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SORBONNE UNIVERSITÉS

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XIV International Workshop on Modelling of Mantle and Lithosphere Dynamics

Daily Program

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Oléron-France

Aug 31-sept 5 2015

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EUROPEAN GEOSCIENCES UNION est. 2002

Welcome to the XIV International Workshop on Modelling of Mantle and Lithosphere Dynamics! The workshop was initiated in 1987 in Neustadt an der Weinstrasse, Germany, and has been followed by meetings every two years in various European countries. The last two workshops were held in Hønefoss, Norway, in 2013 and in Gross Doelln, Germany, in 2011.
The 2015 workshop will be held in Olérons Island, France. The meeting is cosponsored by the Thematic Meeting Series of the European Geosciences Union (EGU), the International Lithosphere Program (ILP), the Institut des sciences de la Terre Paris (ISTeP, UPMC), the ERC-Rheolith, and the Computational Infrastructure for Geodynamics (CIG). It was organised with the great help of the local geosciences student association (AEG).

The aim of this workshop is to bring together experienced scientists, early career scientists and PhD candidates, therefore it is always established in an isolated place where everybody enjoy breakfast lunch dinner and beers together. It is therefore strongly encouraged to mix generations at tables and to get the younger to present their work both at the poster sessions and during social events.

DAILY PROGRAM

The meeting is splitted into for topical sessions :
Deep Earth and Planetory Bodies (chaired by G. Gobalek)
Strain localization in the crust and lithosphere (Sponsored by ERC Rheolith, chaired by E. Burov)
Coupling physics and Linking Time scales : New frontiers and problems (chaired by L. Le Pourhiet)
Mantle Lithosphere Interaction (chaired by D. Stegman)
and one technical session
Data assimilation, efficient solvers and homogeneisation (chaired by D. May)

Due to early departure on Satursday the 5th of September, the topical sessions last one day each, while the technical session orals will spread every afternoon on Monday, Tuesday and Friday.

MONDAY 31TH AUGUST :

19:00 Ice Breaker
20:00 welcome buffet

Daily program

TUESDAY 1rST SEPTEMBER

8:30 Laetitia Le Pourhiet Welcome (with participation of L. Kellogg, S. Buiter and E. Burov)

Deep Earth and Planetory Bodies

Chairman : Gregor Gobalek

9:00 Saskia Goes (Imperial College London, UK)
The deep mantle large low shear-velocity provinces - largely thermal features?

10:00 One minute posters

10:30 coffee break

11:00 Abigail L. Aller (CEEDS, Norway)
Subduction History and the Evolution of Earth's Lower Mantle

12:00 Lunch

13:30 Patrick Cordier (Université de Lille 1, France)
From defects to mantle flow.

Data assimilation, efficient solvers and homogenization (part 1)

Chairman : Dave May

14:30 Jed Brown (Boulder, Colorado and Argonne National Lab., USA)
Tradeoffs in data assimilation and solver design

15:30 coffee break + students meet with speakers

16:30 Poster session

18:30 Plenary Discussion

19:30 Apero and Diner

POSTERS 1/09/2015 :

How can initially stagnant slabs sink into the lower mantle?
Agrusta R. , Goeas S. , van Hunen J.

Compositional mantle layering revealed by slab stagnation at ~1,000 km depth
Ballmer, M. D. , J. Ritsema , T. Nakagawa , N. C. Schmerr

Geodynamic modelling of a mantle plume under La Réunion
Bredow E. , Steinberger B. , Sigloch K.

A benchmark initiative on mantle convection with melting and melt segregation
Dohmen J. , Schmeling H. , Dannberg J. , Maurice M. , Noack L. , Plesa A.C. , Thieulot C. , Tosi N., Wallner H.

Melting at the mantle conditions
Fomin I., Tackley P.

Towards coupled giant impact and long-term interior evolution models
Golabek G. J. , Jutzi M. , Emsenhuber A. , Gerya T. V. , Asphaug E. I.

