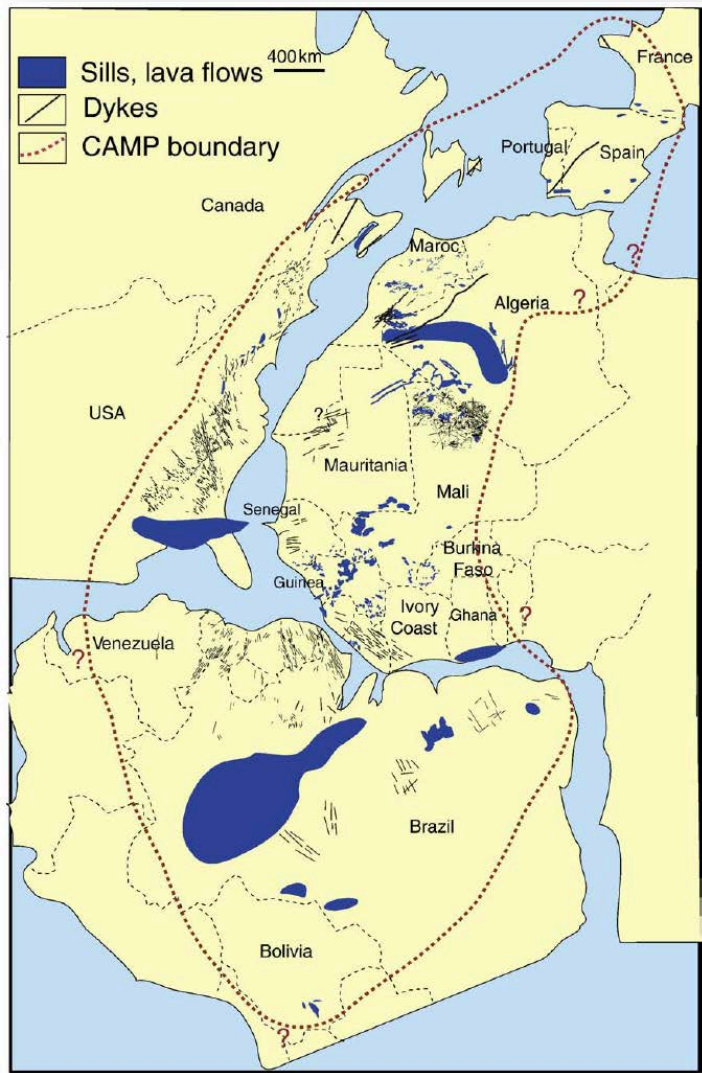


Thermal fluctuations beneath continents

Nicolas Coltice,
Tobias Rolf, Paul Tackley,
Ben Phillips, Hervé Bertrand

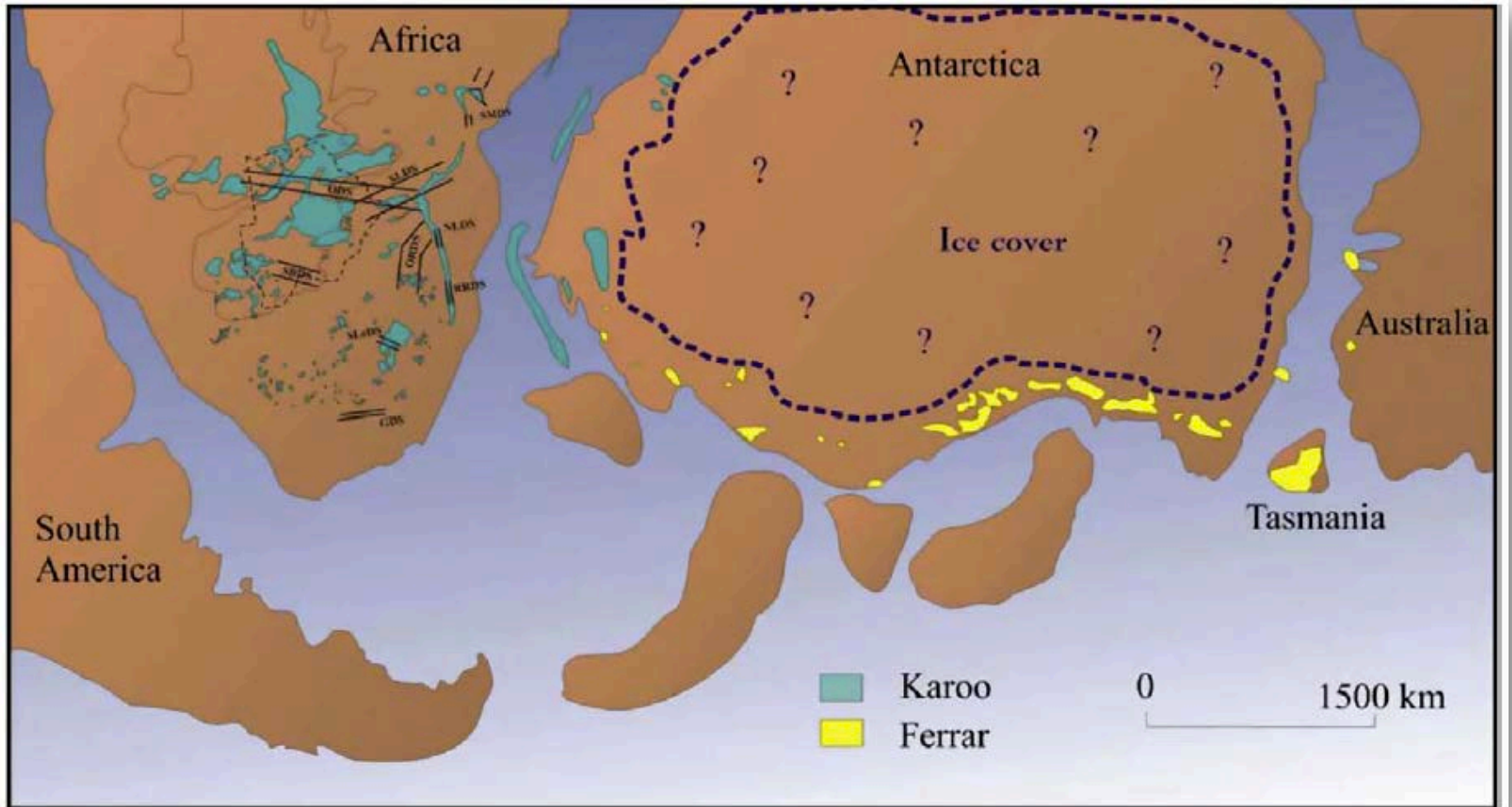


The Central Atlantic Magmatic Province (200Ma): plume evidence?



- No hotspot track
- Region elongated over 8000km
- Low rate of magma supply (100-200m)
- No uplift
- No radial pattern

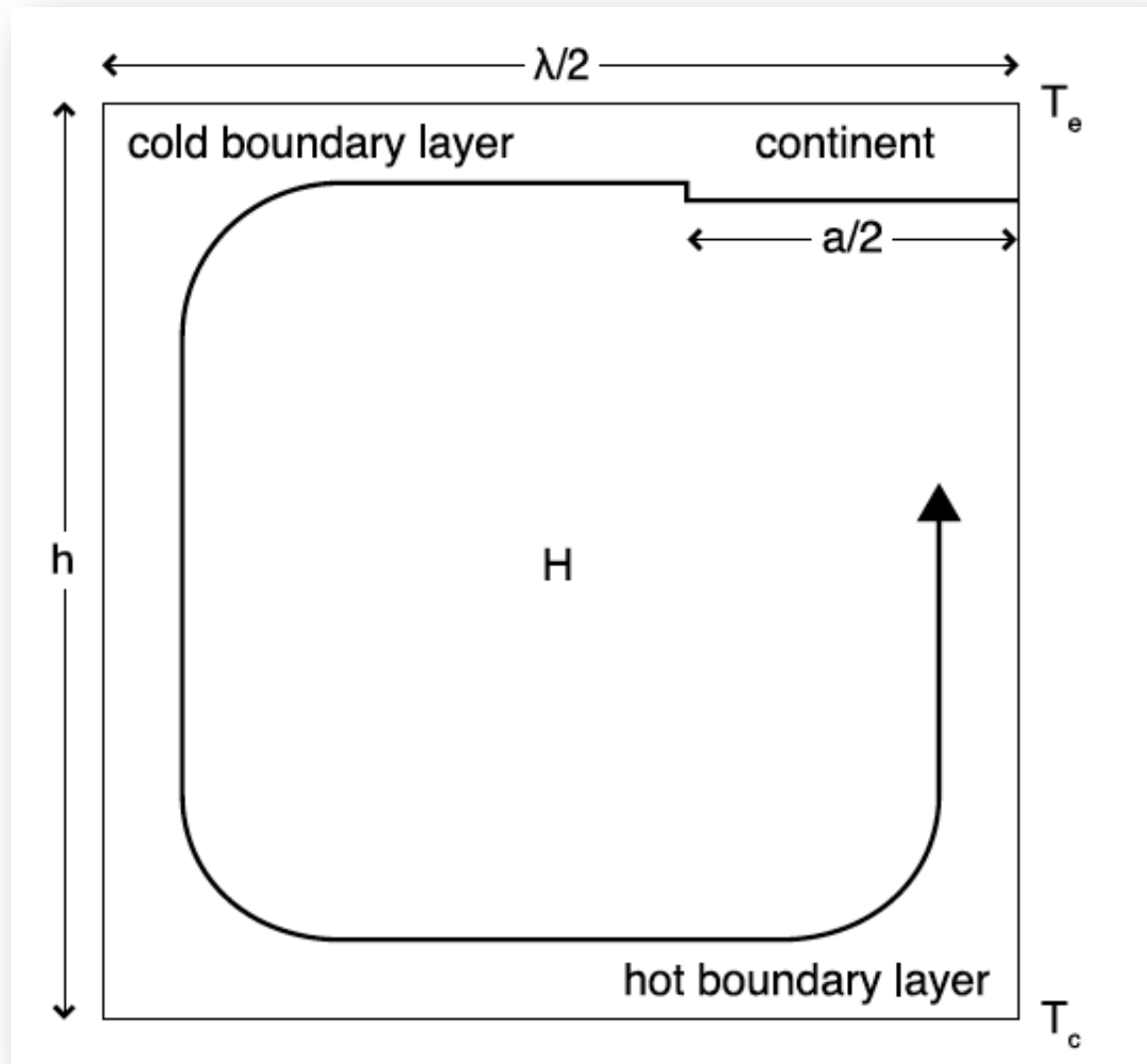
Same for the Karoo (180Ma)



