Conference

"Ice deformation, from the model material to ice in natural environments"

November 7th – 9th 2011, Grenoble, France.

Scientific report and Financial report

M. Montagnat, J. Weiss, LGGE, May 10th, 2012.

Summary

The roots of glaciology were initially high up in the mountains, walking on glaciers to observe, describe and measure in the field those objects which have forever fascinated and, in early days, sometimes frightened mankind. Microscopic details and properties of the material ice were not at first glance the main preoccupation of the pioneers of glaciology. In other words, glaciology was not "iceology", even so "glace" means "ice" in French.
However, as science moved on, it became clearer and clearer that a detailed knowledge of ice physics and mechanics from the atomic scale is an essential step towards an understanding of glaciers, ice sheets, or sea ice. Indeed, dislocation motion and ice microstructure control the flow of glaciers, metamorphism processes at the snow crystal scale the properties of a snow cover, and the physics of ice fracture the evolution of Arctic sea ice.
To bridge the microstructural scale to geophysical scales was one of the purpose of the MicroDICE Conference "Ice deformation: from the model material to ice in natural environments" which was held in Grenoble on 7-9 November 2011 at the MINATEC center, sponsored by the Micro-DICE project of the European Science Foundation, and with administrative support of the IGS. This symposium was also the occasion to honor Paul Duval, Emeritus "Directeur de Recherche" at the Laboratoire de Glaciologie et Géophysique de l'Environnement". During his career, Paul became a world leading scientist on the physics of ice deformation. But, beyond his fundamental advances on creep and recrystallization of the material ice, Paul always tried to analyze the consequences of such micro-scale mechanisms on the large scale behavior of glaciers, ice sheets, or even icy moons. In that sense, the Micro-DICE conference, with its great diversity of topics, was in a perfect agreement with the Paul's contribution to glaciology and material science.
The conference brought together about 85 scientists from 17 countries all around the world, presenting keynote lectures or recent advances on subjects as various as ice sheet flow, sea ice fracturing, recrystallization processes in ice, icy moons, snow structure, ice cream physics, and more. Beyond "glaciology", presentations on collective dislocation dynamics, recrystallization in metals, or crack growth in heterogeneous media, stressed the role of ice as a model material to tackle various fundamental problems in material science, a role recognized by Paul Duval for a long time.
In addition to these various communications, the organization created a friendly atmosphere during breaks and lunches, allowing everybody to exchange and discuss around a (French !) glass of wine and a piece of local cheese! This way, this MicroDICE conference confirmed that ice physics, mechanics and glaciology is more than ever an "hot" topic that can learn from, but also teach to other fields of physics and geophysics.

Organization

Organizing Committee: Maurine Montagnat, Denis Samyn, Jens Rössiger, Paul Bons, Martyn Drury.
Scientific Committee: Maurine Montagnat, Olivier Castelnau, Denis Samyn, Paul Bons

website : http://microdice.eu/activities/past/ice-deformation-from-the-model-material-to-polar-ice/

Description of the event:

The first day was devoted to the theme "ice as a model material", and therefore was named the "Paul Duval's day".
During this first day, both ductile and brittle behavior of ice, from the dislocation scale to the polycrystal scale were evoked.
The aim of this day was to emerge the links between the study performed on ice and on other materials. The sessions were oriented toward the "materials science" perspectives, with presentation concerning the overall understanding of physical mechanisms for material deformation behaviors in general. We could emphasis the contribution of ice studies to progress in the analyses and modeling of heterogeneous mechanical behavior in polycrystalline materials. This contribution was presented on both the experimental and the modeling aspects.
A session was devoted to the brittle behavior of ice. A special part was devoted to the new elasto-brittle mechanical modeling of see ice behavior and its implication on the modeling of sea ice – climate interaction.
During this day five invited talks were given.
This day ended with an ice breaker and the first poster session.

The presentations given during the second day focused on ice rheology, and its implication in the understanding of ice behavior in natural environments and in industry.
This day started with some presentations about laboratory experiments aiming at a better understanding of the mechanical behavior of ice at various levels of complexity. The second part was devoted to some "applied studies" of ice, with an invited presentation on ice/snow friction applied to the development of snow tire or the improvement of the curling techniques.
The oral presentations ended with a special session about ice in extraterrestrial environments which pointed out the crucial role of ice rheology law on the understanding of the behavior of large, unattainable icy bodies.
The afternoon ended with a two-hours poster session and beer party which really was a nice time for exchange and build-up of collaborations.
An evening seminar was given about the modeling of snow avalanches from a materials science point of view.
Four invited talks were given.