Daily program

Reconciling observations of PKIKP precursors and thermochemical convection models
Haugland S. , Ritsema J.

Grain-size dependent transition between dislocation and diffusion creep
Huettig C , Breuer D , Plesa A

Is there any correlation between continents and elevated temperatures in the subcontinental mantle?
Jain C., Rozel A., Tackley P.

Stability of convection patterns in 3D and implications for benchmarking
Kellogg L.H. , Arrial P.A. , Flyer N. , Wright G.B.

Early evolution and dynamics of Earth from a molten initial stage
Lourenço D.L. , Tackley P.J.

Delamination of the Mafic Subducting Crust
Maunder B. , van Hunen J. , Magni V. , Bouilhol P.

Consequences of magma ocean solidification
Maurice M. , Tosi N. , Plesa A.-C. , Breuer D. , Huettig C.

Does Earth's Hot Accreted Core Power Mantle and Core Convection?
Morgan, J.

The effect of viscosity variations in determining dynamic topography from seismic tomography models
O'Farrell, K. , Lithgow-Bertelloni, C.

Semi analytical model for the effective grain size profile in the mantle of the Earth
Rozel A. , Golabek G. , Thielmann Marcel , Tackley P.

Evidence for and dynamical consequences of a viscosity increase in the mid-mantle
Rudolph, M.L. , Lekic, V. , Lithgow-Bertelloni, C.

Temporal variation of the geoid and dynamic topography inferred from geodynamics modeling
Shahraki M. , Schmeling H.

Generating dynamos in basal magma oceans
Stegman D. , Ziegler L. , Davies, C.

The key influence of magmatism on the thermo-chemical-tectonic evolution of terrestrial planets
Tackley P. J. , Lourenco D. , Nakagawa T. , Rozel A.

Mercury's low-degree geoid and topography controlled by insolation-driven elastic deformation
Tosi N. , Cadek O. , Behounkova M. , Kanova M. , Plesa A. , Grott M. , Breuer D. , Padovan S. , Wieczorek M.

On Evolving Lid-States, Bi-Stability, and the Evolution of Terrestrial Planets: Pathways and Divergences in Planetary Evolution
Weller M.B. , Lenardic, A.

Daily program

Wednesday 2nd September

Strain localization in the crust and lithosphere (Sponsored by ERC Rheolith)

chairman : Evgenii Burov

8:30 Stefan Schmalholz (Université de Lausanne, Switzerland)
Fundamental strain localization mechanisms during lithospheric deformation

9:30 Frederic Gueydan (Université de Montpelier 2, France)

Strain localization in the continental lithosphere

10:30 coffee break

11:00 One minute posters (technical session + coupling linking) and poster session

12:00 Lunch

13:30 Martha Perez Gussinié (Royal Holloway,,UK)

Modes of extension and oceanization at magma-poor margins: an example from the Brazilian-African margins

Data assimilation, efficient solvers and homogenization (part 2)

Chairman : Dave May

14:30 Yann Capedeville (Nantes, France)

Non-periodic homogeneization for seismic forward and inverse problems

15:30 coffee break + students meet with speakers

16:30 One minute posters (Strain Localisation in the crust and lithosphere) and poster session

18:30 Plenary Discussion

19:30 Apero and Diner

Posters 2/09/2015 :

Data assimilation, efficient solvers and homogenization

Inferring the initial conditions of mantle convection from the mantle temperature structure using pattern recognition
Atkins, S. , Rozel, A. , Valentine, A.P. , Tackley, P.J. , Trampert, J.

A high-resolution 3D geodynamical model of the present-day India-Asia collision system
Baumann T. , Kaus B. , Popov A.

Applying data assimilation to mantle circulation and surface tectonics: a proof of concept
Bocher M.**,** Coltice, N. , Fournier, A. , Tackley, P.J.

Another regional spherical grid

Daily program

Huettig C

Newton versus Drucker-Prager
May D.A. , Spiegelman M.

