

Program draft for the convection part of the workshop

Tuesday AM: Convection and material properties, plates, heat flow, and surface observables

- 9:00 Opening of the workshop
- 9:10 N. Ribe: Poloidal-toroidal coupling, plates, and surface observables
- 9:35 Discussion and short presentations (Ricard, Jacoby) *Pom a syok*
- 9:55 P. Machetel: Compressible convection with phase boundaries
- 10:20 Discussion and short presentations (Glatzmeier, Steinbach, Khachaj, Baumgardner)
- 10:45 *Coffee break*
- 11:05 General session on variable viscosity and plates (short contributions by Colin, Cadek, Dupeyrat, v.d.Berg, Gable, Gavrilov, O'Connell, Kracht, Fowler, Zhang)
- 12:30 *Lunch*

Tuesday PM: Convection and compositional differences

- 14:00 U. Christensen: Buoyant tracer particles in thermal convection
- 14:25 Discussion and short presentations (Baumgardner, van Keken)
- 14:45 C. Kincaid: Laboratory and numerical experiments on subduction and the long-term fate of chemically distinct lithosphere
- 15:10 Discussion and short presentations (Blankenbach)
- 15:30 *Coffee break*
- 15:50 B. Lafaurie: Plumes and deflection of chemical boundary: cellular automata on a connection machine
- 16:15 Discussion and short presentations (Bagdassarov)
- 16:30 Thermochemical convection exercise - discussion of results
- 19:00 *Dinner*
- 20:00 (if necessary: Continuation of thermochemical exercise or session on variable viscosity and plates)

Wednesday AM: 3-D convection calculations

- 9:00 G. Houseman: 3-D convection models in cartesian coordinates
- 9:25 Discussion and short presentations (Cserepes, Christensen)
- 9:45 D. Bercovici: Modal growth and coupling in 3-D spherical convection
- 10:10 Discussion and short presentations (Harder, Glatzmeier)

- 10:30 *Coffee break*
- 10:50 J. Baumgardner: Influence of buoyant plates and phase transitions in 3-D spherical convection
- 11:15 Discussion and short presentations
- 11:35 B. Travis: 2-D and 3-D models of plumes
- 11:50 Discussion and short presentations (Kincaid)
- 12:30 *Lunch*

Wednesday PM: 3-D Benchmark / Time-dependent convection and nonlinear dynamics

- 14:00 Discussion of 3-D benchmark results
- 15:30 *Coffee break*
- 15:50 U. Hansen: Mass and heat transport in strongly time-dependent convection
- 16:15 Discussion and short presentations (Stewart)
- 16:35 C. Gable: Chaotic mixing in the mantle: Time-dependence is unnecessary
- 17:00 Discussion and short presentations
- 17:15 F. Busse: Rayleigh-Benard convection as example of bifurcation from isotropic states
- 17:40 Discussion and short presentations (Stewart)
- 19:00 *Dinner*
- 20:00 (if necessary: Continuation of 3-D benchmark)

Thursday AM: Laboratory experiments / Numerical technique

- 9:00 C. Lithgow: Experimental results of high Ra convection with temperature dependent viscosity
- 9:25 Discussion and short presentations (Giannandrea, Davaille)
- 9:50 H.C. Nataf: Modelling the lithosphere in laboratory experiments and observing subduction and plumes
- 10:15 Discussion and short presentations
- 10:30 *Coffee break*
- 10:50 L. Guillou: Laboratory experiments of mantle convection with continents
- 11:15 Discussion and short presentations
- 11:30 G. Jarvis: Effects on heat flow of convection in cylindrical coordinates
- 11:55 Discussion and short presentations on numerical technique (Fradkov, Polyakov)
- 12:30 *Lunch*

Day

*MODELING LITHOSPHERIC DYNAMICS**Friday, August 9*

0900 Session 1 Lithosphere - Asthenosphere Interactions

Chairpersons: Marcia McNutt, Luce Fleitout

0900 Overview Presentations and Discussion- McNutt/Fleitout

0945-1045 Topic: Large Scale and Thermal Interactions

Shimon WADOWINSKI SIO-UCSD

Andean Deformation as Indication of Interaction between asthenospheric and lithospheric processes

Mian LIU Penn State

Non-plume localized lithosphere-asthenosphere thermal interaction

Mikhail KARPYCHEV

On the Thermal processes beneath an ocean swell

Ondrej CADEK

Global Lithospheric Rotation

1045-1105 Coffee Break

1105-1150 Topic: Deformation of the Lithosphere

Alexei POLIAKOV

Topography above diapir

Chris KINCAID Univ. Rhode Is.