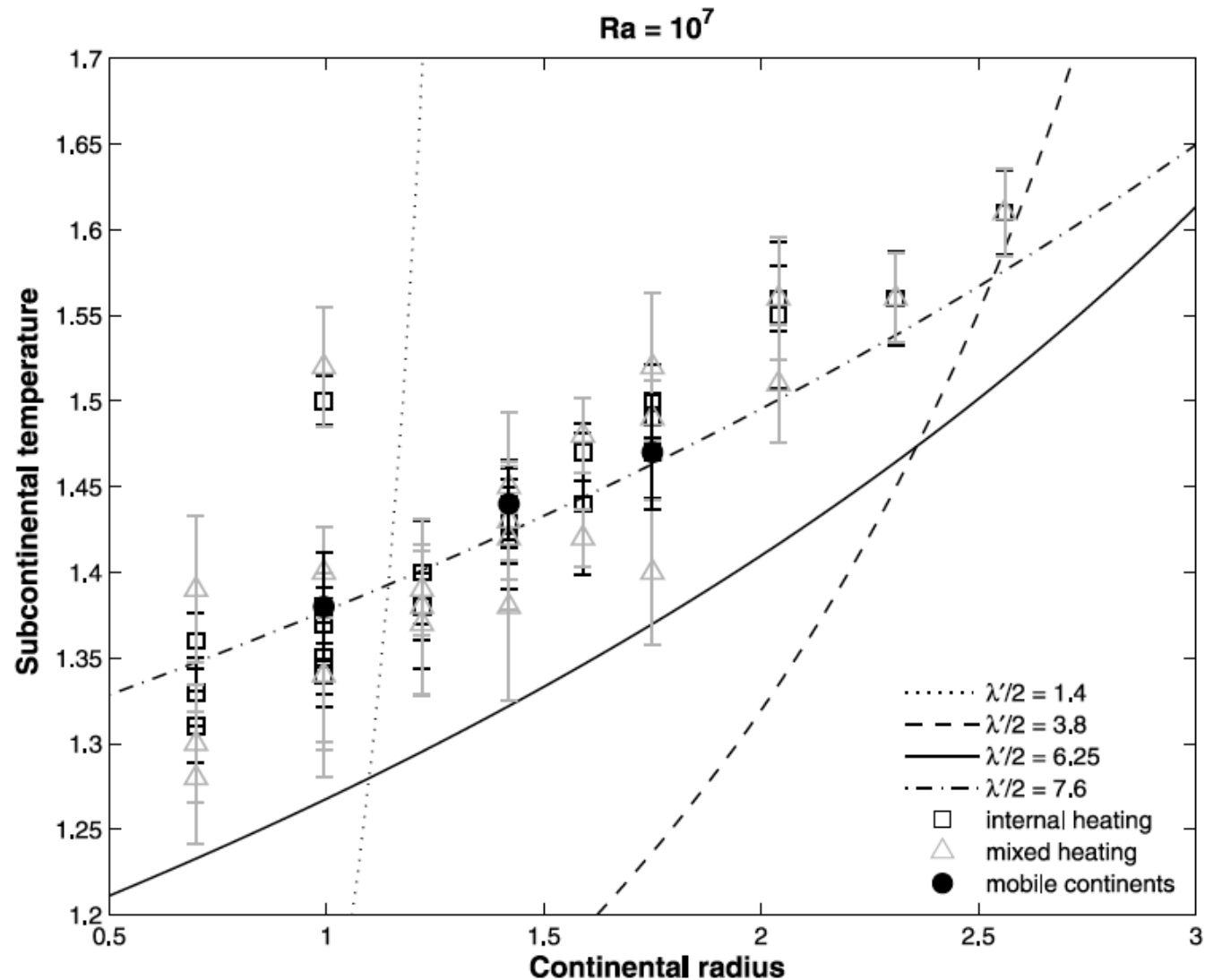
Hypothesis

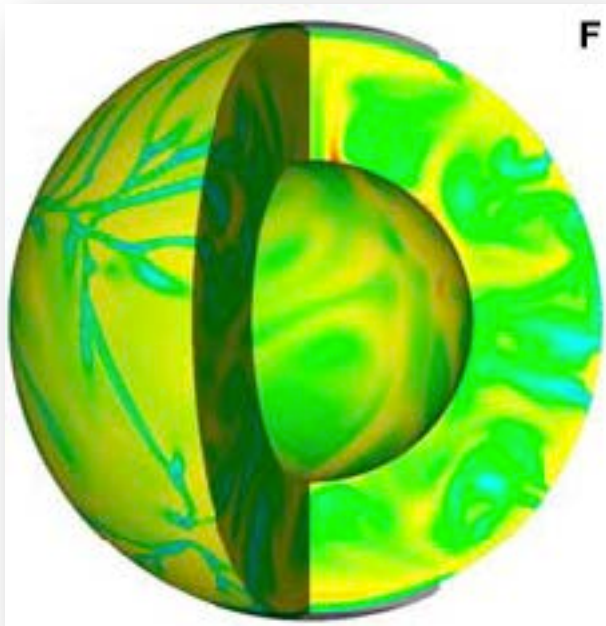


Boundary layer theory: continental insulation + longer wavelength of convection

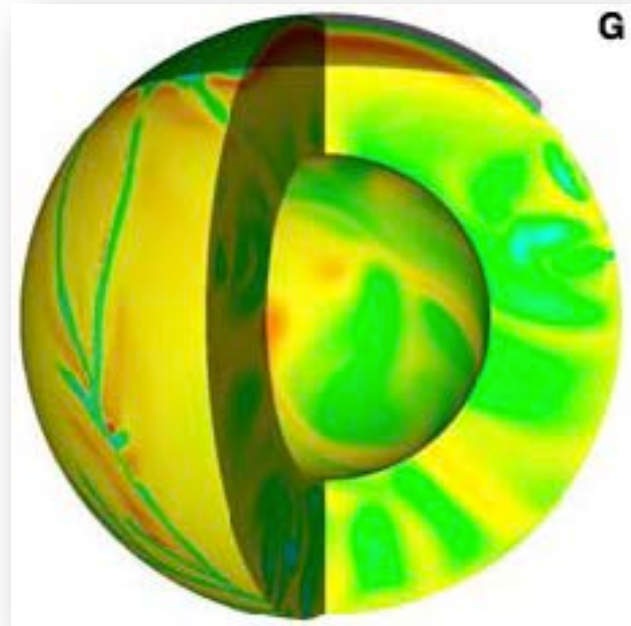


Theory and experiments: temperature increases with continental size



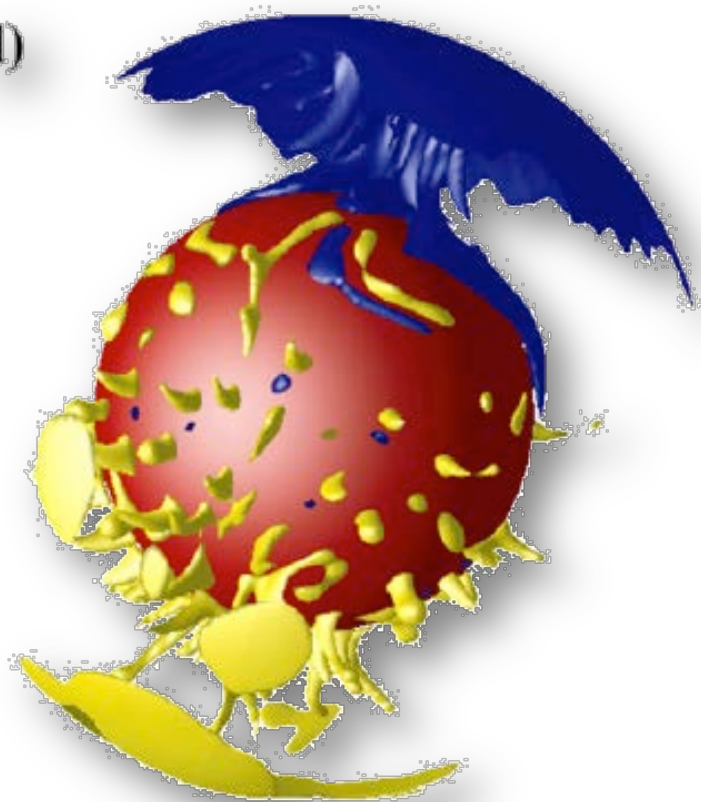


2 small continents

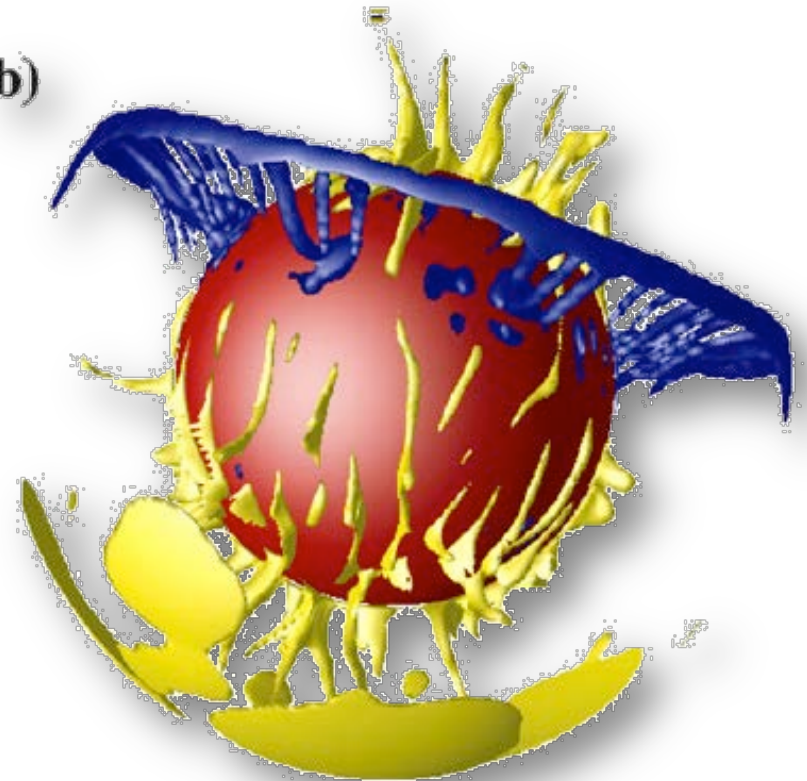


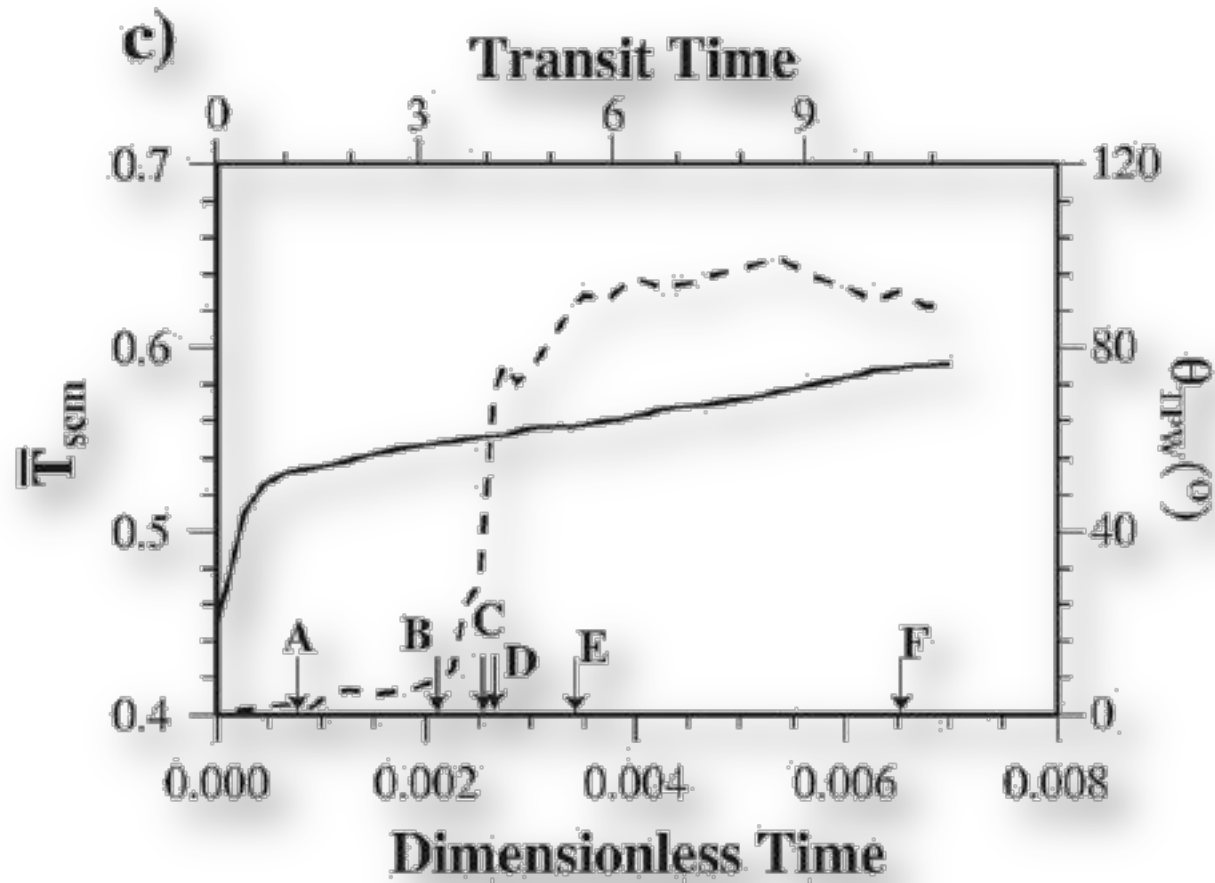
1 big continents

d)



b)