Modelling in tomorrow's technological landscape - unveiling Underworld2
Quenette S. , Moresi L. , Mansour J. , Revote J.

On the use of the stabilised Q1P0 element for geodynamical simulations
Thieulot C.

Coupling physics and Linking Time scales : New frontiers and problems

Seismo-Thermo-Mechanical modeling of collisional margins
Dal Zilio L. , van Dinther Y. , Gerya T.

3D Compressible Melt Transport with Mesh Adaptivity
Dannberg J. , Heister T.

Coupling a geodynamic seismic cycling model to rupture dynamic simulations
Gabriel, A.-A. , van Dinther, Y.

Mapping the subsurface with seismic and GPS data – example of Japan
Kelevitz K., Houlie N., Giardini D., Rothacher M.

Links between long term and short term rheology of the lithosphere
Le Pourhiet L.

Towards continuum models of lateral rupture propagation in a segmented megathrust
Pranger, C. , van Dinther, Y. , Le Pourhiet, L. , May, D. , Gerya, T.

Sea level changes induced variations in mid-ocean ridge and hotspot volcano CO2 degassing
Ruepke L. , Hasenclever J. , Knorr G.

Ocean depth through deep time
Sim S. , Stegman D.R. , Coltice N.

Strain localization in the crust and lithosphere (Sponsored by ERC Rheolith)

Making Coulomb angle-oriented shear bands in numerical tectonic models
Choi, E. , Petersen, K. D.

Numerical thermo-mechanic 3D modeling of the India-Asia collision
Dargère L. , Burov E. , Jolivet L. , Gerya T.

Lower crustal viscosity and modes of continental lithospheric extension
Elena Ros , Marta Pérez-Gussinyé , Jason Phipps Morgan , Miguel Andrés-Martínez

Pattern formation in 3D numerical models of down-built diapirs initiated by a Rayleigh–Taylor instability.
Fernandez N., Kaus, B.J.P.

Impact of fluid circulation on the symmetry of detachments
Mezri L., Le Pourhiet L., Wolf S., Burov E.

Numerical simulation of Glacial Isostatic Adjustment

Daily program

Miglio E. , Penati M.

The role of elasticity in simulating long-term tectonic extension
Olive J.-A. , Behn M. D. , Mittelstaedt E. , Ito G. , Klein B. Z.

Does the inherited composition of the crust controls the symmetric or asymmetric exhumation of continental core complex?
Plunder A. Mezri L., Le Pourhiet, L. and Burov, E.

Submarine Mass-waste Events caused by Seamount Subduction
Ruh, J.B. , Gerya, T.

The impact of the initiation phase in numerical models of continental rifting
Susanne Buiter and Joya Tetreault

Intermediate-depth earthquake generation and shear zone formation caused by grain size reduction and shear heating
Thielmann M., A.Rozel, B.J.P. Kaus and Y.Ricard

Using naturally deformed peridotites to constrain models of shear localization
Warren J.M. , Hansen L.N. , Kumamoto K.M. , Skemer P

Dynamic and structural setting of the Marlborough Fault Zone, New Zealand
Willis D. , Betts P. , Ailleres L., Moresi L.

Daily program

THURSDAY 3RD SEPTEMBER

Coupling physics and Linking Time scales : New frontiers and problems

chairman: Laetitia Le Pourhiet (UPMC)

8:30 Yuri Fialko (UCSD, USA)
What controls the thickness of the seismogenic layer? New insights from high-temperature rock friction experiments.
9:30 Gregory Houseman (University of Leeds,UK)
Geological Constraints on the Constitutive Laws that Govern Deformation of the Crust and Lithosphere.
10:30 coffee break
11:00 Ylona van Dinther (ETH Zurich, Switzerland)
12:00 Lunch + Students meet with speakers
14:30 Plenary discussion

