00	DINNER

## Sunday 15

### Excursion to the glaciers of the Oetztal Alps

## Monday 16

08:30 - 09:20	Basal processes and geomorphology ( <i>Fowler</i> )
09:30 - 10:20	Investigating internal layering by radar-I ( <i>Miller</i> )
10:20 - 10:40	coffee break
10:40 - 11:30	Investigating internal layering by radar-II ( <i>Miller</i> )
11:40 - 12:30	Thermodynamics of ice sheets ( <i>Mayer</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

## Tuesday 17

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	Styding glacier flow by inverse modelling-I ( <i>Gudmundsson</i> )
11:40 - 12:30	Styding glacier flow by inverse modelling-II( <i>Gudmundsson</i> )
12:45	LUNCH
14:00 - 15:30	Group I: exercises ( <i>Gudmundsson</i> ) / Group II: computer projects
15:30 - 16:00	coffee break
16:00 - 17:30	Group II: exercises ( <i>Gudmundsson</i> ) / Group I: computer projects
19:00	DINNER
21:00-21:45	<b>Evening lecture</b> by <i>A Provenzale</i> : Ibex in the Snow: Climate forcing and density dependence in mountain ungulate populations

## Wednesday 18

08:30 - 09:20	Analytical models of glacier-climate interactions III ( <i>Oerlemans</i> )
09:30 - 10:20	Tropical glaciers ( <i>Kaser</i> )
10:20 - 10:40	coffee break
10:40 - 11:30	Ice cores: isotopes ( <i>Van de Wal</i> )
11:40 - 12:30	Dating of ice cores ( <i>Dahl-Jenssen</i> )
12:45	LUNCH
14:00	Excursion
19:00	DINNER

## Thursday 19

08:30 - 09:20	Ice cores: gases ( <i>Mulvaney</i> )
09:30 - 10:20	Ice cores: chemistry ( <i>Mulvaney</i> )
10:20 - 10:40	coffee break
10:40 - 11:30	Mass balance of the Greenland ice sheet ( <i>Van de Wal</i> )
11:40 - 12:30	Modelling the fluctuations of valley glaciers ( <i>Oerlemans</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
19:00	DINNER

## Friday 20

08:30 - 09:20	Inverse modelling on borehole temperatures( <i>Dahl-Jenssen</i> )
09:30 - 10:20	Modelling the evolution of the Pleistocene ice sheets ( <i>Huybrechts</i> )
10:20 - 10:40	coffee break
10:40 - 11:30	Ice sheets, greenhouse warming and sea level ( <i>Huybrechts</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
19:00	DINNER

## Saturday 21

### Departure

## Computer projects

Group 1:	Ice shelf - ocean interaction I ( <i>Jenkins</i> )
Group 2:	Ice shelf - ocean interaction II ( <i>Jenkins</i> )
Group 3:	Dating of an ice core ( <i>Dahl-Jenssen</i> )
Group 4:	Ice-flow model ( <i>Dahl-Jenssen/Gudmundsson</i> )
Group 5:	Ice-sheet model ( <i>Mayer</i> )
Group 6:	SAR interferometry I ( <i>Fischer, Rott</i> )
Group 7:	SAR interferometry II ( <i>Fischer, Rott</i> )
Group 8:	Vostok ice core ( <i>Mulvaney/Van de Wal</i> )
Group 9:	Mass-balance model ( <i>Greuell</i> )
Group 10:	Ice-sheet thermodynamics ( <i>Van de Wal</i> )
Group 11:	Mass balance of tropical glaciers ( <i>Kaser</i> )
Group 12:	Sliding ( <i>Fowler</i> )