

## PROGRAMME OF SESSIONS

*Monday, 26 August 2002*

**OPENING OF SYMPOSIUM:** Dr Elizabeth M. Morris, President, International Glaciological Society  
Dr Jacques Meyssonier, Chairman, Local Organizing Committee  
Dr Paul Duval, Chief Editor

*0920–1030 h*

CHAIR: Thorstein Thorsteinsson

**SESSION 1: PHYSICAL AND MECHANICAL PROCESSES INVOLVED IN DEFORMATION OF ICE**

- J. Helbing, G. H. Gudmundsson and A. Bauder: Can the rheology of polycrystalline ice at stresses lower than 1 bar be determined through field measurements?  
D. M. Cole: A dislocation-based analysis of the creep of granular ice: preliminary experiments and modeling  
B. Hubbard, A. Hubbard, H. Mader, J.-L. Tison, K. Grust and P. Nienow: Spatial variability in the water content and rheology of temperate glaciers: Glacier de Tsanfleuron, Switzerland

*1100–1230 h*

CHAIR: Dorthe Dahl-Jensen

**SESSION 1: PHYSICAL AND MECHANICAL PROCESSES INVOLVED IN DEFORMATION OF ICE**

- S. Kipfstuhl, Y. Wang, J. Freitag and H. Miller: Microstructure of the EPICA deep ice cores: preliminary results  
N. Azuma: Contribution of diffusion creep to the texture evolution and the flow properties of ice in ice sheets  
C. J. L. Wilson, D. S. Russell-Head and H. Sim: The application of an automated fabric analyser system to the textural evolution of folded ice layers in shear zones  
T. H. Jacka and 22 others: Recommended standards for presentation of ice crystal data

*1400–1520 h*

CHAIR: Andrew Fowler

**SESSION 2: MODELS AT DIFFERENT SCALES AND THEIR INTERACTIONS**

- L. W. Morland and R. Staroszczyk: Strain-rate formulation of ice fabric evolution  
G. Gödert: The use of structure tensors to model the evolution of textural anisotropy of polar ice  
T. Thorsteinsson, E. D. Waddington and R. C. Fletcher: Scales of anisotropic effects  
S. H. Faria, G. M. Kremer and K. Hutter: On the inclusion of recrystallization processes in the modelling of induced anisotropy in ice sheets: a thermodynamicist's point of view

*1550–1650 h*

CHAIR: Elizabeth Morris

**SESSION 3: PHYSICAL AND MECHANICAL PROCESSES INVOLVED IN BASAL SLIDING**

- P. W. Nienow, A. L. Hubbard, B. P. Hubbard, D. W. F. Mair, M. J. Sharp and I. C. Willis: Hydrological controls on diurnal ice flow variability in valley glaciers  
S. Sugiyama, G. H. Gudmundsson and J. Helbing: Numerical investigation of the effects of temporal variations in basal lubrication on englacial strain-rate distribution  
A. C. Fowler: On the rheology of till

*Tuesday, 27 August 2002*

*0840–1020 h*

CHAIR: Richard Hindmarsh

**SESSION 4: PHYSICAL PROCESSES AND INTERPRETATION OF FIELD DATA**

- A. Käab: Glacier flow fields measured from ASTER satellite imagery: a new perspective for glacier modelling  
A. Fischer, H. Rott and H. Björnsson: Observation of recent surges of Vatnajökull, Iceland, by means of ERS SAR interferometry  
E. Rignot: Rapid ice discharge from southeast Greenland glaciers  
W. Rack, D. Steinhage, U. Nixdorf and H. Miller: Dynamic behaviour of Jutulstraumen glacier, Dronning Maud Land, Antarctica, derived from ERS SAR interferometry and airborne radio echo sounding

B. A. Patrick, A. F. Corvino and C. J. L. Wilson: Ice flow measurements and deformation at marginal shear zones on the Sørsdal Glacier, Ingrid Christensen Coast, East Antarctica