During the third day, we evoked the field and experimental techniques to characterize the ice and snow microstructure.
During the first session, techniques applied to borehole (large scale) measurements, down lattice misorientation (small scale) were presented. A focus was further given on the interpretations of the measurements.

The afternoon sessions were devoted to the modeling from the polycrystal scale to the ice-sheet scale, with various modeling techniques (from mean-field to Finite Element).
Three invited talks were given.

Results and impacts:

This conference was the first one to focus on ice deformation behavior with a volunteer link with materials science in general.
Therefore, this conference enabled a fruitful meeting between glaciologists, materials scientists and geologists.
Discussions were very animated around the understanding of fundamental physical mechanisms, but also on the interest to transfer techniques between fields.
Being able to cover ranges from dislocation to large ice-sheet scales allowed to understand better the various degrees of complexity necessary to solve each independent question.

The discussions and presentations also enlightened the "hot" subjects for which a strong interest is emerging, and toward which efforts must concentrate for a better understanding and modeling.

This conference was therefore very well adapted to a mi-term in the Micro-DICE project, to present a state of the art, to build collaborations, and to emerge scientific themes to focus on.

On success marker for the conference was the number of "non glaciologist" participants, as an evidence for the interest of ice deformation studies, far beyond the themes of ice sheets and glaciers!

Financial support:

Main support from ESF : 60 000 euros
Secondary support from IGS, CNRS, UJF- Grenoble I, METRO, Ville de Grenoble : 3900 euros

Financial report, details :
Details of the financial reports are provided in a following table.
On the ESF site, the figures were provided as explain below :

- accommodation = conference room + some hotel fees for invited speakers (listed in the table)
- travel = all individual reimbursement for invited participants (listed in the table)
- meal = fees for lunches, breaks, and cocktail included in the registration fees
- co-sponsorship = registrations, and co-sponsorship founded by the convener
- local administrative cost = floralis company costs + books of abstracts (there is a mistake in the table, there were no cost for "Pack conferencier", but only 1550 euros for books of abstract, instead of 1000 + 950)

Financial report table (provided by Floralis)

Budget Prévisionnel Physique et Mécanique de la glace 2011

MAJ 03/05/2012

	RECETTES	Nb	Unité HT	Total HT	TVA (19,6%)	Total TTC	Réglé le
Inscriptions	Inscriptions Junior early (150€)	15	125,42 €	1 881,27 €	368,73 €	2 250,00 €	
	Inscriptions Junior late (200€)	5	167,22 €	836,12 €	163,88 €	1 000,00 €	
	Inscriptions Sénior early (200€)	29	167,22 €	4 849,50 €	950,50 €	5 800,00 €	
	Inscriptions Sénior late (250€)	9	209,0301003	1 881,27 €	368,73 €	2 250,00 €	
	TOTAL	**58**		**9 448,16 €**	**1 851,84 €**	**11 300,00 €**	
Subventions & Sponsors	ESF - Facture n° 4322	**1**		48 000,00 €	0,00 €	48 000,00 €	30/06/2011
	Ville Grenoble - Facture 4326			800,00 €	0,00 €	800,00 €	10/08/2011
	La Métro - Facture n°4127			500,00 €	0,00 €	500,00 €	27/05/2011
	UJF			*600,00 €*	*0,00 €*	*600,00 €*	*Versé au LGGE*
	CNRS			*2 000,00 €*	*0,00 €*	*2 000,00 €*	*Versé au LGGE*
	TOTAL			**49 300,00 €**	**0,00 €**	**49 300,00 €**	
TOTAL RECETTE	**TOTAL GENERAL de l'évènement**			**61 348,16 €**	**1 851,84 €**	**63 200,00 €**	
	TOTAL GENERAL encaissé par Floralis			**58 748,16 €**	**1 851,84 €**	**60 600,00 €**	