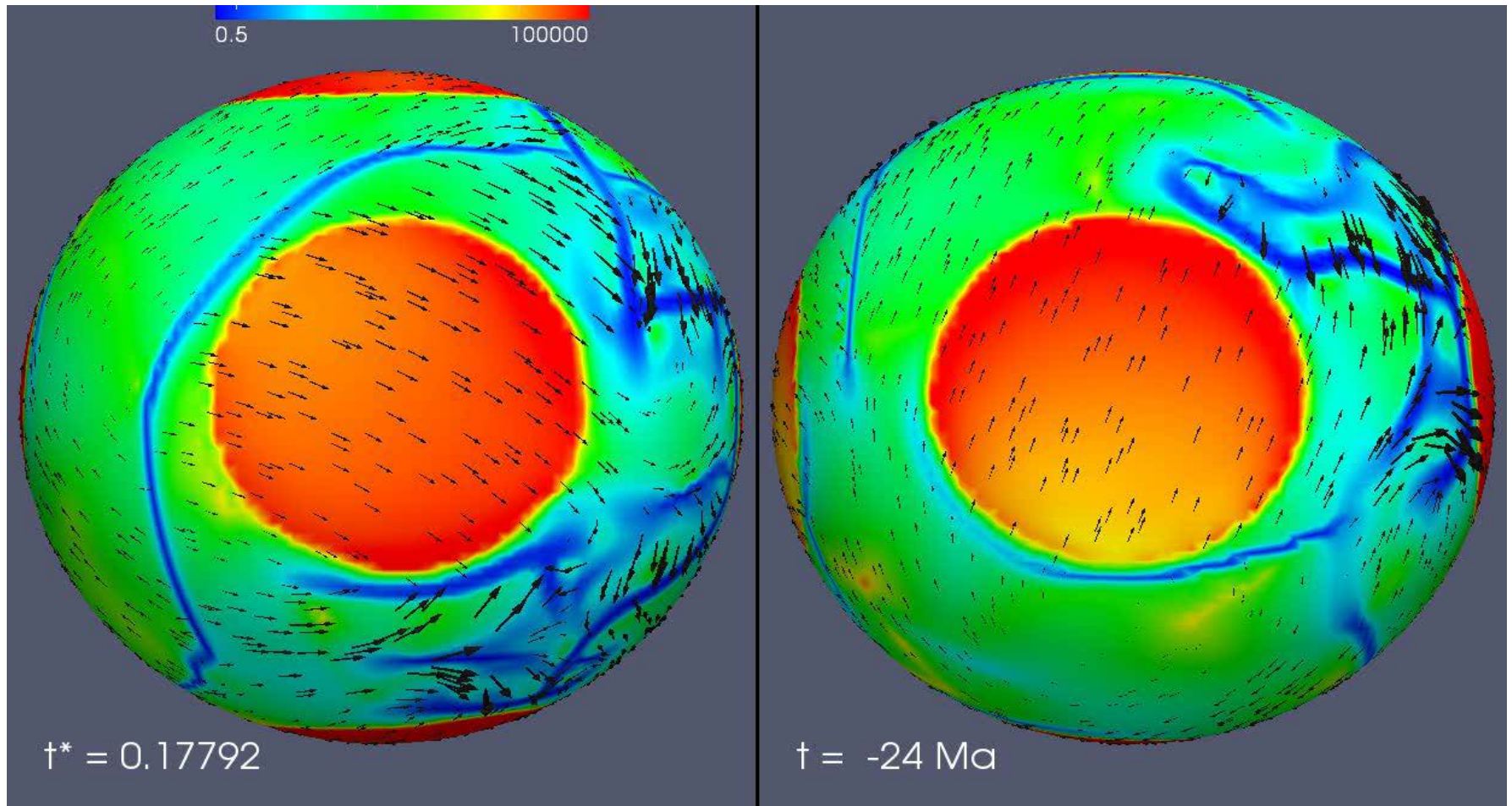


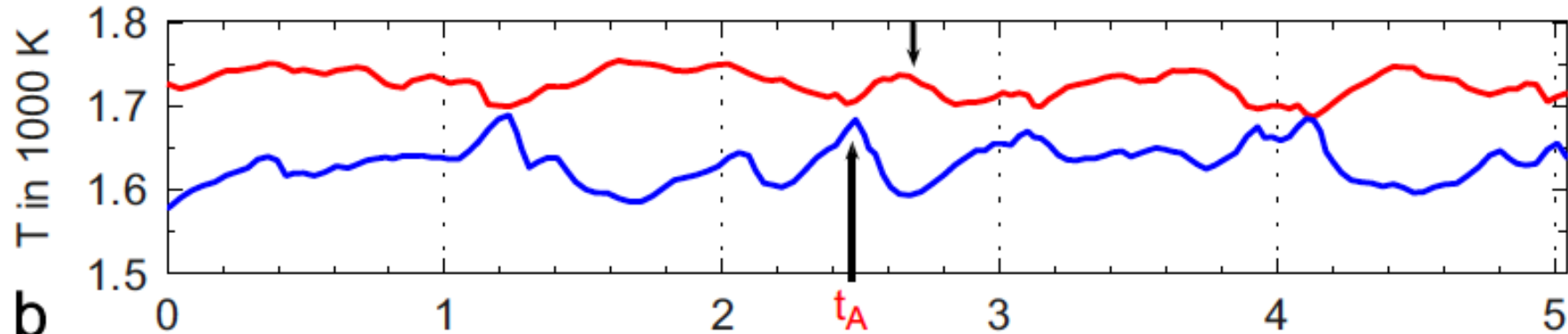
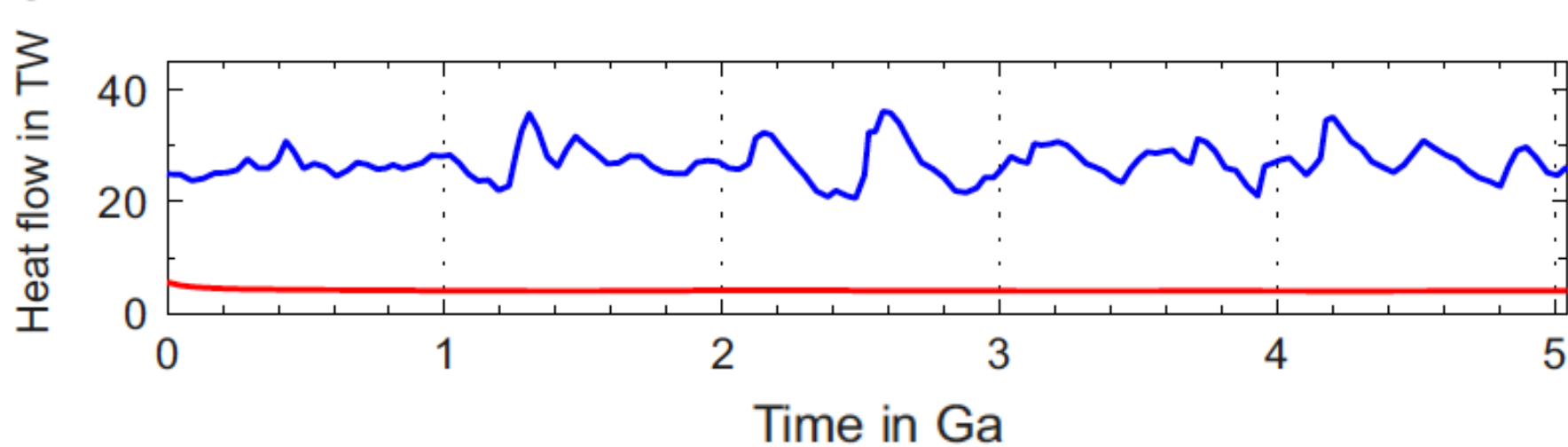




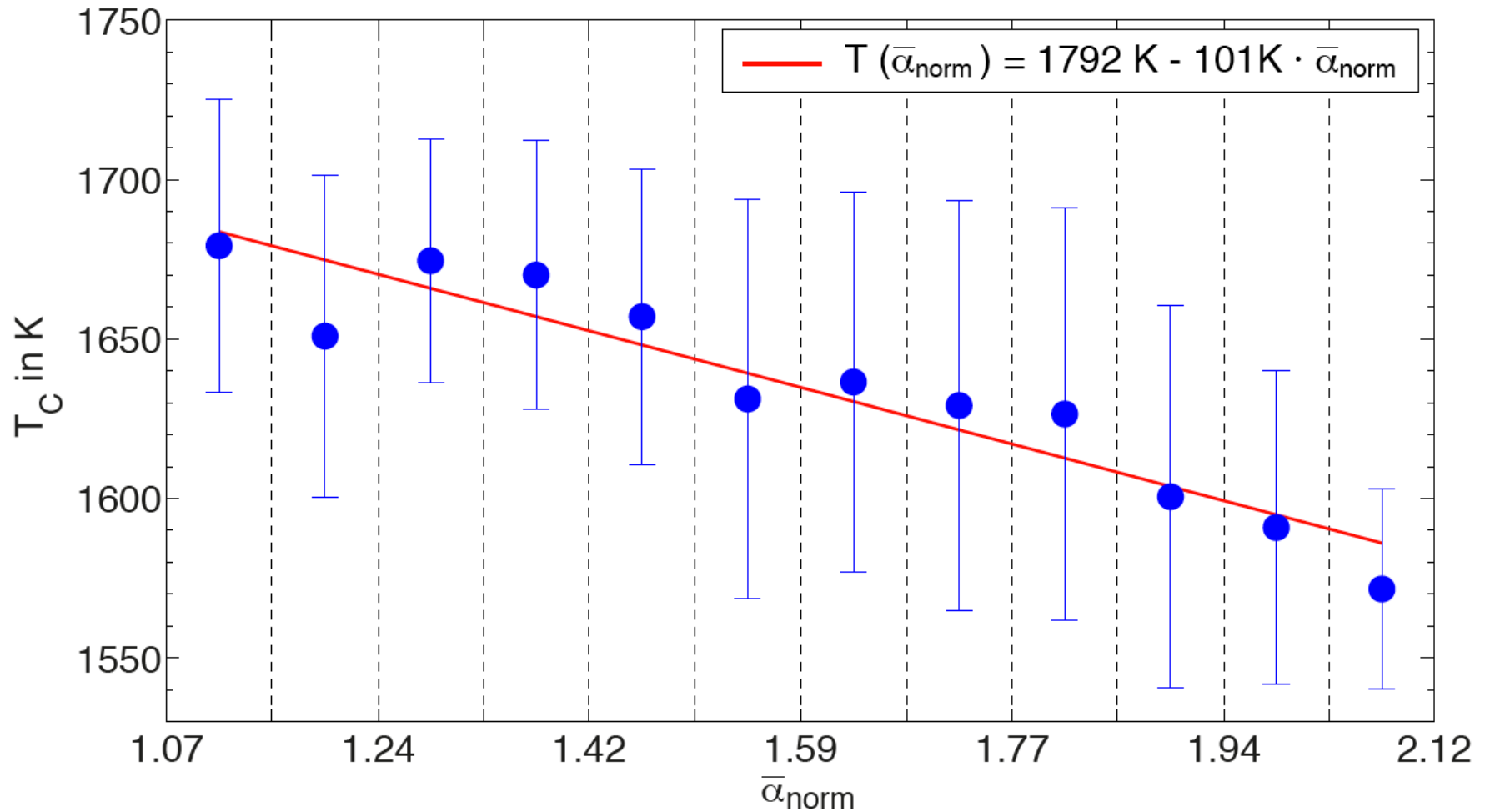


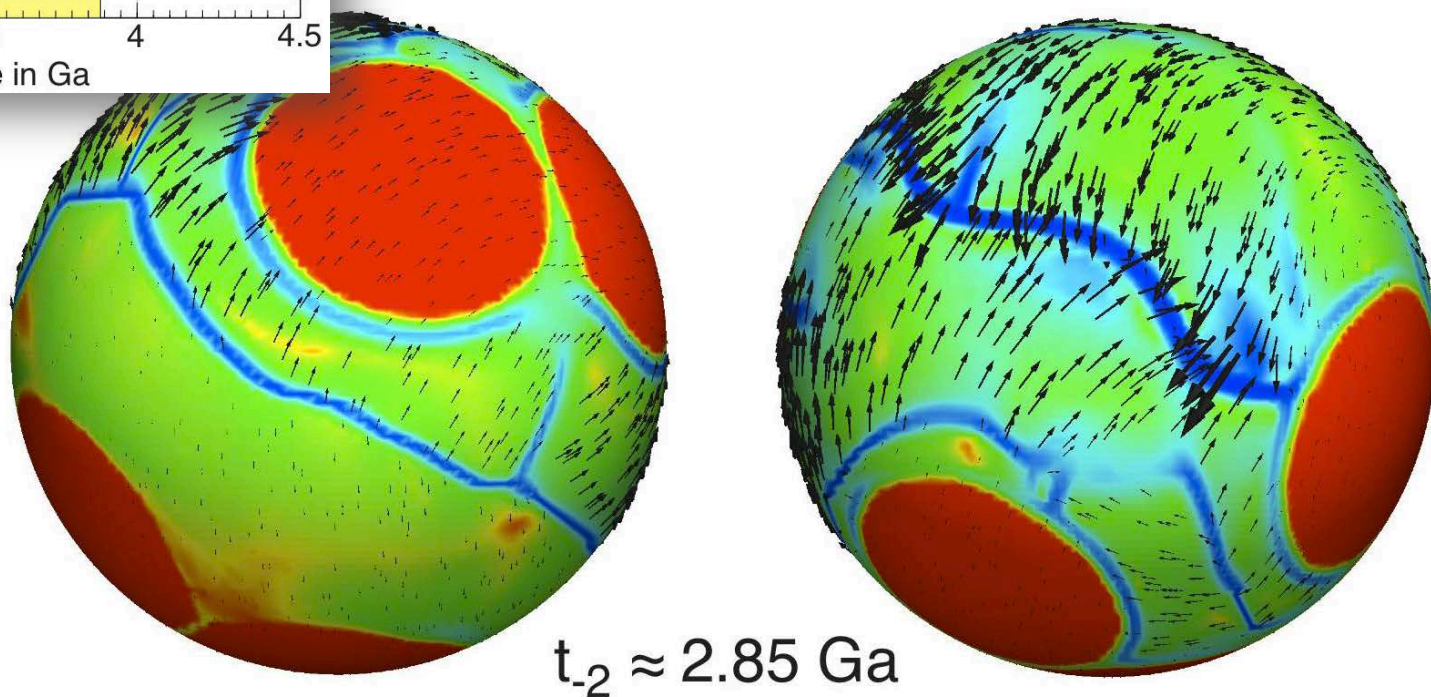
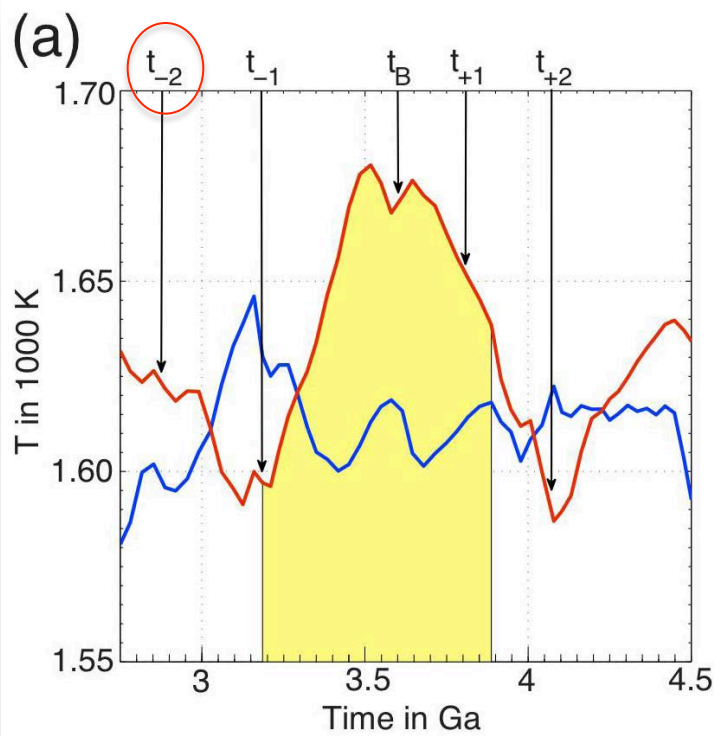
3D spherical convection with plate-like behavior and continental rafts

