

CMG2004 Program

June 16th

- 7:45-8:45 **Breakfast (Coffee/Bagels etc.) Lobby Schapiro**
- 8:40 **Welcome and Opening Remarks (Dan Rothman & Marc Spiegelman)**

Session I: Fluids I (the atmosphere)

- 8:50 **Self-organization of the atmospheric macroturbulence to critical states of weak nonlinearity**
Tapio Schneider (CalTech)
- 9:10 **Surface fluxes, ocean coupling, and the tropical intraseasonal oscillation**
Adam Sobel (Columbia Univ), Hezi Gildor (Weizmann Inst), and Eric Maloney (Oregon State Univ)
- 9:30 **Convective entrainment in the tropical tropopause**
Frank Robinson and Steven Sherwood (Yale University)
- 9:50 **A Simple Model Of Annular Modes in the Atmosphere**
Mathew Whittman, Andrew Charlton and Lorenzo Polvani (APAM/Columbia)
- 10:10 **Simple Dynamical and Stochastic Models of Annular Patterns of Variability and the NAO**
Edwin P. Gerber with Geoffrey K. Vallis (Princeton)
- 10:30-11:00 **Break**

Session II: Multi-phase systems I (Fire, ice and life)

- 11:00 **Simulating the Dynamics of Volcanic Columns: a New Challenge in Volcanology**
Augusto Neri and Tomaso Esposti Ongaro Istituto Nazionale di Geofisica e Vulcanologia Centro per la Modellistica Fisica e Pericolosità dei Processi Vulcanici Via della Faggiola 32, 56126 Pisa, Italia
- 11:20 **'Flow instabilities induced by viscous heating in magma conduits '**
Antonio Costa, G. Macedonio (Observatorio Vesuviano, Napoli, Italy)
- 11:40 **Rheology of magmas and transition in lava flow dynamics inferred from percolation theory**
Martin Saar (University of Michigan) and Michael Manga (UC Berkeley)
- 12:00-1:45 **Lunch**

Session III: Multi-phase systems (Fire, ice and life contd.)

- 1:45 **Caustic Grain Boundary Melting in Ice**
J. S. Wettlaufer^{1,2}, L. Benatov² and L.A. Wilen¹ (Yale University)
- 2:05 **Flow-induced morphological instability in mushy layers with applications to sea ice**
Jerome Neufeld and John Wettlaufer (Yale University)
- 2:25 **Effects of spatio-temporal variability of upwelling events on primary productivity.**
C. Pasquero, A. Provenzale, A. Bracco (UCLA, INRI Torino)
- 2:45 **Dynamics of the Ancient Carbon Cycle**
Daniel H. Rothman Department of Earth, Atmospheric, and Planetary Sciences Massachusetts Institute of Technology
- 3:05-3:35 **Break**

Session IV: The Solid Earth I (Earthquakes and Damage)

- 3:40 **Short term earthquake prediction: Reverse tracing of precursors approach**
V. Keilis-Borok (UCLA)
- 4:00 **A visco-elastic damage rheology and rate- and state-dependent friction**
Vladimir Lyakhovsky ¹, Yehuda Ben-Zion² and Amotz Agnon³
- 4:20 **A generalized law for aftershock rates in a damage rheology model**
Yehuda Ben-Zion (1) and Vladimir Lyakhovsky (2)
- 5:00 **The Evolution of Fault Populations with Brittle Strain**
C. H. Scholz¹, B. E. Shaw¹, C. Spyropoulos^{2,3}
- 5:20 **Modeling compaction and anti-cracks in High porosity rocks**
Einat Aharanov (Weizmann Inst.)