	DEPENSES	Nb	Prix Unit. HT	HT	TVA	TTC	Réglé le
Honoraires Floralis	Pole administratif et financier	1	3 730,00	3 730,00 €	731,08 €	4 461,08 €	
	Gestion des inscriptions - Formulaire	1	1 500,00	1 500,00 €	294,00 €	1 794,00 €	
	Gestion des inscriptions - Frais variables	60	17,00	1 020,00 €	199,92 €	1 219,92 €	
	Assurance	1	528,00	528,00 €	0,00 €	528,00 €	
	TOTAL			**6 778,00 €**	**1 225,00 €**	**8 003,00 €**	
Salle de conférence	Minatec - Facture n° 90132117	1	5 299,00	5 299,00 €	1 038,60 €	6 337,60 €	09/01/2012
				5 299,00 €	**1 038,60 €**	**6 337,60 €**	
Restauration Balades Gourmandes	FC 4288 - Pauses, déjeuners, cocktail -TVA 19,6%	1	877,00	877,00 €	171,89 €	1 048,89 €	12/12/2011
	FC 4288 - Pauses, déjeuners, cocktail -TVA 19,6%	1	8 959,00	8 959,00 €	492,74 €	9 451,75 €	12/12/2011
	TOTAL			**9 836,00 €**	**664,64 €**	**10 500,64 €**	
Pack conférencier	*Pack conférenciers*	*1*	*2 000,00*	*2 000,00 €*	*392,00 €*	*2 392,00 €*	
	Book Abstract	*1*	*1 000,00*	*1 000,00 €*	*196,00 €*	*1 196,00 €*	
	Imprimerie des Ecureuils - Facture 11111081	1	950,00	950,00 €	186,20 €	1 136,20 €	02/01/2012
	TOTAL			**950,00 €**	**186,20 €**	**1 136,20 €**	
Invités Remboursements NDF	H. Kolumban - transport	1	302,49	302,49	0,00 €	302,49 €	01/07/2011
	S. Trimby - transport	1	2 101,73	2 101,73	0,00 €	2 101,73 €	23/09/2011
	O. Castelnau - transport (Facture n°30567760)	1	194,00	194,00	0,00 €	194,00 €	
	O. Castelnau - transport (Avoir n°39243611)	1	-80,50	-80,50	0,00 €	-80,50 €	
	O. Castelnau - transport (Facture n°30567850)	1	87,00	87,00	0,00 €	87,00 €	
	O. Castelnau - NDF	1	143,68	143,68	0,00 €	143,68 €	19/12/2011
	G. Tobie - transport	1	178,70	178,70	0,00 €	178,70 €	24/10/2011
	M. Carmen - transport	1	400,92	400,92	0,00 €	400,92 €	27/10/2011
	N. Calonne - NDF	1	150,00	150,00	0,00 €	150,00 €	13/12/2011
	A. Herman - NDF	1	805,69	805,69	0,00 €	805,69 €	19/12/2011
	M. Peternell - NDF	1	467,99	467,99	0,00 €	467,99 €	19/12/2011
	J. Blackford - NDF	1	408,14	408,14	0,00 €	408,14 €	19/12/2011
	A. Luque - NDF	1	1 126,92	1 126,92	0,00 €	1 126,92 €	19/12/2011
	T. Binder - NDF	1	608,69	608,69	0,00 €	608,69 €	19/12/2011
	E. Schulson - NDF	1	1 588,80	1 588,80	0,00 €	1 588,80 €	
	E. Schulson - NDF (fais bancaires)	1	147,81	147,81	0,00 €	147,81 €	
	P. Bons- NDF	1	1 022,24	1 022,24	0,00 €	1 022,24 €	19/12/2011
	L. Zoet - NDF	1	390,10	390,10	0,00 €	390,10 €	19/12/2011
	V. Pellissier	1	150,00	150,00	0,00 €	150,00 €	19/12/2011
	G. Tobie - NDF	1	160,12	160,12	0,00 €	160,12 €	19/12/2011
	J. Barès - NDF	1	440,78	440,78	0,00 €	440,78 €	06/01/2012
	M. Carmen - NDF	1	111,78	111,78	0,00 €	111,78 €	06/01/2012
	J. Roessinger - NDF	1	277,40	277,40	0,00 €	277,40 €	17/01/2012
	M. Dierckx - NDF	1	629,75	629,75	0,00 €	629,75 €	17/01/2012
	A. Treverrow	1	748,42	748,42	0,00 €	748,42 €	24/01/2012
	C. Middleton	1	672,93	672,93	0,00 €	672,93 €	24/01/2012
	S. Trimby - NDF	1	144,05	144,05	0,00 €	144,05 €	24/01/2012
	M. Tsamados - NDF	1	602,12	602,12	0,00 €	602,12 €	20/12/2011
	A. Seymour-Pierce - NDF	1	680,52	680,52	0,00 €	680,52 €	24/01/2012
	K. HUTTER	1	237,23	237,23	0,00 €	237,23 €	24/01/2012
	I. Weikusat - NDF	1	897,87	897,87	0,00 €	897,87 €	24/01/2012
	D. Samyn - NDF	1	849,73	849,73	0,00 €	849,73 €	31/01/2012
	C. Wilson - NDF	1	852,10	852,10	0,00 €	852,10 €	14/02/2012
	L. W. MORLAND - NDF	1	914,00	914,15	0,00 €	914,00 €	29/02/2012
	S. MAUS - NDF	1	720,08	720,08	0,00 €	720,08 €	10/02/2012
	TOTAL			**19 133,43 €**	**0,00 €**	**19 133,28 €**	
Hébergement	Hipark Résidences - Facture 14418	1	844,14	844,14 €	46,14 €	890,28 €	19/12/2011
	Novotel - facture 7703/30802 (Miguel Carmen) (TVA 5,5%)	1	283,56	283,56 €	0,00 €	283,56 €	17/11/2011
	Hôtel des Alpes - S. Trimby (TVA 5,5%) - Facture 8352	1	494,38	494,38 €	26,90 €	521,28 €	17/11/2011
	TOTAL			**1 622,08 €**	**73,04 €**	**1 695,12 €**	
TOTAL DEPENSE	**TOTAL GENERAL de l'évènement**			**46 618,51 €**	**3 775,48 €**	**50 393,84 €**	
	TOTAL GENERAL décaissé par Floralis			**43 618,51 €**	**3 187,48 €**	**46 805,84 €**	

