

Surface Observables

1. Recommended Reading:

- Radial viscosity structure: *Hager and Richards* (1989) and *Forte and Mitrovica* (2001).
- Lateral viscosity variations: *Cadek and Fleitout* (2003) and *Zhong and Davies* (1999)
- Mantle structure, composition and seismology: *Kellogg et al.* (1999) and *Tackley* (2000b).

2. Other Reading:

- Post Glacial Rebound: *Mitrovica* (1996), *Simons and Hager* (1997).
- Gravity: *Hipkin* (2001) and *Steinberger and Holme* (2002).
- Geoid: *Hager* (1984) and *Ricard et al.* (1984).
- Plate Motion: *Lithgow-Bertelloni and Richards* (1998), *Lithgow-Bertelloni et al.* (1993) and *Richards et al.* (2001)
- Dynamic Topography: *Lithgow-Bertelloni and Silver* (1998)
- More on Radial Structure: *Panasyuk and Hager* (2000), *Richards and Hager* (1989), *Spada et al.* (1994), *O'Connell et al.* (1991), *Hager et al.* (1985).
- More on Lateral Viscosity Variations: *Koch and Ribe* (1989), *Richards and Hager* (1989), *Zhong* (2001), *Billen et al.* (2003), *Tackley* (2000a).

References

- Billen, M. I., M. Gurnis, and M. Simons, Multiscale dynamic models of the Tonga-Kermadec subduction zone, *Geophys. J. Int.*, 153, 359–388, 2003.
- Cadek, O., and L. Fleitout, Effect of lateral viscosity variations in the top 300 km on the geoid and dynamic topography, *Geophys. J. Int.*, 152, 566–580, 2003.
- Forte, A. M., and J. X. Mitrovica, Deep-mantle high viscosity flow and thermochemical structure inferred from seismic and geodynamic data, *Nature*, 410, 1049–1056, 2001.
- Hager, B. H., Subducted slabs and the geoid: constraints on mantle rheology and flow, *J. of Geophys. Res.*, 89, 6003–6015, 1984.

- Hager, B. H., and M. A. Richards, Long-wavelength variations in Earth's geoid: physical models and dynamical implications, *Phil. Trans. R. So. Lond. A*, 328, 309–327, 1989.
- Hager, B. H., R. W. Clayton, M. A. Richards, R. P. Comer, and A. M. Dziewonski, Lower mantle heterogeneity, dynamic topography and the geoid, *Nature*, 313, 541–545, 1985.
- Hipkin, R. G., The statistics of pink noise on a sphere: applications to mantle density anomalies, *Geophys. J. Int.*, 144, 259–270, 2001.
- Kellogg, L. H., B. H. Hager, and R. D. van der Hilst, Compositional stratification in the deep mantle, *Science*, 283, 1881–1884, 1999.
- Koch, D. M., and N. M. Ribe, The effect of lateral viscosity variations on surface observables, *Geophys. Res. Lett.*, 16, 535–538, 1989.
- Lithgow-Bertelloni, C., and M. A. Richards, The Dynamics of Cenozoic and Mesozoic plate motions, *Reviews of Geophysics*, 36, 27–78, 1998.
- Lithgow-Bertelloni, C., and P. G. Silver, Dynamic topography, plate driving forces and the African superswell, *Nature*, 395, 269–272, 1998.
- Lithgow-Bertelloni, C., M. A. Richards, Y. Yicard, R. J. O'Connell, and D. C. Engebretson, Toroidal-poloidal partitioning of plate motion since 120 Ma, *Geophys. Res. Lett.*, 20, 375–378, 1993.
- Mitrovica, J. X., Haskell [1935] revisited, *J. of Geophys. Res.*, 101, 555–569, 1996.
- O'Connell, R. J., C. W. Gable, and B. H. Hager, Toroidal-poloidal partitioning of lithospheric plate motion, in *Glacial Isostasy, Sea Level and Mantle Rheology*, edited by R. Sabadini, pp. 535–551, Kluwer, Norwell, MA, 1991.
- Panasyuk, S. V., and B. H. Hager, Inversion for mantle viscosity profiles constrained by dynamic topography and the geoid, and their estimated errors, *Geophys. J. Int.*, 143, 821–836, 2000.
- Ricard, Y., L. Fleitout, and C. Froidevaux, Geoid heights and lithospheric stresses for a dynamic Earth, *Annales Geophysicae*, 2, 267–286, 1984.
- Richards, M. A., and B. H. Hager, Effects of lateral viscosity variations on long-wavelength geoid anomalies and topography, *J. of Geophys. Res.*, 94, 10,299–10,313, 1989.

- Richards, M. A., W.-S. Yang, J. R. Baumgardner, and H.-P. Bunge, Role of a low-viscosity zone stabilizing plate tectonics: implications for comparative terrestrial planetology, *Geochemistry, Geophysics, Geosystems*, 2, 2000GC000,115, 2001.
- Simons, M., and B. H. Hager, Localization of the gravity field and the signature of glacial rebound, *Nature*, 390, 500–503, 1997.
- Spada, G., R. Sabadini, and E. Boschi, True polar wander affects the Earth dynamic topography and favours a highly viscous lower mantle, *Geophys. Res. Lett.*, 21, 137–140, 1994.
- Steinberger, B., and R. Holme, An explanation for the shape of Earth's gravity spectrum based on viscous mantle flow models., *Geophys. Res. Lett.*, 29, 2002GL015,476, 2002.
- Tackley, P. J., Self-consistent generation of tectonic plates in time-dependent, three-dimensional mantle convection simulations, *Geology, Geochemistry and Geophysics*, 1, 2000a.
- Tackley, P. J., Mantle convection and plate tectonics: Toward an integrated physical and chemical theory, *Science*, 288, 2002–2007, 2000b.
- Zhong, S., Role of ocean-continent contrast and continental keels on plate motion, net rotation of lithosphere, and the geoid, *J. of Geophys. Res.*, 106, 703–712, 2001.
- Zhong, S., and G. F. Davies, Effects of plate and slab viscosities on the geoid, *Earth and Planet. Sci. Lett.*, 170, 487–496, 1999.