

Scientific Computing

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CBC Talk on Reconciling Surface Plate Motions With Rapid 3D Mantle Flow Around a Slab Edge - September 1, 2010

Postdoc Margarete Jadamec from Monash University in Australia will hold a talk at CBC, September 1, at 15:00.

Total number of participants: 11
 Total number of guests outside of CBC: 2
 Number of different nationalities represented: 6
 Total number of speakers: 1
 Total number of talks: 1

Abstract

Surface plate motions and the mantle flow field inferred from seismic anisotropy are well-correlated globally, suggesting large-scale coupling between the surface plates and the underlying mantle. However, the fit is typically poor at subduction zones, where regional observations of seismic anisotropy suggest that the direction of mantle flow is non-parallel to and may be several times faster plate motions. We use 3D numerical models of the Alaska subduction-transform system, that include a realistic 3D slab geometry, to determine the origin of this regional decoupling of flow. We find that that near a subduction zone edge, mantle flow velocities can have magnitudes of greater than 10 times the surface plate motions (i.e., up to 80 cm/yr), while surface plate velocities are consistent with plate motions and the complex mantle flow field is consistent with observations from seismic anisotropy. The incorporation of the non-Newtonian viscosity leads to low mantle viscosities in regions of high strain-rate, and this low viscosity enables the mantle flow field to partially decouple from the motion of the surface plates. These results imply geochemical signatures may be rapidly transported through subduction zones.

Here is a link to the paper topic: www.nature.com/nature/journal/v465/n7296/abs/nature09053.html#/

About the speaker

Margarete is a post doctoral student at Monash University in Australia.

Her research interest span the following topics:

- Plate boundary zones: Subduction zone dynamics and continental deformation.
- Visualization in science: 3D visualization of complex geologic and geophysical systems.
- Primary methods: Numerical modeling, analytic modeling, and field mapping.

What	▪ Talk
When	Sep 01, 2010 from 03:00 PM to 04:00 PM
Where	Bakrommet @ Simula
Contact Name	Hans Petter Langtangen
Attendees	Are Magnus Bruaseth Joakim Haga Jonathan Feinberg Lyudmyla Vynntska Margarete Jadamec Marie Rognes Matt Knepley Omar Al-Khayat Rainer Nerlich Stuart Clark Tor Gillberg
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