SOLDE CONFERENCE en € HT	**14 729,65 €**
SOLDE FINAL FLORALIS en € HT	**15 129,65 €**

ANNEXES

Program:

First day (7th)

"Paul Duval's day, what material science learns from ice study"

8:30 **Welcoming**

FROM DISLOCATION TO POLYCRYSTAL DUCTILE BEHAVIOR

9:00 - 10:30	Dislocation dynamics - Intermittency, scale invariance and modelling
9:00 - 9:30	Spatio-temporal scaling properties of dislocation dynamics models, **Carmen Miguel**, Univ. of Barcelono, Spain
9:30 - 9:50	Concerning the Mobile Dislocation Density, **Armand Beaudoin** , Univ. of Illinois, USA.
9:50 - 10:10	3D Dislocation Dynamics Simulations of HCP materials: case of ice loaded in torsion and compressed micro-pilars of Magnesium, **Marc Fivel**, SIMAP, France
10:10 - 10:30	Characterizing spatial correlations in dislocation fields in ice single crystals, **Claude Fressengeas**, Univ. Metz, France

Coffee break

11:00 - 12:30	Grain growth and recrystallization
11:00 - 11:30	Nucleation of recrystallisation in metals : a physically based approach to critical conditions, **Yves Bréchet**, SIMAP, France
11:30 - 11:50	Modelling the role of stress gradients in dynamic discontinuous recrystallization, **François Louchet,** LGGE, France
11:50 - 12:10	Dynamic recrystallization of quartz – a natural analog for crystal plastic deformation of ice, **Michael Stipp**, IFM-GEOMAR, Germany
12:10 - 12:30	The effect of microstructure on static grain growth, **Paul Bons**, Tübingen Univ., Germany

Lunch break

14:00 - 15:30	Brittle behaviour in ice and snow
14:00 - 14:30	Faulting in ice under high confinement, **Erland Schulson**, Dartmouth College, USA
14:30 - 14:50	A laboratory sea ice model to explore the interaction between fracture and healing processes, **Vincent Pellissier**, LGGE, France
14:50 - 15:10	A statistical approach to damage evolution applied to polycrystalline ice, **Arne Keller**, ETH Zürich, Switzerland
15:10 - 15:30	Crack propagation in model brittle heterogeneous material, **Jonathan Barés**, CEA, France
15:30 - 15:50	Weak snow layer failure, **Ingrid Reiweger**, SLF Davos, Switzerland