1050–1210 h

CHAIR: Chris Wilson

**SESSION 5: ICE-SHEET AND GLACIER CREVASSING AND DISCHARGE**

- A. Pralong and M. Funk: A description of crevasse formation using continuum mechanics  
E. Larour and E. Rignot: Initiation and propagation of cracks and rupture tips along Hemmen Ice Rise, on the Ronne Ice Shelf, Antarctica, observed with SAR interferometry, precursor to the large calving events of 1998  
U. C. Herzfeld, G. K. C. Clarke, H. Mayer and R. Greve: Derivation of deformation characteristics in fast-moving glaciers  
N. Reeh, E. Lintz Christensen, C. Mayer and O. B. Olesen: Tidal bending of glaciers: a linear visco-elastic approach

1400–1800 h

CHAIR: Ralph Greve and Eric Rignot

**SESSION 6: POSTER SESSION 1**

- M. Montagnat and P. Duval: Lattice distortion in deformed ice crystals from polar ice sheets; implications in the definition of deformation modes of ice and texture development (1)  
A. Miyamoto and H. Shoji: Long-term uniaxial compression tests on strong single maximum fabric ice (1)  
C. Scapozza and P. Bartelt: The influence of temperature on the small strain viscous deformation mechanics of snow: a comparison to polycrystalline ice (1)  
D. H. B. Irving: The rheology of coarse-grained, warm ice at low stress: implications for small ice bodies and their response to climate change (1)  
N. Azuma, K. Funaki and T. Takeda: Mechanical properties of ice which contains silica particles (1)  
A. Demongeot, J. Meyssonier and A. Philip: Stress concentrations at triple junctions of an ice multi-crystal (1)  
P. Sirota: The mechanical strength of basal ice and movement in polar glaciers (1)  
T. H. Jacka, S. Donoghue, LiJun and W. F. Budd: Laboratory studies of the flow rates of debris-laden ice (1)  
QiJilin, Lai Yuanming and Pu Yibing: The micro-fabric of frozen soil: experiments carried out using triaxial apparatus and CT (1)  
S. Kipfstuhl, Y. Wang, J. Freitag and H. Miller: Relaxation phenomena observed on the Dome C ice core  
Y. Wang, J. Kipfstuhl, N. Azuma, T. Thorsteinsson and H. Miller: Ice fabrics study in the upper 1500 m of the Dome C deep ice core, East Antarctica (1)  
G. Durand and J. Weiss: Grain size and grain shape profiles of the Dome Concordia ice core (1)  
A. Svensson, K. G. Schmidt, D. Dahl-Jensen, S. J. Johnsen, Y. Wang, J. Kipfstuhl and T. Thorsteinsson: Properties of ice crystals in NorthGRIP late Holocene ice (1)  
A. Svensson, P. Baadsager, A. Persson, C. S. Hvidberg and M.-L. Siggaard-Andersen: Seasonal variability in ice crystal properties at NorthGRIP. A case study around 301 m depth (1)  
D. E. Voigt, R. B. Alley, S. Anandakrishnan and M. K. Spencer: Ice core insights into the flow and shutdown of Ice Stream C (1)  
T. Thorsteinsson, O. Sigurðsson, T. Jóhannesson and G. Larsen: Identification of annual layers in a 100 m ice core from a temperate ice cap in Iceland (1)  
E. M. Morris and J. D. Cooper: Density measurements in ice boreholes using neutron scattering (1)  
O. Gagliardini and Y. Wang: Can grain area be used as a weight of polycrystal constituents? (1)  
K. G. Schmidt and D. Dahl-Jensen: An ice crystal model for Jupiter's moon Europa (1)  
A. Deponti, L. de Biase and V. Maggi: Thermal flow in glaciers (2)  
V. A. Pohjola and J. Hedfors: Studying the effects of strain heating on glacial flow within outlet glaciers from the Heimefrontjella Range, D.M.L., Antarctica (2)  
B. De Smedt and F. Pattyn: Numerical modelling of historical front variations and dynamic response of Sofiyskiy glacier, Altai Mountains, Russia (2)  
D. Zyryanov and R. Korsnes: Mathematical modeling of the large-scale ice sheets behavior subjected to the wind stress (2)  
K. Melvold, T. Laumann, S. O. Dahl and A. Nesje: Evolution of the Holocene climate at Midtdalsbreen, southern Norway, using a coupled mass-balance and ice flow model (2)  
O. Rybak and P. Huybrechts: A comparison of Eulerian and Lagrangian methods for dating in numerical ice sheet models (2)  
C. Zweck and P. Huybrechts: Modeling the marine extent of Northern Hemisphere ice sheets during the last glacial cycle  
B. Paschke and M. A. Lange: Dynamics and mass balance of the ice sheet/ice shelf regime Nivlisen, Antarctica, as derived from a coupled three-dimensional numerical flow model  
F. Pattyn: A 3D numerical thermomechanically coupled ice-sheet model including higher-order stress gradients: numerics and sensitivity experiments  
F. Saito, A. Abe-Ouchi and H. Blatter: Effects of the first order stress gradients to an ice sheet evaluated by a three-dimensional thermo-mechanical coupled model  
G. Aðalgeirsdóttir, G. H. Gudmundsson and H. Björnsson: A regression model for the mass-balance distribution of the Vatnajökull ice cap, Iceland  
R. G. Bingham, P. W. Nienow and M. J. Sharp: Intra-annual and intra-seasonal flow dynamics of a High Arctic polythermal valley glacier