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Session V: Advances in computational Earth Sciences

- 8:40 **Adaptable Geophysics Models and Solvers**
Bill Applebe (Victorian Partnership for Advanced Computation)
- 9:00 **Dynamically adaptive geophysical fluid dynamics simulation using GASPAR**
Duane Rosenberg, Aime Fournier, Annick Pouquet (NCAR, Boulder)
- 9:20 **Modeling and Simulation of Hazardous Geophysical Mass Flows Using the TITAN toolset**
A. K. Patra, M.F. Sheridan, E. B. Pitman, M. Bursik, C. Renschler, C. Nichita, B. Yu, A. C. Bauer and K. Dalbey. SUNY Buffalo
- 9:40 **First-principles Multiscale Modeling of Earth Materials Properties**
Ronald Cohen, (Geophysical Laboratory Carnegie Institution of Washington)
- 10:00-10:30 **Break**

Session VI: Fluids II (The Oceans)

- 10:30 **An Inverse Spectral Element Ocean Model**
Julia Levin, Dale Haidvogel (Rutgers) & Mohammed Iskandarani (Univ. of Miami)
- 10:50 **The Ocean and Thermohaline Loops, Stommel Box Models, and Sandström's Theorem'**
Carl Wunsch (MIT)
- 11:10 **Pacific decadal variability in the view of linear equatorial wave theory**
Julien Emile-Geay and Mark Cane (LDEO/Columbia Univ).
- 11:30 **Use of coupled modeling of ENSO to detect processes that are not detectable in forced models**
Claire Perigaud(*) and Jean-Philippe Boulanger (**) (* CALTECH/JPL) ** Laboratoire d'Océanographie Dynamique et de Climatologie, Paris)
- 11:50 **Extending the Diagnosis of the Climate of the 20th Century to Coupled GCMs**
Edwin Schneider (George Mason Univ/COLA)
- 12:10-1:45 **Lunch**

Session VII: New Approaches in data analysis

- 1:45 **Multiscale Trend Analysis: a new approach to studying complex time series**
I. Zaliapin, A. Gabrielov, V. Keilis-Borok (UCLA)
- 2:05 **Balance Issues in Four-Dimensional Data Assimilation**
Lisa Neef (Univ. of Toronto)
- 2:25 **Multifractal Predictability in Geophysics**
Daniel SCHERTZER and Shaun LOVEJOY (Ecole Nationale des Ponts et Chaussées, Physics dept., McGill U.)
- 2:45 **Statistical Significance Test of Intrinsic Mode Functions**
Zhaohua Wu Center for Ocean-Land-Atmosphere Studies Calverton, Maryland, USA
- 3:05-3:35 **Break** (+Poster session set up)

Session IV: Fluids III (Mainly GFD I)

- 3:40 **Numerical simulations of vortical and wave motion in stably stratified turbulence.**
Michael Waite and Peter Bartello, McGill University
- 4:00 **Rosby wave interaction connecting the tropics and midlatitudes: asymptotics and solitary waves**
Joseph A Biello and A. J. Majda (Courant Inst., NYU)
- 4:20 **Nonlinear interactions of inertia-gravity modes and planetary waves in rotating fluid flows**
T. W. N. Haine 1, P. D. Williams 2 and P. L. Read 3 1 (Johns Hopkins University) 2 Centre for Global Atmospheric Modelling, University of Reading, UK 3 Oxford University, UK (read@atm.ox.ac.uk)
- 4:40 **A Unified Theory of Small Froude Number and Small Rossby Number Balance**
Simal Saujani and Theodore G. Shepherd (Univ. of Toronto)
- 5:00 **Anisotropic turbulence and zonal jets in the ocean, giant planets and computer simulations'**
Boris Galperin (College of Marine Science, University of South Florida) Semion Sukoriansky (Department of Mechanical Engineering, Ben-Gurion University) Hideyuki Nakano (Oceanographic Research Department, Meteorological Research Institute, Tsukuba, Japan)

6:00-9:00pm

Poster Session/Gala Reception: Faculty Room , Low Library

June 18th

Session IX: Solid Dynamics II

- 8:40 **Role of Compositional Stratification on the Evolution of Planets**
Sarah Zaraneek, E.M. Parmentier, and L.T. Elkins-Tanton (Brown University)
- 9:00 **The Big Bend and the strength of the San Andreas fault**
Yuri Fialko (UCSD/Scripps)
- 9:20 **An Application of Multiple Objective Optimized Simulated Annealing to Waveforms in the Baikal Rift**
Richard Brazier, Penn State University
- 9:40 **Wavelet Maxima Curves for the Analysis of Surface Latent Heat Flux Data**
G. Cervone, D. Napoletani, M. Kafatos, R.P. Singh (George Mason University)