Coffee break

16:10 - 18:00	The sea ice and large-scale brittle behavior
16:10 - 16:40	Sea ice as a brittle material: from observational evidence to numerical modelling, **Jérôme Weiss**, LGGE, France
16:40 - 17:00	Impact of a new anisotropic rheology in the sea ice component of a global circulation model, **M. Tsamados**, Univ. College London, UK
17:00 - 17:20	Statistical model of dynamical sea ice deformation and breaking, **Agnieszka Herman**, Univ. of Gdansk, Poland
17:20 - 17:40	Brittle failure near the transition from grounded to floating ice, **Roiy Sayag**, Univ. of Cambridge, UK
17:40 - 18:00	Land-fast ice modelling in the Kara Sea, **Einar Orn Olason**, Max Planck Institute for Meteorology, Germany

18:30 **Ice breaker and pre-poster session.**

Second day (8th)

Ice rheology; implications in natural extreme environments and in industry.

NATURAL ICE

8:30 - 10:20	Ice rheology
8:30 - 9:00	Physical deformation mechanisms of ice at low stresses, **Paul Duval**, LGGE, France
9:00 - 9:20	Intragranular strain field in columnar ice during transient creep, **Fanny Grennerat**, LGGE, France
9:20 - 9:40	Combined simple shear and confined compression of polycrystalline ice: tertiary creep observations from laboratory deformation experiments, **Adam Treverrow**, Artic Climate and Ecosystems Cooperative Res. Center, Australia
9:40 - 10:00	Ice fabric development in compression and simple shear, **Christopher J.L. Wilson**, Monach Univ., Australia
10:00 - 10:20	Ice fabric heterogeneities in the deep part of NEEM ice core: implications for flow interpretation and stratigraphy, **Denis Samyn,** Nagaoka Univ., Japan

Coffee break

11:00 - 12:30	Ice, an engineering point of view
11:00 - 11:30	Ice, materials and engineering, **Jane Blackford**, Univ. Edinburgh, UK
11:30 - 11:50	Downscaling of sea ice dynamics from mesoscale to local scale, **Matti Leppäranta**, Univ. of Helsinki, Finland
11:50 - 12:10	Ice cream research: taming an ice-based microstructure for sensory pleasures, **Javier Gil Sevillano**, Univ. of Navarra, Spain
12:10 - 12:30	Ice wall growth and the probability of falling ice blocks along the main transportation corridors of northern Gaspésie, Quebec, Canada **Francis Gauthier**, Univ. Laval, Canada

Lunch break

14:00 - 15:50	Extra-terrestrial ice
14:00 - 14:30	Dynamics and evolution of icy satellites, **Gabriel Tobie**, LPG, France
14:30 - 14:50	Water ice deformation in glaciers and permafrost of the planet Mars, **Nicolas Mangfold**, LPG, France
14:50 - 15:10	The role of grain size in the rheology of planetary water ice, **Hans de Bresser**, Utrecht Univ., the Netherlands
15:10 - 15:30	Insight into the phase transformations between Ice Ih and Ice II from EBSD data, **David J. Prior**, Univ. of Otago, New Zealand
15:30 - 15:50	Combined rheological and neutron diffraction studies of planetary ice-rock analogues, **C.A. Middleton**, Univ. College London, UK

16:00 - 18:00 Poster session + beer party

18:30 - 19:00 **Evening seminar**

Avalanche modeling (F. Louchet)

Third day (9th)

Recent techniques for ice and snow behaviour/microstructure characterization and modelling

FIELD AND EXPERIMENT CHARACTERIZATION TECHNIQUES FOR ICE AND SNOW

8:30 - 10:20	Natural ice and snow microstructure
8:30 - 9:00	A Tour through Hexagonal Ice, **Kolumban Hutter**, ETH Zürich, Switzerland
9:00 - 9:20	Inferring ice crystal fabric from full waveform borehole sonic logging, **Alessio Gusmeroli**, Univ. Fairbank, Alaska
9:20 - 9:40	Ice microstructure in Antarctic deep drilling samples (EDML): Cryogenic EBSD, X-ray Laue diffraction and optical microscopy, **Ilka Weikusat**, AWI, Germany
9:40 - 10:00	Microstructure analysis of fresh snow densification, **Stefan Schleef**, SLF Davos, Switzerland
10:00 - 10:20	Features of the free and open source toolbox MTEX for texture analysis - application to ice cores from the Talos Dome, **David Mainprice**, Geoscience Montpellier, France