- A. Zeoli, G. Corti, M. Bonini and M. Mellini: Analogue experiments of ice flow at the Frontier Mountain blue-ice field, Antarctica
- A. Grinsted, A. Sinisalo, J. Moore, E. Kärkäs and R. Pettersson: Snow accumulation studies in Antarctica with ground penetrating radar using 50, 100 and 800 MHz antenna frequencies
- D. Mair and D. Burgess: Reconstructing the spatial pattern of mass balance across Devon Ice Cap, Nunavut, Canada
- U. C. Herzfeld and H. Mayer: Seasonal comparison of ice-surface structures in the ablation area of Jakobshavn Isbræ drainage system, West Greenland
- L. Nicholson and D. Benn: Modelling ablation driven topographic evolution on a debris mantled glacier tongue, Ngozumpa Glacier, Nepal Himalaya
- S. Takahashi and O. Watanabe: Features of ice sheet flow and surface mass balance in the East Dronning Maud Land, East Antarctica
- H. J. Zwally, W. Abdalati, Li Jun, J. Saba, K. Steffen and W. Wang: Vertical ice velocities along flowline through the equilibrium zone of west central Greenland
- D. Russell-Head and C. J. L. Wilson: Automated fabric analyser system for hexagonal minerals

Wednesday, 28 August 2002

0840–1030 h

CHAIR: Nobuhiko Azuma

**SESSION 7: PHYSICAL PROCESSES AND INTERPRETATION OF FIELD DATA**

- J. L. Bamber and A. J. Payne: On the relationship between enhanced flow in an ice sheet and basal topography
- M. Lüthi, M. Funk and A. Iken: Mechanisms of fast flow in Jakobshavn Isbræ, Greenland: measurements of ice deformation, temperature and cross-borehole conductivity in boreholes to the bedrock
- N. Gundestrup, D. Dahl-Jensen, S. P. Gogineni and H. Miller: Wet feet at NorthGRIP
- A. Sinisalo, J. Moore, R. van de Wal, R. Bintanja and S. Jonsson: A 14-year mass balance record of a blue ice area in Antarctica
- A. Pälli, J. C. Moore, J. Jania and P. Glowacki: High-resolution ground-penetrating radar and DGPS survey results from Hornbreen, Hambergbreen and adjacent glaciers in southern Spitsbergen, compared with mapping by Mission Russe in 1899–1901