15:30 FREE TIME
You can take a initiation to sailing (25 euros) or enjoy the swiming pool or play petanques or go for a bike tour (free) or go for an optional guided tour in english of the Oyster parc at Fort-Royer (3 euros, max 50 participants) and then we all meet in Boyard ville for :

17:30 Apero and degustation of local products at For Boyer Boyard Ville (included)
19:00 Boat trip to Fort Boyard (included)
20:30 Diner

FRIDAY 4RTH SEPTEMBER

Mantle Lithosphere Interaction

Chairman: Dave Stegman

8:30 Taras Gerya (ETH zurich, Switzerland)

Earth before plate tectonics: questions and answers

9:30 One minute poster presentations

10:30 coffee break

11:00 Alexandre Koptev (UPMC, France)

3D thermo-mechanical numerical modelling of continental rifting via plume-lithosphere interaction in presence of far-field forces

12:00 Lunch

13:30 Claudio Faccenna (Univ. Roma tre, Italy)

Mountain building and mantle dynamics

Data assimilation, efficient solvers and homogenization (part 3)

Chairman : Dave May

14:30 Boris Kaus (Univ. Mainz, Germany)

Geodynamic inverse modelling to constrain the rheology of the lithosphere

15:30 coffee break + student meet with speakers

16:30 Poster session

18:00 Plenary discussion

19:30 Gala

POSTERS 4/09/2015 :

How to model an incipient subduction across a transform fault ?
Abecassis S. , Arcay D. , Lallemand S.

The effects of far-field boundary conditions on 2D numerical solutions for continental rifting: Tests and recipes for improved treatment of asthenosphere flow and melting
Albert de Montserrat Navarro , Jason P. Morgan , Robert Hall , Marta Perez-Gussinye, Miguel Andres-Martinez

Assessing the Long-Term Structural Deformation of the Crust-Mantle Boundary Beneath the Lunar Basins
Balcerski, J. , Hauck, S

3D geodynamic models of alpine type collisions and details of a new method to create 3D input geometries for particles-in-cell based codes
Bauville A. , Baumann T. , Kaus B.

Thermal Reconstruction of the South Atlantic conjugate margins: coupling geodynamic modelling with

petroleum system modelling
Beniest, A. ; Burov, E. ; Cloetingh, S. ; Sassi, W. ; Guichet, X.

Simultaneous wide-spread intraplate normal faulting and ultraslow oceanic spreading in Arctic Ocean: Insights from 3D models
Burov E. , Koptev A., Nikishin A. , Gaina, C. , Yu.B. Kazmin , E.I. Petrov , I.F. Glumov , T. Gerya , N.A. Kulyukina , A.F. Morozov

Relationship between slab dip and topography segmentation in an oblique subduction zone : insights from numerical modeling
Cerpa N.G., Hassani R. , Gerbault M.

Lithosphere–asthenosphere interactions near the San Andreas fault
Chamberlain C.J. , Houlie N. , Bentham H.L.M., Stern T.

Towards dynamically constraining subduction zone parameters from surface-topography characteristics
Crameri F. , Lithgow-Bertelloni C.R. , Tackley P.J.

Subduction-induced break-up and drifting of continental plates
Dal Zilio L. , Faccenda M. , Capitanio F.

Influence of subduction history and surface processes on continental-scale topography
Flament N. , Salles T. , Müller R.D. , Gurnis M.

Two aplications of the mantle convection code “aspect” for geodynamics
Fraters M. R. T. , Glerum A. , Thieulot C. , Spakman W.

Constraining slab breakoff induced magmatism through numerical modelling
Freeburn R. , van Hunen J. , Maunder B. , Magni V. , Bouilhol P.

Thermo-mechanical modelling of progressive deformation and seismic anisotropy at the lithosphere-asthenosphere boundary: the effect of a

horizontal pressure gradient
Fuchs L. , Schmeling H. , Koyi H.

Subduction history and slab morphology
Garel F. , Goes S. , Davies D. R. , Davies J.H. , Kramer S. , Wilson C.

