Geophysical Research Abstracts, Vol. 8, 03000, 2006
SRef-ID: 1607-7962/gra/EGU06-A-03000
© European Geosciences Union 2006

Irregular supercontinent cycles in global geodynamic models with multiple continents

B. R. Phillips (1,2), H.-P. Bunge (3)

(1) Department of Geosciences, Princeton University, Princeton, NJ 08544, (2) Present address: Earth and Environmental Sciences Division, Los Alamos National Laboratory, Los Alamos, NM 87545 (Email: benp@lanl.gov), (3) Geophysics, Department of Earth and Environmental Sciences, Munich University, Theresienstr. 41, 80333 Munich, Germany

Models coupling 3D spherical mantle convection with multiple, mobile continents suggest an erratic nature to Earth's supercontinental cycle. We study cases incorporating three or six continents in a mantle with a radially stratified viscosity and varied proportions of heating from the core and the decay of radioactive elements. Regular cycles of continental aggregation and dispersal lasting $\sim$400 million years (Myr) occur in an idealized model with three continents and a purely internally heated mantle. This regularity breaks down in more realistic models incorporating a larger number of continents and modest heat flux from the core. Greater core heating, amounting to 30% of the mantle's heat budget, may further disrupt supercontinent cycling. The models also indicate a minimum lifetime for supercontinents of order 100 Myr, consistent with geophysical and geological constraints.