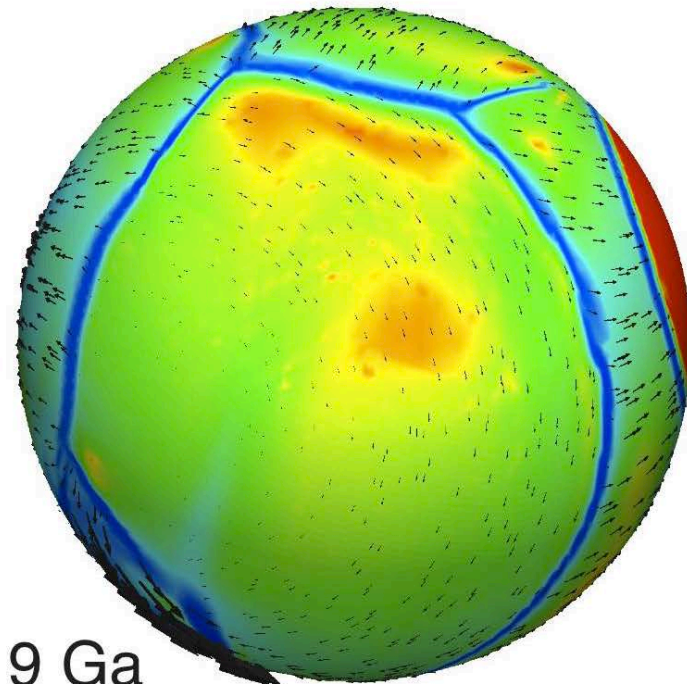
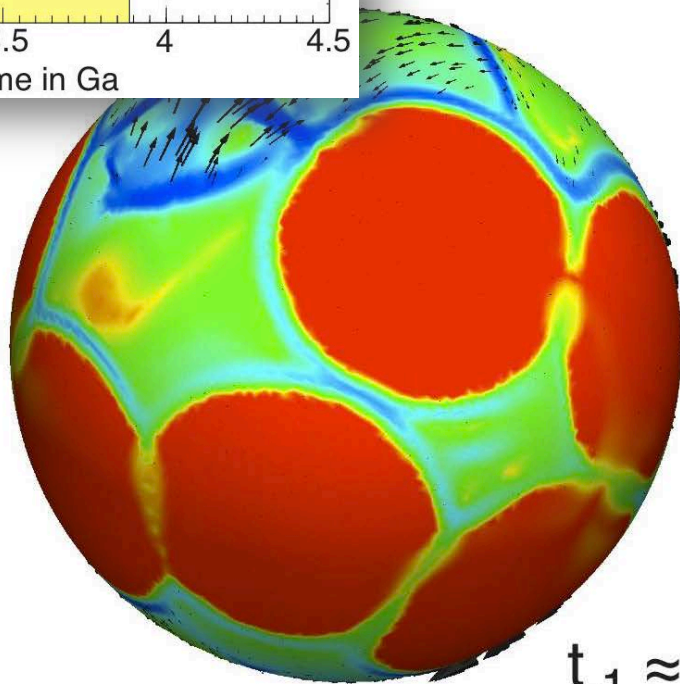
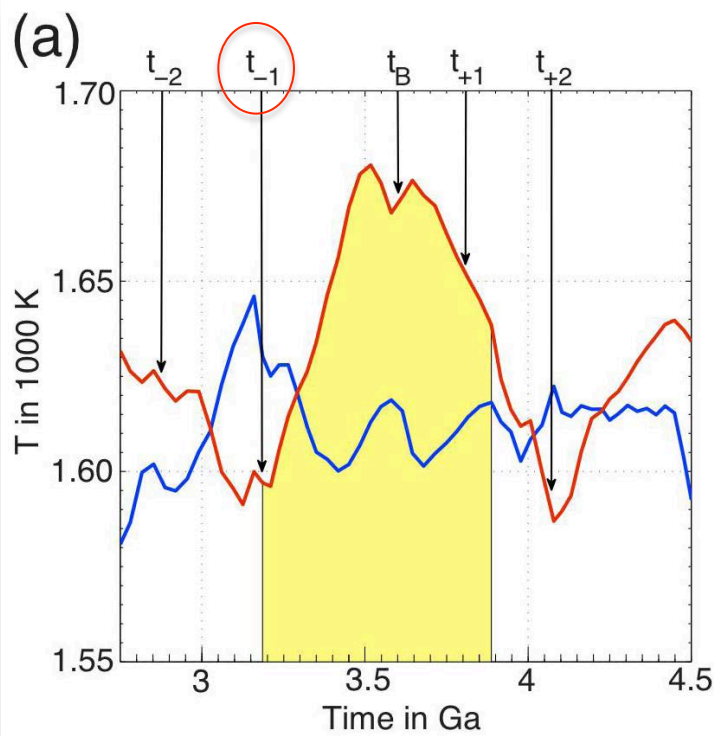


a**b**

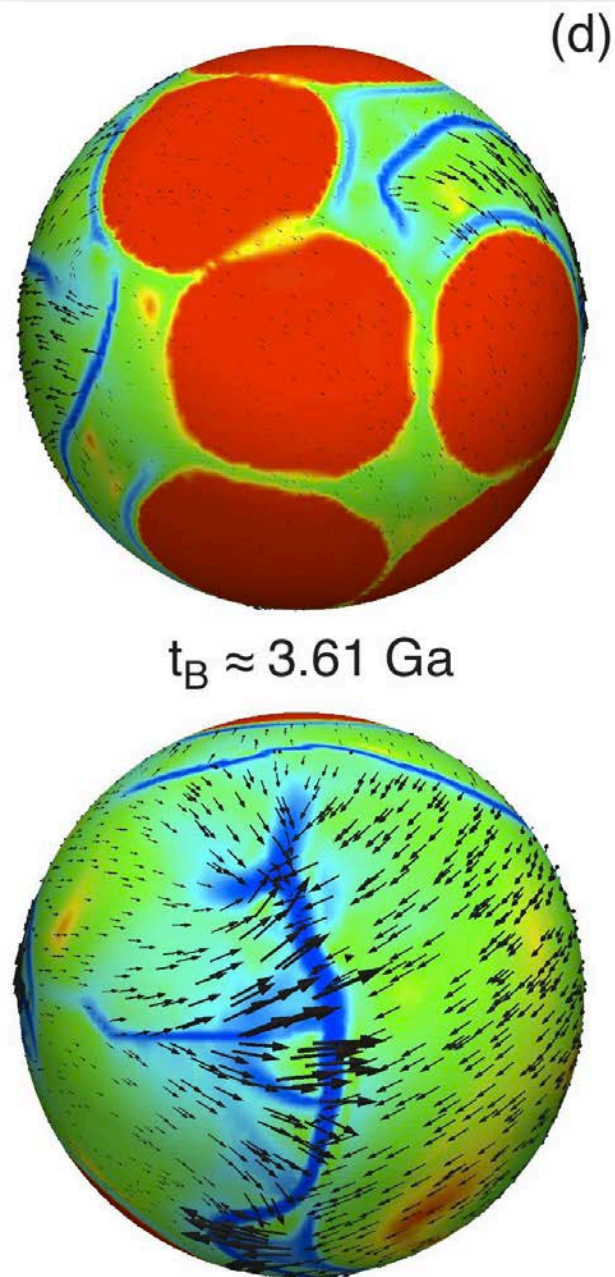
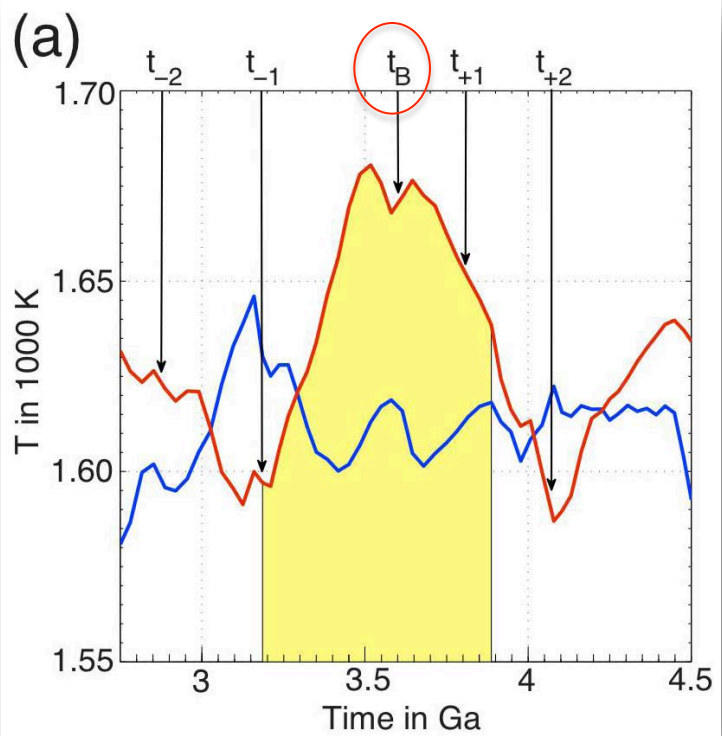
Average subcontinental temperature vs. continental connectivity

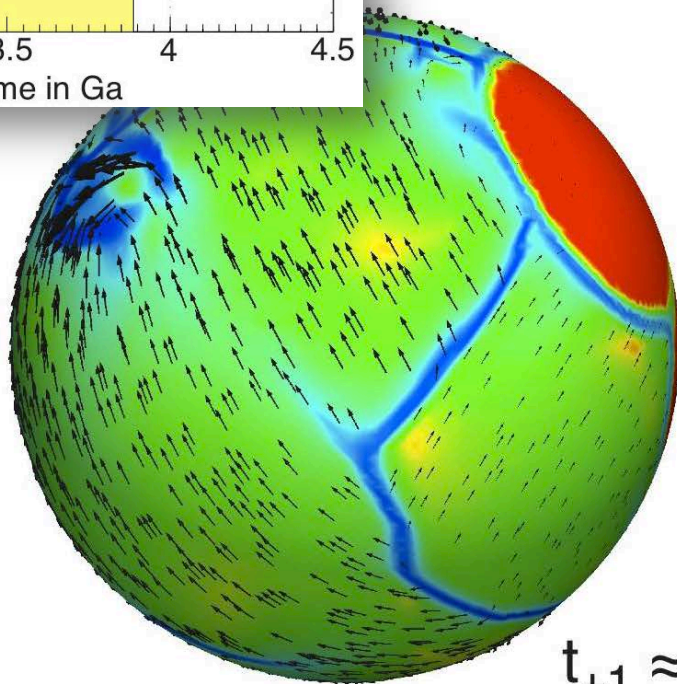
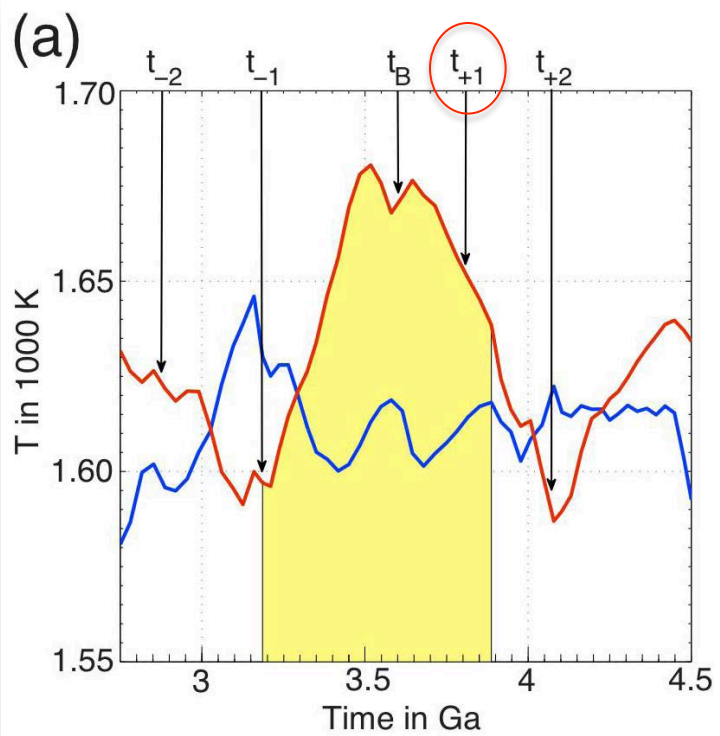