10:00-10:30 **Break**

Session X: Fluids IV

- 10:30 **Reduced atmospheric models: proper basis functions, dimensionality, replacing fast degrees of freedom by stochastic noise**
Frank Kwasiok (London School of Economics)
- 10:50 **Simulation of Tropical Precipitation using the Weak Temperature Gradient Approximation**
Christina Perez, Adam Sobel and G Gu (Columbia Univ)
- 11:10 **Dynamically balanced decade-mean global sea level at mesoscale resolution**
Nikolai A. Maximenko¹ and Pearn P. Niiler² ¹ SOEST, University of Hawaii ² Scripps Institution of Oceanography
- 11:30 **Wave-like phenomena during the morning transition in the PBL: water-tank experiments'**
Nicolas Arnault⁽¹⁾, Pierre H. Flamant⁽¹⁾, Paul Billant⁽²⁾, Jean-Marc Chomaz⁽²⁾ ⁽¹⁾LMD-CNRS, Ecole Polytechnique ⁽²⁾LADHYX-CNRS, Ecole Polytechnique
- 11:50 **Two Dimensionalization of rapidly rotating turbulence**
Lydia Bourouiba and Peter Bartello (McGill Univ)

12:10-1:45 **Lunch**

Session XI: Multi-phase systems II (Sedimentary and erosion processes)

- 1:45 **Threshold phenomena in erosion driven by subsurface flow**
Alexander Lobkovsky¹, Bill Jensen², Arshad Kudrolli², Daniel H. Rothman¹ ¹Department of Earth, Atmospheric, and Planetary Sciences Massachusetts Institute of Technology, Cambridge, MA 02119 ²Department of Physics, Clark University, Worcester, MA 01610
- 2:05 **A new kind of bedform**
Brad Murray Division of Earth and Ocean Sciences/Center for Nonlinear and Complex Systems Duke University, Box 90320, Durham, NC, 27708, (919) 681-5069, abmurray@duke.edu Rob Thielert U. S. Geological Survey, Coastal and Marine Geology Program 384 Woods Hole Road, Woods Hole, MA, 02543-1598, (508) 457-2350, rthielert@usgs.gov
- 2:25 **A simple model of aeolian megaripples**
Hezi Yizahq BIDR, Ben Gurion University, Sde Boker Campus 84990, Israel
- 2:45 **Stability of Viscous-Plastic Sea Ice Rheology: 1-D Approximation Method**
JINRO UKITA (LDEO/Columbia) JUN YU and GUANGHUI WANG (Department of Mathematics and Statistics, University of Vermont)

3:05-3:35 **Break**

Session XII: Chemical & Tracer Dynamics

- 3:35 **Towards an integrated theory of geochemistry and geodynamics**
Marc Spiegelman (Columbia University LDEO/DEES/DAPAM)
- 3:55 **Statistical inversion of oceanographic tracer data**
Radu Herbei, Ian W. McKeague & Kevin Speer (Florida State University)
- 4:15 **Ocean uptake and transport of anthropogenic carbon inferred from tracers**
Tim Hall (GISS, New York)
- 4:35 **Sedimentary fingerprints and consequences of asymmetric flow fields surrounding isolated topography**
Robert Turnewitsch (Southampton Oceanography Centre) Jean-Louis Reyss (Laboratoire des Sciences du Climat et de l'Environnement, France) David C. Chapman (Woods Hole Oceanographic Inst.) John Thomson, Richard S. Lampitt (SOC)
- 4:55 **The entrainment rate of a rotating gravity current**
Mathew Wells & John Wettlaufer (Department of Geology and Geophysics, Yale)

6pm IUGG/CMG Business Meeting