Models and observations of plume-ridge interaction in the South Atlantic and their implications for crustal thickness variations
Gassmoeller, R. , Dannberg, J. , Bredow, E. , Steinberger, B. , Torsvik, T.

Flat-slab subduction, topography, and mantle dynamics in southwestern Mexico
Gérault M. , Husson L. , Miller M.S. , Humphreys D.E.

Upstream offset of surface volcanism with respect to the plume axis explained with elastic plate flexure
Gerbault M. , Fontaine F. , Rabinowicz M.

The Role of Plateau Collision-Subduction on Overriding Plate Deformation in Alaska
Haynie K. , Jadamec M.

Perennial plate tectonics with lasting mantle lithosphere scars
Heron, P.J. , Pyslywec, R.N. , Stephenson, R.

The dynamics of double slab subduction
Holt A. F. , Becker T. W. , Royden L. , Faccenna C.

Thermo-mechanical investigation of onset and stability of flat subduction
Kanda, R. V. S., Lowry, A. R.

Integrating predictions from 3D numerical flow models with observations of seismic anisotropy from the Nazca-South America boundary
Kendall E. , Lithgow-Bertelloni C., Faccenda M.

Daily program

Double-sided subduction systems: insights from analogue models
Kiraly A. , Funiciello F. , Faccenna C.

A complex melt-network and the effect of his geometrical properties on the shear viscosity of the matrix in a partially molten medium
Kruse J. Ph. , Schmeling H.

Coupling Stokes and Darcy Flow in Melt Migration Modelling
Lehmann R.S. , Kaus B.J.P. , Lukáčová-Medvidová M.

Numerical modeling of the destruction of North china craton in terms of thermal erosion
Liang Liu, Jason Morgan, Yigang Xu, Martin Menzies

Strain partitioning in the crust during continental collision: Insight from 2D numerical modeling
Liao J. , Gerya T.

Understanding lithospheric stresses: systematic analysis of controlling mechanisms with applications to the African Plate
Medvedev S.

Role of viscoelasticity in mantle convection models
Patocka V. , Cadek O. , Tackley P.

Reconciling numerical models of the mantle wedge with lava thermobarometry in Tonga
Perrin A. , Goes S. , Prytulak J. , Davies R. , Wilson C. , Kramer S.

Strong Plates & Weak Slabs
Petersen R. I. Stegman D. R. , Tackley P. J.

Thermal evolution and heat-pipe melt transport: implications for one-plate planets
Plesa A.-C. , Tosi N. , Hüttig C. , Breuer D.

The effect of non-linear rheology on the dynamics and topography of 3D subduction-collision models
Pusok, A. E. , Kaus, B. , Popov, A.

Time-dependent evolution of subduction beneath non-uniform overriding plate: slab dip, trench parallel flow and subduction velocity
Rodriguez-Gonzalez J. , Billen, M.I., Negredo, A.M.

Characteristics of continental drift through deep geological time
Rolf, T. , Capitanio, F.A. , Tackley, P.J.

Coupling geodynamic with thermodynamic modelling – application to the Eifel plume
Rummel L. , Kaus B. J. P. , White R. , Yang J.

Influence of Edge-Driven 3D Convection on Mantle-Lithosphere Interactions in East Africa
Stamps D.S. , Bangerth W. , Hager B.

Topography caused by mantle density variations: Observation-based estimates and models derived from topography and lithosphere thickness
Steinberger, B.

Using Global Plate Velocity Boundary Conditions for Embedded Regional Geodynamic Models
Taramon J. M., Morgan, J. P., Pérez-Gussinyé, M.

The Interaction between Supercontinent Cycles and Compositional Variations in the Deep Mantle
Trim S.J. , Lowman J.P.

Stress in high viscous lithosphere by melt emplacement
Wallner H., Schmeling H.

Numerical Modeling of Destruction of the North China Craton by Subduction of the Western Pacific
Yang J.F., Kaus B.J.P, Zhao L., Lu G.

Daily program