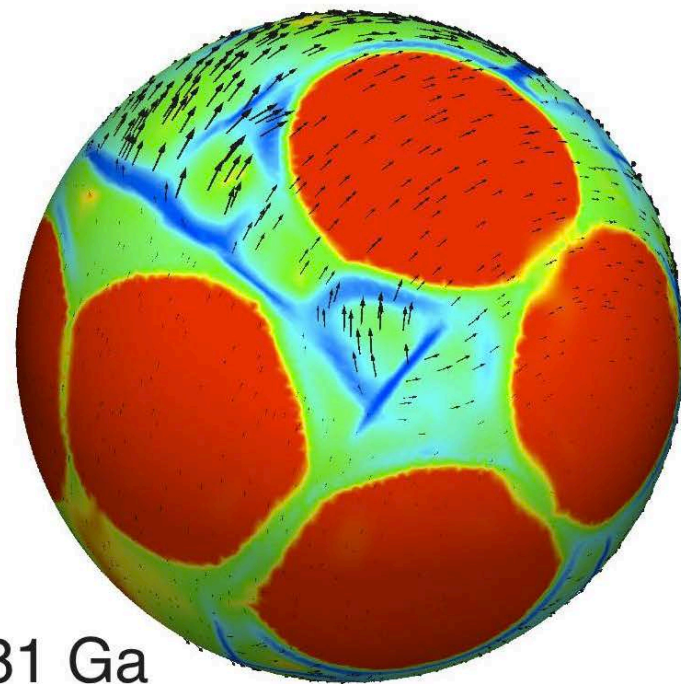


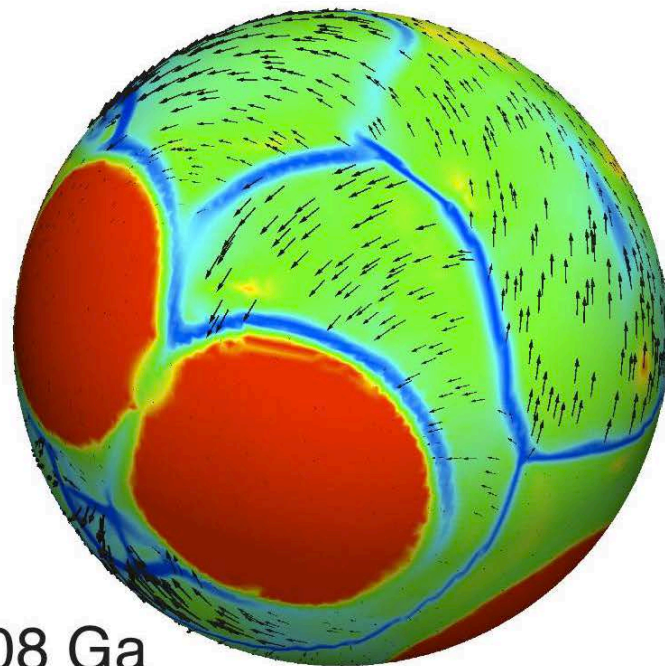
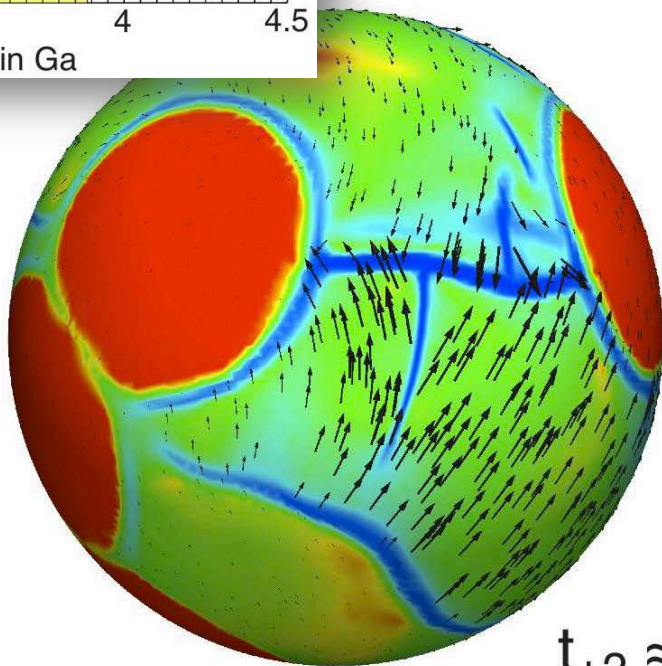
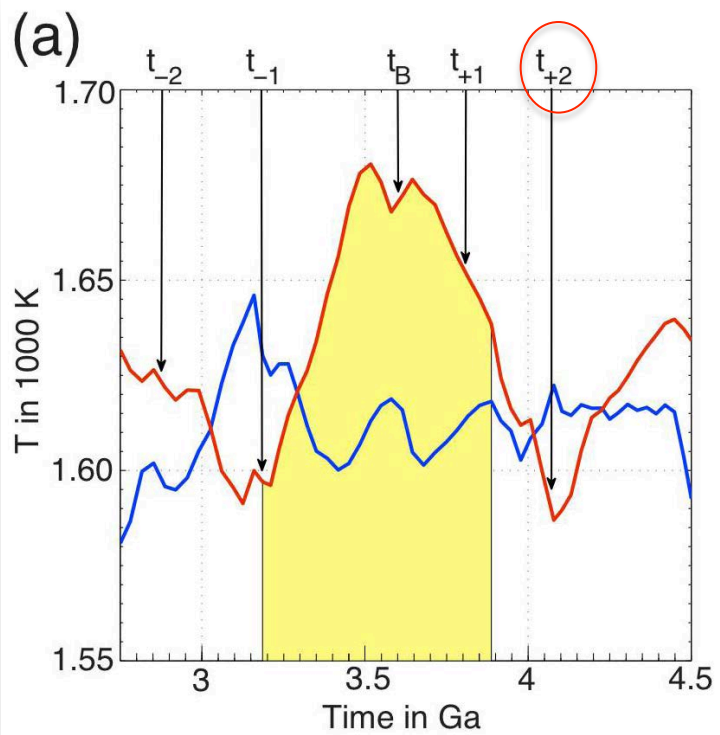
$t_{-1} \approx 3.19$ Ga