Coffee break

10:40 - 12:40	Microstructure characterization and interpretation
10:40 - 11:10	Strain heterogeneities and recrystallization in polycrystalline materials: Characterization and Interpretation, **Sandra Piazolo**, Macquarie Univ., Australia
11:10 - 11:30	Advanced microstructural characterization of firn and ice, **Ian Baker**, Dartmouth College, USA
11:30 - 11:50	G60 Fabric Analyser: design overview and performance tests, **David Russell-Head**, Russell-Head Instruments, Melbourne, Australia
11:50 - 12:10	Synchrotron-based X-ray Tomographic Microscopy of Sea Ice, **Sönke Maus**, Univ. Bergen, Norway
12:10 - 12:30	Experimental testing of snow at the grain scale, **Jacques Meyssonnier**, LGGE, France

Lunch break

14:20 - 16:10	Multi-scale modeling, ice and snow
14:20 - 14:50	Elastoviscoplastic micromechanical modeling of the transient creep of ice, **Olivier Castelnau**, PIMM, France
14:50 - 15:10	Deformation of ice on the grain scale using a finite element fast Fourier transformation approach, **Jens Roessiger**, Tübingen Univ., Germany
15:10 - 15:30	Microstructures and rheology of the Earth's upper mantle inferred from a multiscale approach, **F. Detrez**, ENSAM, France
15:30 - 15:50	Modeling the evolution of microstructure and crystal fabric and its link to climate and ice sheet history, **Joseph Kennedy**, Univ. Fairbank, Alaska
15:50 - 16:10	3D image-based numerical simulations and experimental measurements of the effective thermal conductivity of snow, **Neige Calonne**, CEN, France

Coffee break

16:40 - 17:40	Large scale ice flow dynamic
16:40 - 17:00	Modelling the effect of anisotropy on large scale ice flows, **Olivier Gagliardini**, LGGE, France
17:00 - 17:20	Understanding ice rheology from the flow at ice divides, **Richard Hindmarsh**, BAS, UK
17:20 - 17:40	Numerical modelling of dense snow rheology by means of the FEM with Lagrangian integration points, **Dominique Daudon**, Lab 3SR, France

18:30 **End of the conference**

List of participants:

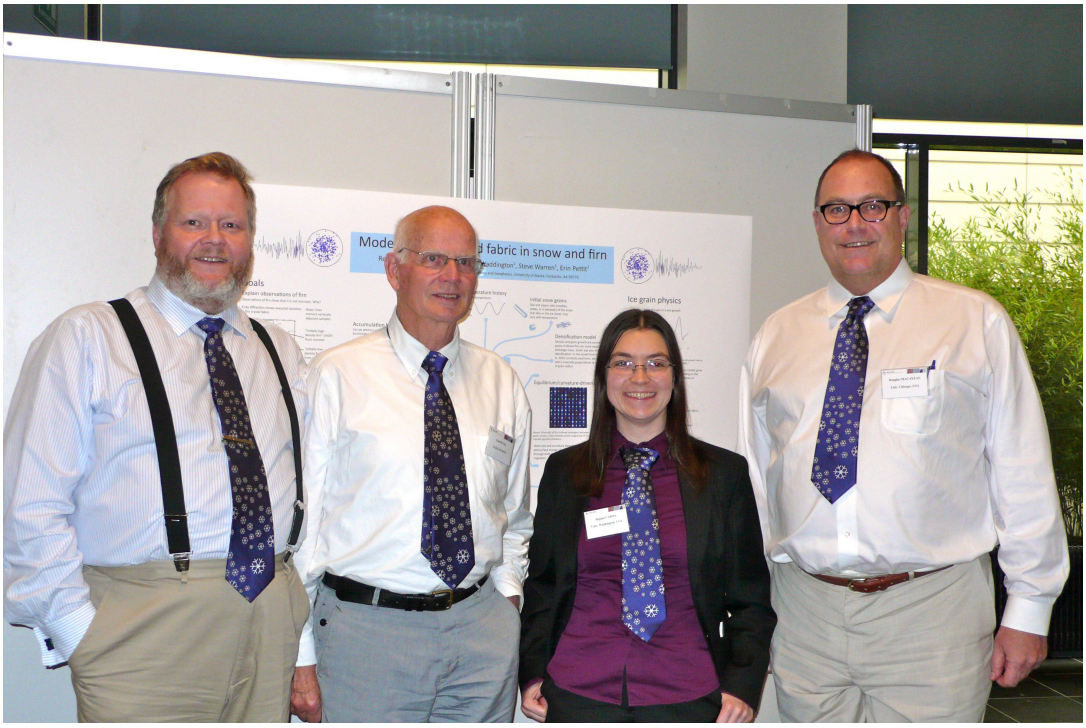
Registrant : Firstname	Registrant : Surname	Status
Maurine	MONTAGNAT	Organiser
Paul	BONS	Organiser
Jens	RößIGER	Organiser
Denis	SAMYN	Organiser
Jane	BLACKFORD	Invited speaker
Yves	BRECHET	Invited speaker
Olivier	CASTELNAU	Invited speaker
Paul	DUVAL	Invited speaker
Kolomban	HUTTER	Invited speaker
Carmen	MIGUEL	Invited speaker
Sandra	PIAZOLO	Invited speaker
Erland	SCHULSON	Invited speaker
Gabriel	TOBIE	Invited speaker
Jérôme	WEISS	Invited speaker
Regina	CARNS	Funded non EU
Adam	TREVERROW	Funded non EU
Lucas	ZOET	Funded non EU
Jonathan	BARéS	Funded EU
Tobias	BINDER	Funded EU
Xavier	BODIN	Funded EU
Neige	CALONNE	Funded EU
Marie	DIERCKX	Funded EU
Agnieszka	HERMAN	Funded EU
Aitor	LUQUE	Funded EU
Sönke	MAUS	Funded EU
Ceri	MIDDLETON	Funded EU
Leslie	MORLAND	Funded EU
Vincent	PELLISSIER	Funded EU
Mark	PETERNELL	Funded EU
Vincent	PEYAUD	Funded EU
Alexandra	SEYMOUR-PIERCE	Funded EU
Michel	TSAMADOS	Funded EU
Ilka	WEIKUSAT	Funded EU
Ian	BAKER	
Pierre	BASTIE	
Armand	BEAUDOIN	
Sylvain	BOUILLON	
Claude	CARRY	
Dominique	DAUDON	
Hans	DE BRESSER	
Fabrice	DETREZ	
Joern	DONGES	
Gael	DURAND	
Lionel	FAVIER	
Marc	FIVEL	
Frédéric	FLIN	
Claude	FRESSENGEAS	
Olivier	GAGLIARDINI	
Francis	GAUTHIER	
Fabien	GILLET-CHAULET	
Lucas	GIRARD	
Fanny	GRENNERAT	
Florence	GRISOLLE	
Pascal	HAGENMULLER	

Richard	HINDMARSH	
Arne	KELLER	
Joseph	KENNEDY	
Werner F.	KUHS	
Axel	LEFEVRE	
Matti	LEPPäRANTA	
Douglas	MACAYEAL	
Magnus	MAGNUSSON	
NICOLAS	MANGOLD	
Ulysse	MARBOEUF	
Christine	MCCARTHY	
Jacques	MEYSSONNIER	
Luc	MOREAU	
Samuel	MORIN	
Einar	OLASON	
Armelle	PHILIP	
Laurent	POUILLOUX	
David	PRIOR	
Ingrid	REIWEGER	
Fabienne	RICHE	
Catherine	RITZ	
David	RUSSELL-HEAD	
Katharina	RUSSELL-HEAD	
Roiy	SAYAG	
Stefan	SCHLEEF	
Martin	SCHNEEBELI	
Katrin	STEPHAN	
Michael	STIPP	
Christopher	WILSON	
Juliette	CHEVY	not registered
François	LOUCHET	not registered

Pictures:

The audience listens attentively to Erland Schulson's presentation.

Colleagues from the LGGE modeling their special “Paul Duval” T-shirts



A fine display of IGS ties

The poster session

Delegates enjoying a coffee break against the impressive backdrop of the Belledonne Massif.