1110–1220 h

CHAIR: Niels Reeh

**SESSION 7: PHYSICAL PROCESSES AND INTERPRETATION OF FIELD DATA**

- H. Rebban, D. Wingham and G. Ratier: CryoSat: interferometric altimetry over ice sheets
- Li Jun, H. J. Zwally, H. Cornejo and D. Yi: Seasonal variability of snow-surface elevation in northern Greenland as modeled and detected by satellite radar altimetry
- F. Rémy, L. Testut, B. Legrésy, A. Forieri, C. Bianchi and I. Tabacco: Lakes and subglacial hydrological networks around Dome C and their impact on ice flow
- R. J. Arthern and R. C. A. Hindmarsh: Testing an optimal estimation algorithm for ice sheet mass balance

Thursday, 29 August 2002

0840–1020 h

CHAIR: John Moore

**SESSION 8: PHYSICAL PROCESSES AND INTERPRETATION OF FIELD DATA**

- D. P. Winebrenner, B. Smith, G. Catania, H. Conway and C. F. Raymond: Radio-frequency attenuation beneath Siple Dome, West Antarctica from wide-angle and profiling radar observations
- J. Kohler: Polythermal glacier firn and ice stratigraphy imaged with ground-penetrating radar
- D. Steinhage, U. Nixdorf and H. Miller: Internal structure detected by airborne RES and derived properties in the vicinity of Kohnen Station, Dronning Maud Land, Antarctica
- S. Fujita, K. Matsuoka, H. Maeno and T. Furukawa: Scattering of VHF radio waves from within the deepest several-hundred-meter of the Antarctic ice sheet: implication for the physical conditions
- K. Matsuoka, S. Uratsuka, T. Furukawa, H. Maeno and S. Fujita: Crystal-orientation fabrics revealed by dual-frequency, multi-polarization-plane radar surveys and their relation to ice-sheet topography in East Antarctica Alaska

1050–1210 h

CHAIR: Ayako Abe-Ouchi

**SESSION 9: MODELS AT DIFFERENT SCALES AND THEIR INTERACTIONS**

- A. J. Payne: Numerical modelling of the flow pattern of the present-day Antarctic Ice Sheet
- S. Bradford and J. Bamber: A finite volume model of ice flow in the Northeast Greenland ice stream
- M. Schmeltz, E. Rignot, D. MacAyeal and T. K. Dupont: Modelling experiments on Pine Island Glacier, West Antarctica
- M. Bougamont, S. Tulaczyk and I. Joughin: Numerical investigations of the slowdown of Whillans Ice Stream, West Antarctica: is it shutting down like Ice Stream C?