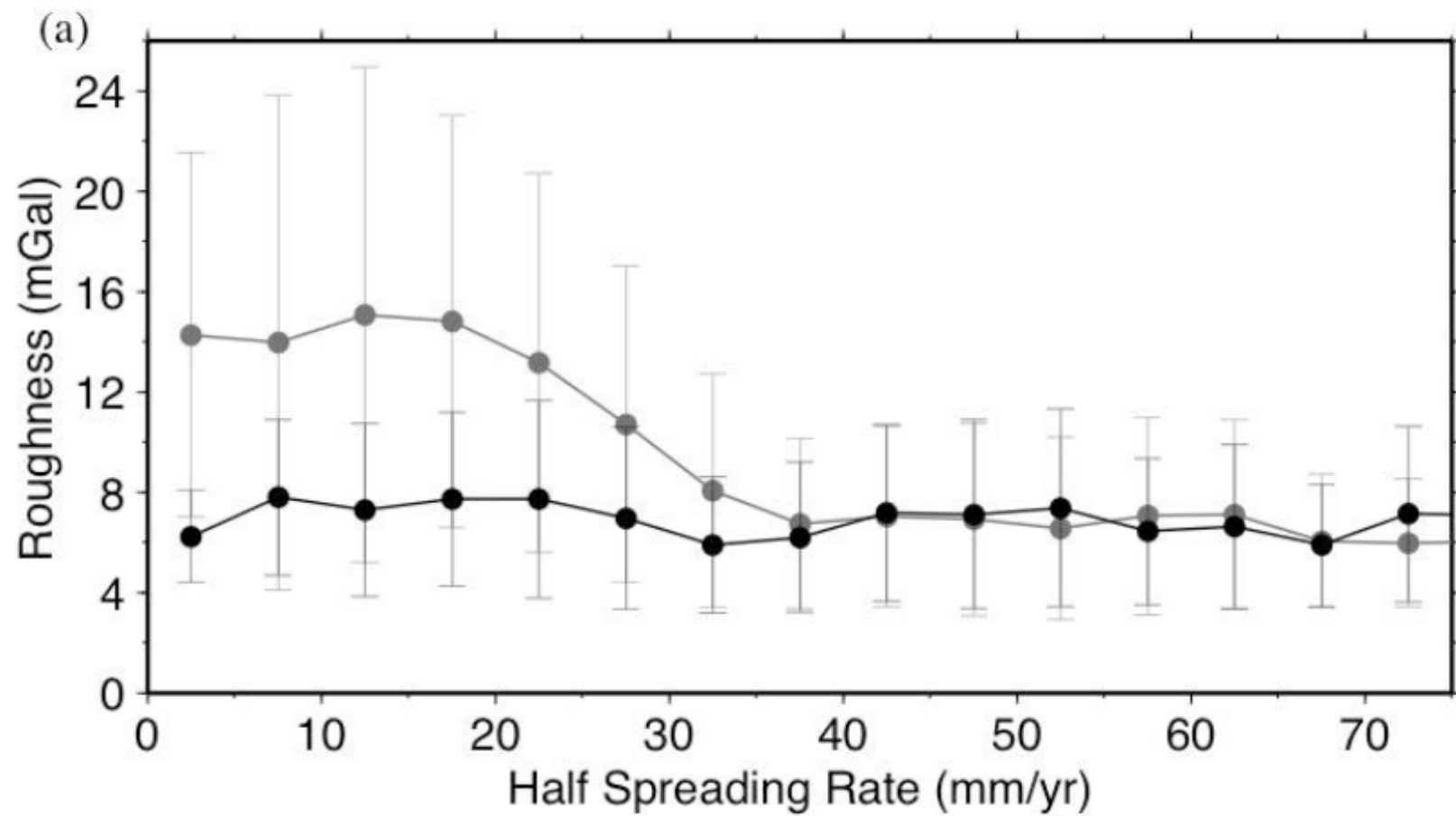


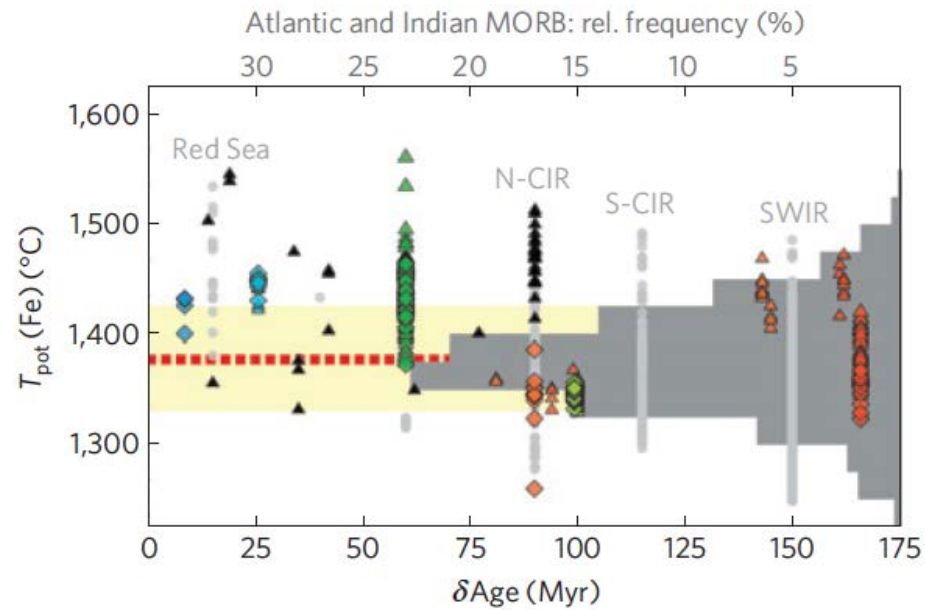
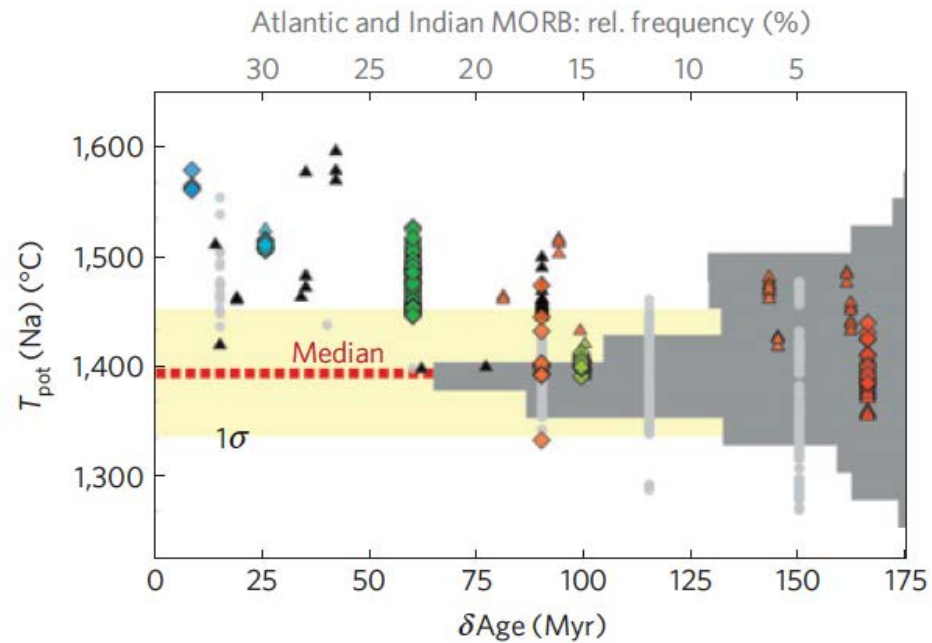
$t_{+1} \approx 3.81$ Ga

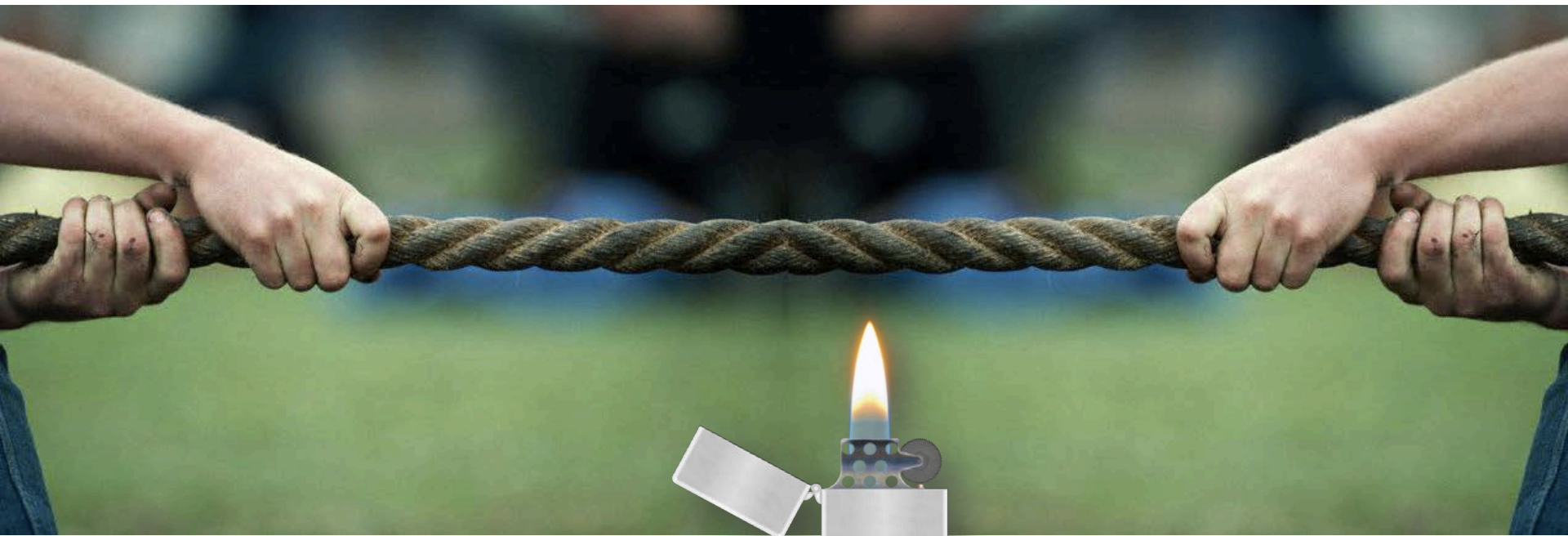


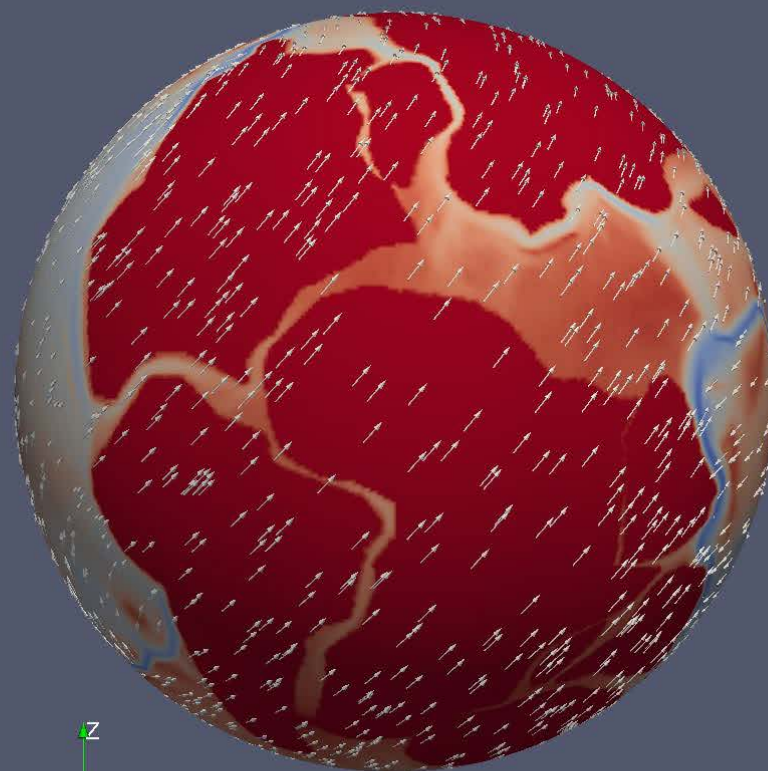
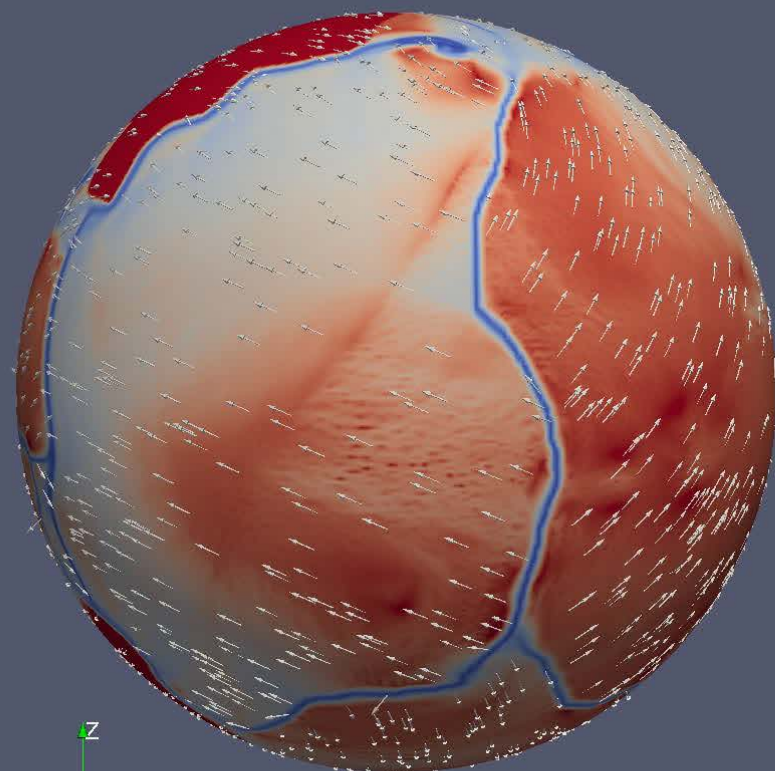


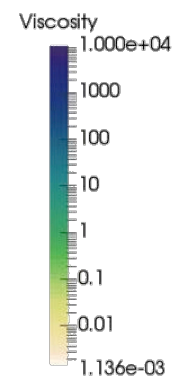
$t_{+2} \approx 4.08$ Ga



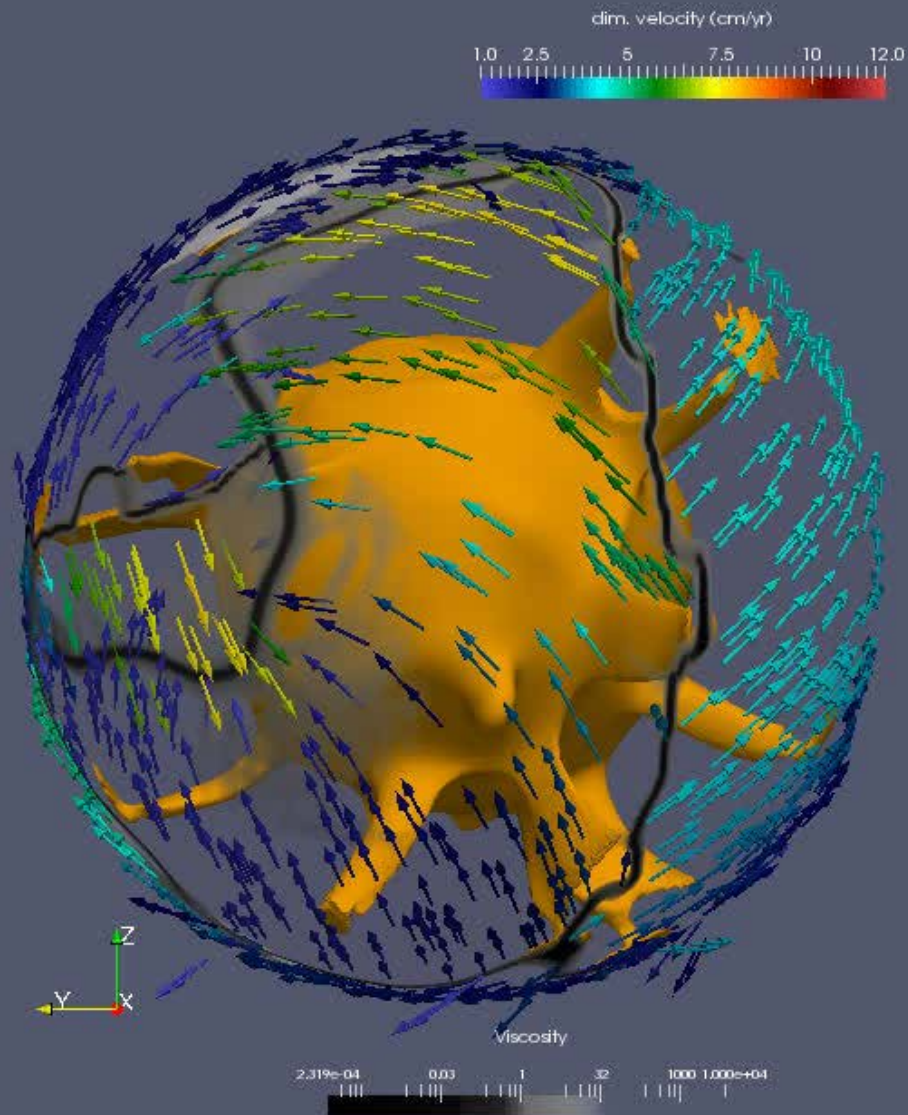
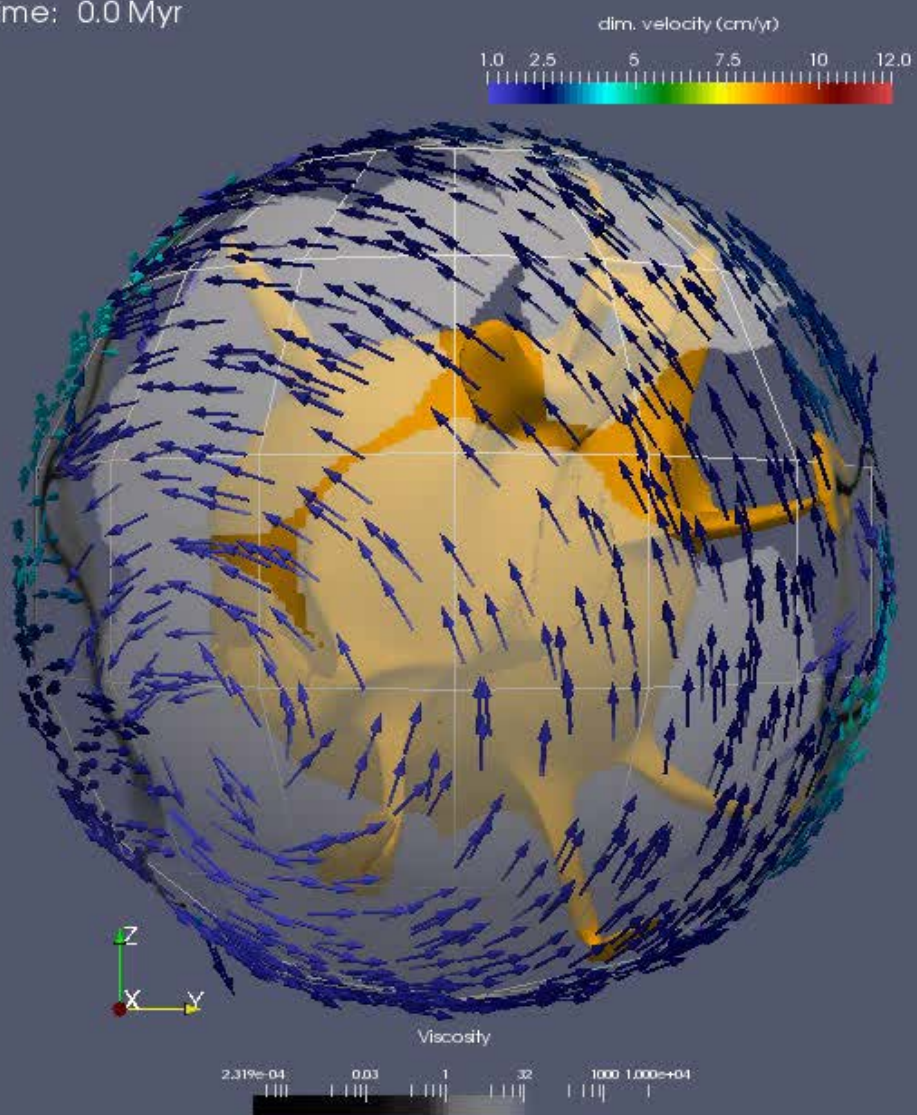




