Interactions between surface processes and mantle dynamics

Seminar info and schedule

For the spring of 2018 we'll discuss about different interactions between surface processes and mantle dynamics.

Seminars will take place on Wednesdays at 12:00-13:30 in room **D501** of the Exactum (unless otherwise noted).

A tentative schedule of readings is below.

Date	Discussion leader(s)	Topic and papers
24.1.2108	Lars	• Flament, Gurnis and Müller, 2013. **A review of observations and models of dynamic topography** . *Lithosphere*, 5 (2)
31.1.2018	Dave	• Moucha et al., 2008. **Dynamic topography and long-term sea-level variations: There is no such thing as a stable continental platform** . *Earth and Planetary Science Letters*, 271. • Müller, Sdrolias, Gaina, Steinberger and Heine, 2008. **Long-Term Sea-Level Fluctuations Driven by Ocean Basin Dynamics** . *Science*, 319.
14.2.2018	--	• Organizational meeting
21.2.2018	Lars	• Braun, J., 2010. The many surface expressions of mantle dynamics. *Nature Geoscience*, *3*(12), p.825.
7.3.2018	Jorina	• Hoggard, M.J., White, N. and Al-Attar, D., 2016. Global dynamic topography observations reveal limited influence of large-scale mantle flow. *Nature Geoscience*, *9*(6), p.456.
14.3.2018	Dave	• Braun, J., Guillocheau, F., Robin, C., Baby, G. and Jelsma, H., 2014. Rapid erosion of the Southern African Plateau as it climbs over a mantle superswell. *Journal of Geophysical Research: Solid Earth*, *119*(7), pp.6093-6112.
21.3.2018	Lotta	• Shephard, G.E., Müller, R.D., Liu, L. and Gurnis, M., 2010. Miocene drainage reversal of the Amazon River driven by plate–mantle interaction. *Nature Geoscience*, *3*(12), p.870. • Sacek, V., 2014. Drainage reversal of the Amazon River due to the coupling of surface and lithospheric processes. *Earth and Planetary Science Letters*, *401*, pp.301-312.
4.4.2018	Lars	• Steinberger, B., 2007. Effects of latent heat release at phase boundaries on flow in the Earth's mantle, phase boundary topography and dynamic topography at the Earth's surface. *Physics of the Earth and Planetary Interiors*, *164* (1-2), pp.2-20.
18.4.2018	Dave	• Karlstrom, K.E., Coblentz, D., Dueker, K., Ouimet, W., Kirby, E., Van Wijk, J., Schmandt, B., Kelley, S., Lazear, G., Crossey, L.J. and Crow, R., 2012. Mantle-driven dynamic uplift of the Rocky Mountains and Colorado Plateau and its surface response: Toward a unified hypothesis. *Lithosphere*, *4*(1), pp.3-22.

Papers under consideration

Papers to consider

- https://pubs.geoscienceworld.org/gsa/geology/article/34/4/225/129488/surface-erosion-control-on-the-evolution-of-the
- Braun, J., Robert, X. and SimonLabric, T., 2013. Eroding dynamic topography. *Geophysical Research Letters*, *40*(8), pp.1494-1499.
- Burgess, P.M., Gurnis, M. and Moresi, L., 1997. Formation of sequences in the cratonic interior of North America by interaction between mantle, eustatic, and stratigraphic processes. *Geological Society of America Bulletin*, *109*(12), pp.1515-1535.
- Burov, E. and Gerya, T., 2014. Asymmetric three-dimensional topography over mantle plumes. *Nature*, *513*(7516), p.85.
- Chu, R., Leng, W., Helmberger, D.V. and Gurnis, M., 2013. Hidden hotspot track beneath the eastern United States. *Nature Geoscience*, *6*(11), p.963.
- Cloetingh, S., Burov, E. and Francois, T., 2013. Thermo-mechanical controls on intra-plate deformation and the role of plume-folding interactions in continental topography. *Gondwana Research*, *24*(3-4), pp.815-837.
- Cloetingh, S., Tibaldi, A. and Burov, E., 2012. Coupled Deep Earth and surface processes and their impact on geohazards. *Global and Planetary Change*, *90*, pp.1-19.
- Coblentz, D. and Karlstrom, K.E., 2011. Tectonic geomorphometrics of the western United States: Speculations on the surface expression of upper mantle processes. *Geochemistry, Geophysics, Geosystems*, *12*(11).
- Gurnis, M., Mitrovica, J.X., Ritsema, J. and van Heijst, H.J., 2000. Constraining mantle density structure using geological evidence of surface uplift rates: The case of the African superplume. *Geochemistry, Geophysics, Geosystems*, *1*(7).
- Kiraly, A., Faccenna, C., Funiciello, F. and Sembroni, A., 2015. Coupling surface and mantle dynamics: A novel experimental approach. *Geophysical Research Letters*, *42*(10), pp.3863-3869
- Liu, L., 2015. The ups and downs of North America: Evaluating the role of mantle dynamic topography since the Mesozoic. *Reviews of Geophysics*, *53*(3), pp.1022-1049.
- Molin, P., Fubelli, G., Nocentini, M., Sperini, S., Ignat, P., Grecu, F. and Dramis, F., 2012. Interaction of mantle dynamics, crustal tectonics, and surface processes in the topography of the Romanian Carpathians: a geomorphological approach. *Global and planetary change*, *90*, pp. 58-72.
- Spasojevic, S., Gurnis, M. and Sutherland, R., 2010. Mantle upwellings above slab graveyards linked to the global geoid lows. *Nature Geoscience*, *3*(6), p.435.
- Stanley, J.R., Flowers, R.M. and Bell, D.R., 2015. Erosion patterns and mantle sources of topographic change across the southern African Plateau derived from the shallow and deep records of kimberlites. *Geochemistry, Geophysics, Geosystems*, *16*(9), pp.3235-3256.