**SESSION 10: POSTER SESSION 2.**

- R. Staroszczyk: Plane ice-sheet flow with evolving and recrystallising fabric (1)
- C. S. Hvidberg and D. Dahl-Jensen: Anisotropic flow of ice sheet ice (1)
- B. A. Marmo and C. L. Wilson: Strain softening due to fabric development in polycrystalline ice and its control on the flow rate of a polar outlet glacier (1)
- S. Fitzsimons: Patterns and processes of basal ice deformation in cold glaciers (1)
- S. Sleewaegen, D. Samyn, S. Fitzsimons and R. Lorrain: Build-up of basal ice beneath a cold-based Antarctic glacier: a combined isotopic and gas composition approach (1)
- P. Sammonds, C. Stafford, C. Bristow, N. Eyre and J. Hart: Comparison of proglacial and subglacial landforms and sediments at the Langjökull ice cap (1)
- J. Hedfors, V. Peyaud, V. Pohjola, P. Jansson and R. Pettersson: Investigating the dynamic environment for local extrusion flow on Storglaciären, Sweden, using force budget analysis (1)
- L. Moreau: Relationship between basal sliding and subglacial hydrology, Glacier d'Argentière, Mont Blanc, France: 15 years of continuous measurements (1)
- G. E. Flowers, S. J. Marshall and H. Björnsson: Using hydrology to improve the basal boundary condition in models of Vatnajökull, Iceland (1)
- C. Schoof: Basal sliding and cavitation on irregular hard beds
- K. Melvold, G. Lappégard and T. Schuler: Modeling of an artificial conduit, applied on Høganäsreen, Spitsbergen (1)
- P. Bates, M. Siebert, V. Lee, B. Hubbard and P. Nienow: Numerical simulation of three-dimensional velocity fields in pressurised and non-pressurised Nye channels (1)
- T. Schuler and U. H. Fischer: Elucidating changes in the degree of tracer dispersion in a subglacial channel (1)
- M. Lüthi, M. Funk and A. Iken: Possible detection of an englacial shear zone (1)
- J. S. Kargel, A. Kääb, R. Wessels and H. H. Kieffer: Glacier bed slip, internal deformation, and glacier rheology deconvolved from high-resolution displacement data (1)
- S. Donoghue and T. H. Jacka: The stress regime within the Law Dome summit to Cape Folger ice flowline, based on examination of the crystal fabrics (1)
- K. Saheicha, H. Sandhäger and M. A. Lange: Modelling the effect of fracture structures on the flow-regime of an idealized ice shelf (1)
- J. Weiss: Scaling analysis of crevassing (1)
- H. J. Zwally, J. L. Saba and W. Wang: Driving stresses and ice flowlines in the Mars North Polar ice cap (1)
- C. Sotin and G. Tobie: Viscosity of ice and dynamics of the large icy satellites of the giant planets (1)
- C. Mayer, N. Reeh, O. B. Olesen, E. Lintz Christensen and H. Oerter: The “Midgårdormen” ice ridge, NE-Greenland, from an ice mechanical viewpoint (2)
- F. Pattyn, B. de Smedt, S. de Brabander, W. van Huele, A. Agatova, A. Mistrukov and H. Declair: Ice-dynamical and basal properties of Sofiyskiy glacier, Altai Mountains, Russia, based on GPS and radio-echo sounding surveys (2)
- J. Kohler, J. C. Moore and E. Isaksson: Comparison of modelled and observed responses of a glacier snowpack to ground-penetrating radar (2)
- R. Hindmarsh and M. Fahnestock: Inversion for relative accumulation and ablation in Greenland using radar lines (2)
- A. Pälli, J. C. Moore and C. Rolstad: Differences in firn-ice transition zone properties of polythermal glaciers near Ny Ålesund, Lomonosovfonna and Hornsund, Svalbard, determined by ground-penetrating radar (2)
- S. Fujita, K. Matsuoka, H. Maeno and T. Furukawa: Scattering of VHF radio waves from within an ice sheet containing the vertical-girdle-type ice fabric and anisotropic reflection boundaries (2)
- K. Matsuoka, T. Furukawa, H. Maeno, S. Fujita and R. Naruse: Interpretation of internal reflection layers detected with a 30-MHz radar in Antarctica (2)
- B. Benjumea, Yu. Ya. Macheret, F. J. Navarro and T. Teixidó: Interpretation and intercomparison of radar and seismic data from a temperate glacier to infer internal structure and physical parameters of ice (2)
- O. Eisen, F. Wilhelms, U. Nixdorf and H. Miller: Identifying isochrones in GPR profiles from DEP-based forward modeling (2)
- M. J. Siegert: Three-dimensional ice sheet structure across the Byrd station strain network measured by ice penetrating radar (2)
- E. C. King, D. L. Morse, R. B. Alley, S. Anandkrishnan, D. D. Blankenship and A. M. Smith: Radar profiles from the onset region of Ice Stream D1, Siple Coast, West Antarctic (2)
- A. Forieri, C. Ritz, F. RÚmy, I. Tabacco, A. Della Vedova and A. M. Marotta: Reprocessing of radar data in Dome C area and first experiment for a 3-D thermomechanical model (2)
- D. J. Baldwin, J. L. Bamber, A. J. Payne and R. L. Layberry: Using internal layers from the Greenland Ice Sheet, identified from radio echo sounding data, with numerical models (2)
- A. Bauder, M. Funk and G. H. Gudmundsson: The ice thickness distribution of Aaregletscher, Switzerland (2)
- Sun Bo, He Maobing, Jiao Keqin, Wen Jiahong and Li Yuansheng: Determination of ice thickness, sub-ice topography and ice volume at Ürümqi glacier No.1 in the Tien Shan, China, by ground penetrating radar (2)
- U. Nixdorf, D. Steinhage, W. Rack and H. Miller: Mass balance considerations for the Jutulstraumen basin, Dronning Maud Land, Antarctica, based on airborne radio echo sounding, field measurements, and satellite remote sensing (2)
- L. Testut, R. Hurd, R. Coleman, F. Rémy and B. Legresy: Precise drainage pattern of Antarctica derived from high resolution topography (2)