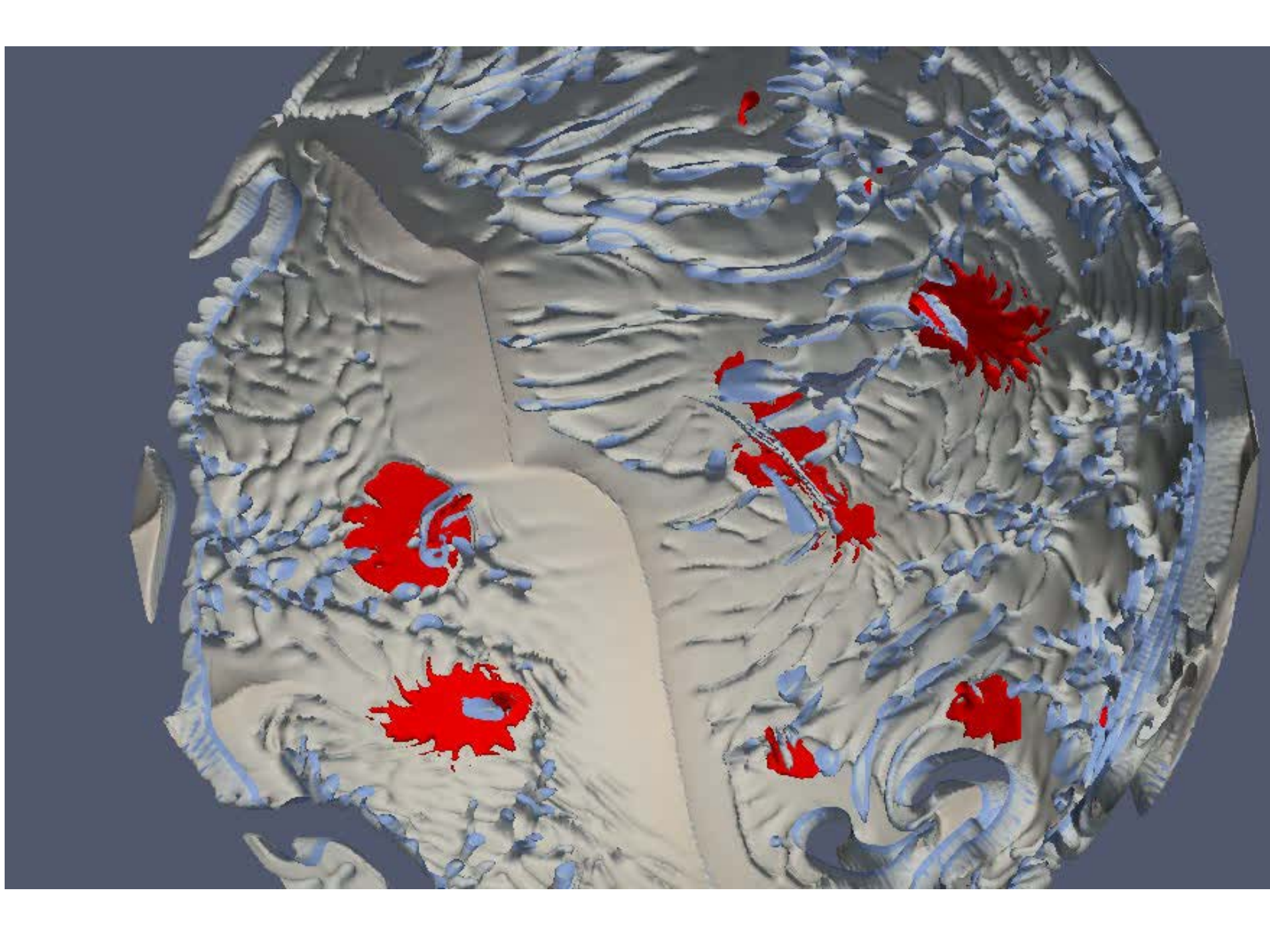


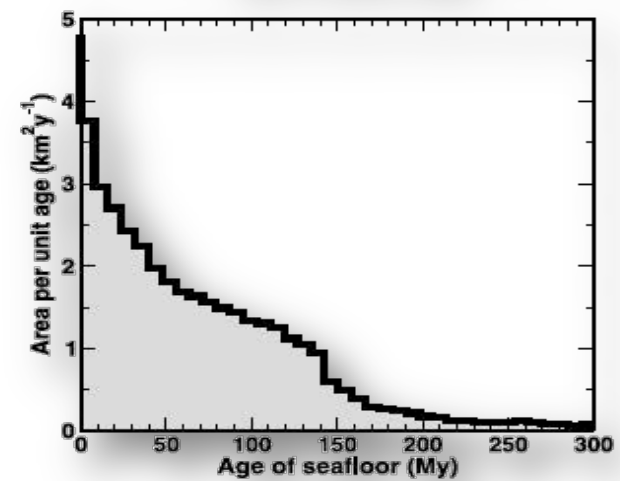
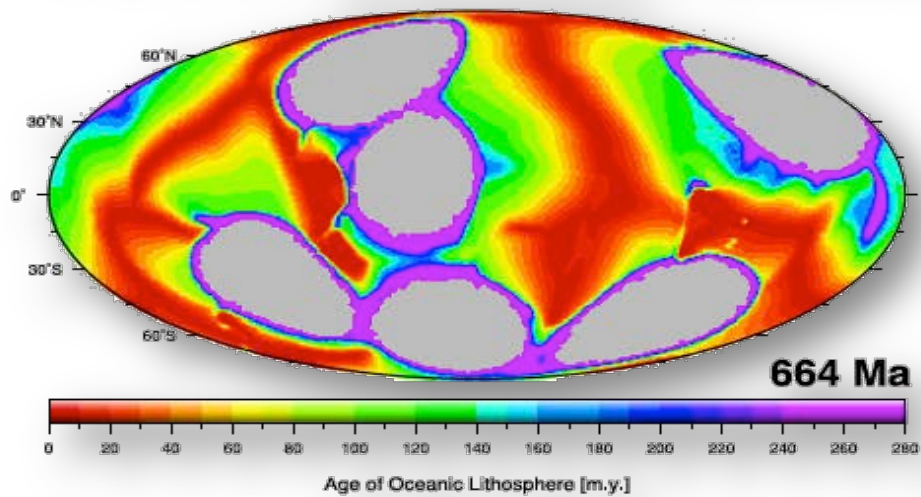
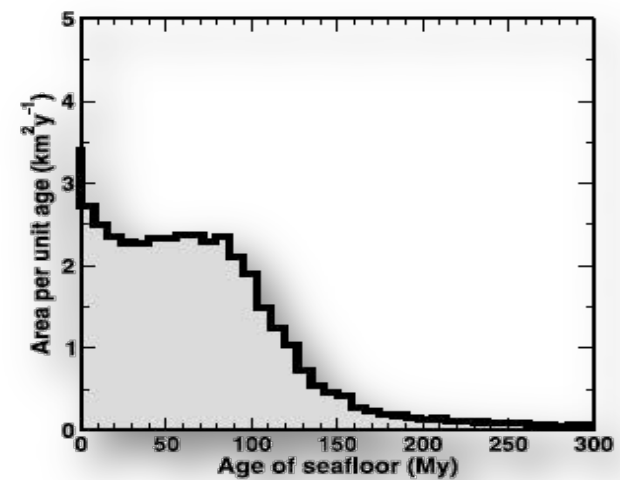
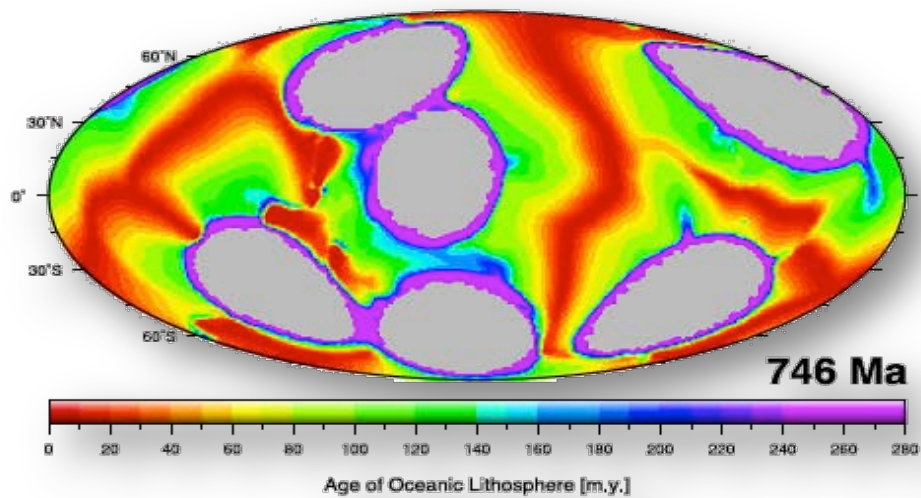