Numerical experiments on deformation of the subcontinental lithosphere and mantle convection

Gabriele MARQUART

Lithospheric Squeezing

1150-1230 Topic: Geoid and Mantle Structure

Svetlana PANASYUK

The mantle structure of Eurasia in terms of steady state convection:  
Combination of geoid and seismic tomography data

Maarten REMKES Utrecht

Mediterranean geoid from seismic tomography

1400 Session 2 Modeling of Lithospheric Dynamics I.

Chairpersons: Jay Melosh Jean-Pierre Vilotte

1400 Overview Presentations and Discussion- Melosh/Villote

1445-1510 Topic: Eulerian/Lagrangian Formulations

Uli CHRISTENSEN

Eulerian techniques in lithospheric mechanics

Michelle WALLACE Univ. Arizona

Buckling of a homogeneous plate (use of TECTON)

1510-1550 Topic: Large Deformations and Regridding

Greg HOUSEMAN

Dynamic mesh regridding for large strain FEM calculations

Jean BRAUN RSES-ANU

Efficient technique for large strain deformation

J.P. VILOTTE

Adaptive remeshing for strain localization

1550-1610 Coffee Break

1610-1640 Topic: Fault/Shear Zone Properties

Randy RICHARDSON Univ. Arizona

Byerlee's Law Paradox

Kevin FURLONG Penn State

Rheologic properties of lithospheric plate boundaries

1640-1710 Topic: Incorporating Faults/Discontinuities

Greg HOUSEMAN

Fault embedded in non-linear ductile medium: methods and initial results

Charles WILLIAMS Princeton

Slippery Nodes: Strain energy considerations

1710-1745 Topic: Modeling Techniques - Advances and Problems

Charles WILLIAMS Princeton

Viscoplastic modeling

Rob Govers Utrecht

Stability Problems in FEM Simulations

Saturday, August 10

0900 Session 3 Modeling Lithospheric Dynamics II

Chairpersons: Rinus Wortel Yannick Ricard

0900 Overview Presentations and Discussion - Wortel/Ricard

0945-1015 Topic: Lithospheric Strength

Randy RICHARDSON Univ. Arizona  
Long-term strength of the lithosphere

Gabriele MARQUART  
Plate bending, effect of lateral variable elastic thickness

1015-1100 Topic: Regional Modeling

Paul MEIJER Utrecht  
Dynamics of plate motion - South American plate

David COBLENTZ Univ. Arizona  
Stress modeling in the Andes: Constraints of intraplate stress magnitudes

H. J. MELOSH Univ. Arizona  
Stress and strain modeling of the Pacific Northwest

1100-1115 Coffee Break

1115-1145 Topic: Buckling and Faulted Media

Michelle WALLACE Univ. Arizona  
Buckling of a faulted lithosphere

Fred BEEKMAN (et al.) V.U. Amsterdam  
Numerical models for stress induced large scale folding/thrusting in oceanic and continental lithosphere

Igor GARAGASH Inst. Earth Physics, USSR Acad. Sci.  
Large scale stress state of lithosphere associated with fault tectonics

1145-1230 Topic: Extensional Regimes

Gianna BASSI AGC, Canada  
Lithosphere Rifting - necking instabilities, Lithosphere Strength

Shimon WADOWINSKI SIO-UCSD  
Extension in Metamorphic Core Complexes

J.D. van WEES (et al.) V.U. Amsterdam  
Lithospheric rheology and dynamics of extension and inversion

1400 Session 4    Scaling and Subduction Processes

Chairperson:        Kevin Furlong

1400 H. HERMANN  
      Scaling Laws and Disordered Media

1530-1550 Coffee Break

1550-1620 Topic: Subduction Zone Processes

Marc R. de JONGE Utrecht  
      Thermal structure of the upper mantle by means of conduction analysis

Cheryl STEWART Cornell  
      Mechanics of Olivine-Spinel phase transformation in subduction zones

1620-1730 *Plenary Discussion - Future Plans*

FORMAT OF LITHOSPHERIC DYNAMICS SESSIONS

The format for the lithospheric session is aimed at maximizing discussion. Each half-day session (with the exception of Session 4) will start with an overview presentation by the Chairpersons. The overview will help to identify important topics/problems to be focused on in that session. Each session is divided into topics for which approximately 30-45 minutes each is scheduled. In each of these topics speakers and titles are listed. Each of the speakers should plan on approximately *5 Minutes* for presentation. Discussion on all of the presentations in each topic will then follow. With this format we hope to promote discussion of the important details in sufficient depth.

Remember this is intended to be a workshop. In your presentations please focus on new developments in technique, problems encountered (and overcome?) in your modeling, or insight gained from your applications. We suggest you plan on no more than 3-5 slides/viewgraphs for the SHORT presentations.