- B. Legresy, M. Gay, C. Vincent, E. Berthier, Y. Arnaud and F. Rémy: Satellite imagery for investigation of small alpine glaciers dynamics (2)
- J. L. Bamber, D. J. Baldwin and S. P. Gogineni: A new bedrock and surface elevation data set for modelling the Greenland ice sheet (2)
- B. H. Raup, T. A. Scambos and T. Haran: Investigation of Antarctic flow stripe morphology using data from the ALI instrument (2)

Friday, 30 August 2002

0840–1030 h

CHAIR: Jay Zwally

**SESSION 11: ICE BEHAVIOUR AND ICE MASS EVOLUTION IN EXTRATERRESTRIAL ENVIRONMENTS**

- F. Carsey, C. T. Mogensén, A. Behar, H. Engelhardt and A. L. Lane: Science goals for a Mars polar cap subsurface mission: optical approaches for investigations of inclusions in ice
- W. C. Mahaney, J. Dohm, V. Baker, N. A. Cabrol, E. A. Grin and R. C. Anderson: Rock glaciers on Mars? Earth-based clues to Mars' recent paleoclimatic history
- J. S. Kargel: Martian polar caps: active, phenomenologically complex glacial ice sheets
- C. S. Hvidberg: Relations between topography and flow in the North Polar Cap on Mars
- R. Greve, V. Klemann and D. Wolf: Ice flow and isostasy of the north polar layered deposits of Mars

1100–1220 h

CHAIR: Martin Funk

**SESSION 12: PROCESSES AND INTERPRETATION OF FIELD DATA**

- N. Tosi: Comparison between different models of Lys Glacier (Alpes-Italy) with particular reference to its basal behavior; utilizing different hypotheses about its flow parameter values and various methods of interpolating the measured data
- M. J. Siegert, A. J. Payne and I. Joughin: Spatial stability of Ice Stream D and its tributaries, West Antarctica, revealed by radio-echo sounding and interferometry
- E. C. Pettit, H. P. Jacobson and E. D. Waddington: Effects of basal sliding on isochrones and flow near an ice divide
- R. Warner, N. Young and M. Ross: Ice flow properties from the Amery Ice Shelf, computed by a control method

1400–1520 h

CHAIR: Leslie Morland

**SESSION 13: MODELS AT DIFFERENT SCALES AND THEIR INTERACTIONS**

- P.-L. Forsström, O. Sallasmaa, R. Greve and T. Zwinger: Simulation of the Late Weichselian glaciation in Fennoscandia with the ice-sheet model SICOPOLIS
- C. Schoof: The effect of bed topography on ice sheet dynamics
- R. C. A. Hindmarsh: Thermo-mechanical coupling of ice flow with the bedrock
- F. Ng and H. Björnsson: On the Clague-Mathews relation for jökulhlaups

1550–1630 h

CHAIR: Leslie Morland

**SESSION 13: MODELS AT DIFFERENT SCALES AND THEIR INTERACTIONS**

- A. Humbert, M. Weiss, R. Greve and K. Hutter: Parameter sensitivity study for the ice flow in the Ross Ice Shelf, Antarctica
- W. Wang, H. J. Zwally, C. L. Hulbe, M. J. Siegert and I. Joughin: Dynamics of ice flow leading to the onset of Ice Stream D, West Antarctica - numerical modelling based on the observations from Byrd Station borehole