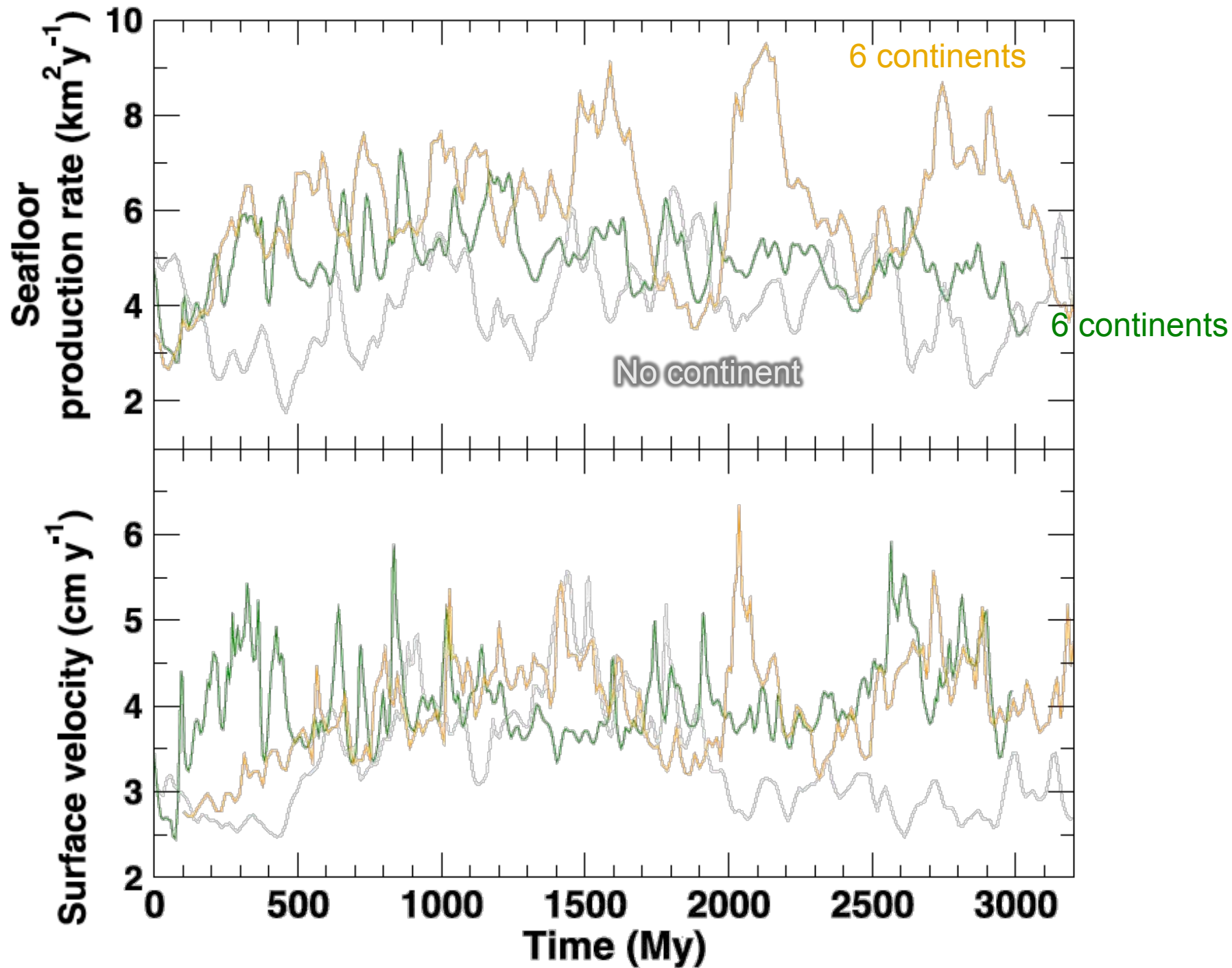
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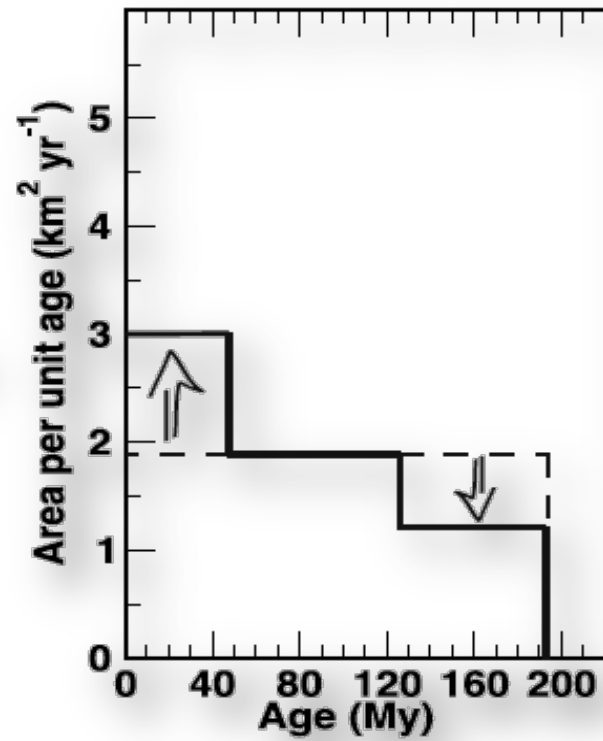
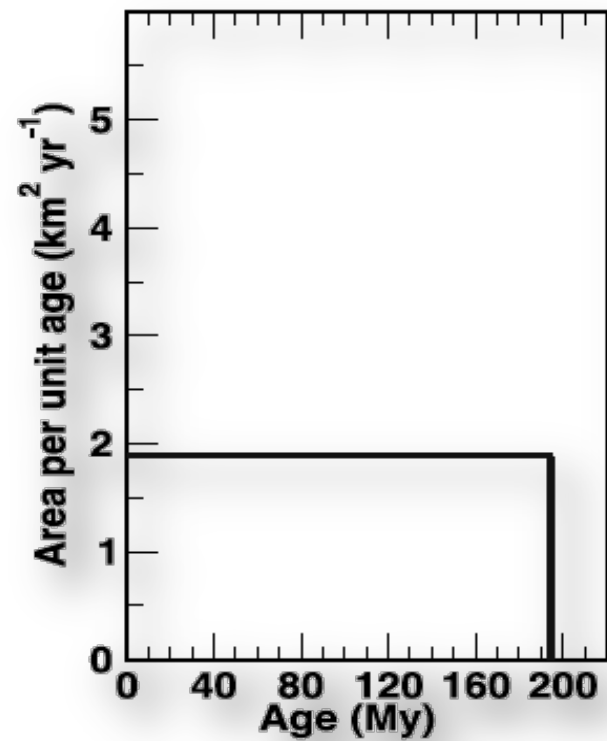


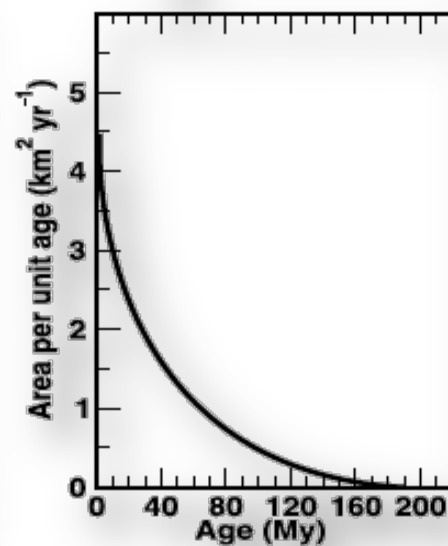
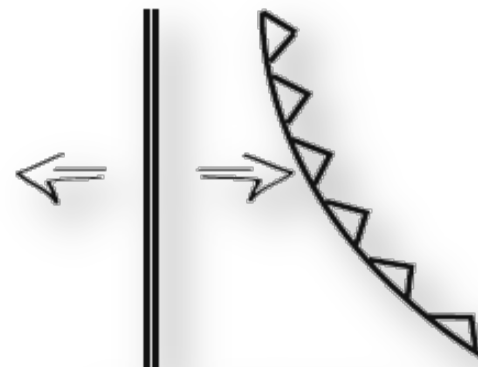
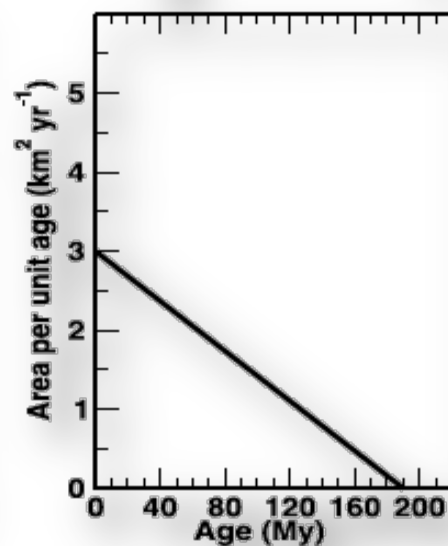
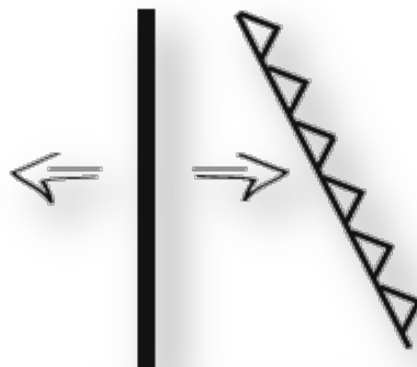
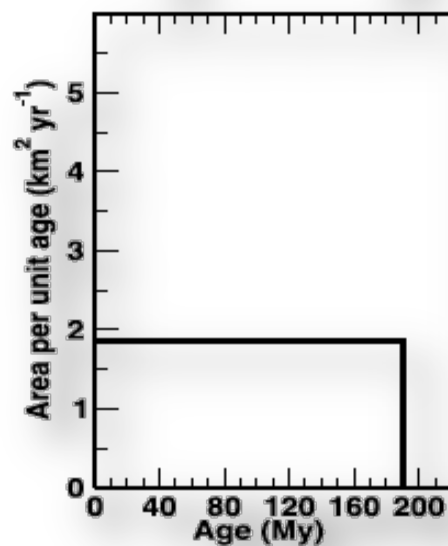
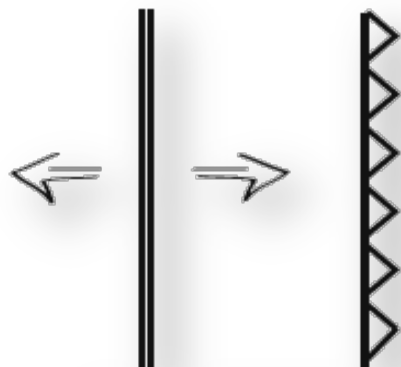




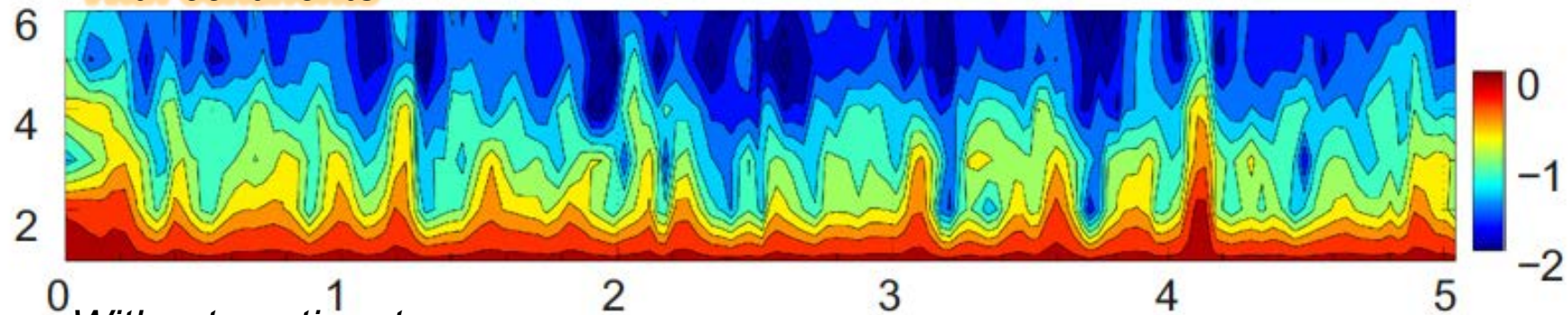




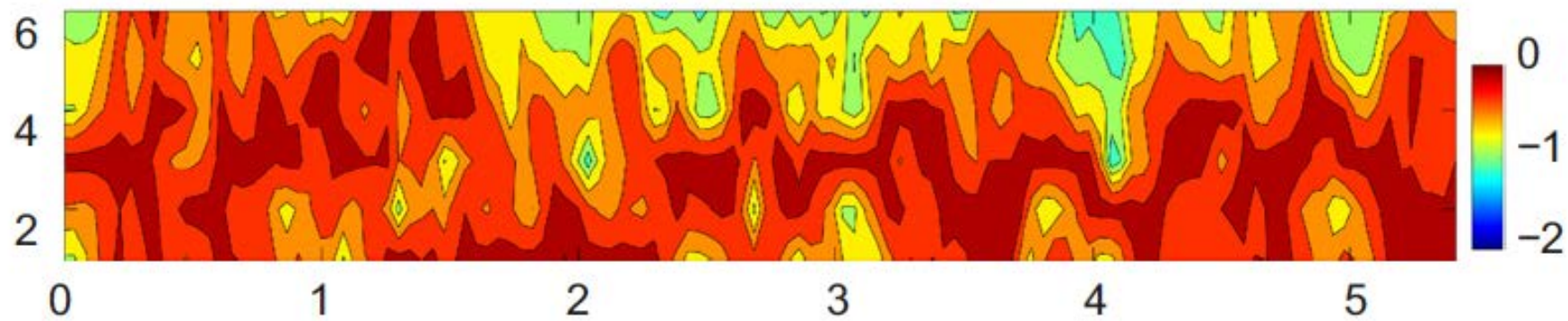




With continents



Without continents



Time in Ga