

Table S4: Parameters used in geodynamic thermal models

Mantle reference density	3300 kg·m ⁻³
Mantle reference temperature	1300°C
Reference thermal conductivity, k_0	3 W·K ⁻¹ ·m ⁻¹
Thermal expansivity, α	3×10 ⁻⁵ K ⁻¹
Specific heat capacity, C_p	1250 J·kg ⁻¹ ·K ⁻¹
Nusselt number, Nu	4
Frictional angle, φ	30°
Cohesions, c_0	20 MPa
Effective viscosity, η_{eff}	10 ¹⁹ to 10 ²³ Pa·s
Creep pre-exponential factor ¹ , B_{dif} ; B_{dis}	2.25×10 ⁻⁹ ; 6.52×10 ⁻¹⁶ Pa ⁻ⁿ ·s ⁻¹
Creep activation energy ¹ , E_{dif} ; E_{dis}	375; 530 kJ·mol ⁻¹
Creep activation volume ¹ , V_{dif} ; V_{dis}	6; 18 cm ³ ·mol ⁻¹
Stress exponent ¹ , n_{dif} ; n_{dis}	0; 3
Gas constant, R	8.314 J·K ⁻¹ ·mol ⁻¹
Grain size and its exponent in diffusion creep ¹ , d; m	0.001 m; 2.5
Ridge half-spreading rate, U_{half}	2.78 cm·yr ⁻¹
¹ Mantle material: Dry Olivine from Hirth, G., and Kohlstedt, D. (2003). Rheology of the upper mantle and the mantle wedge: A view from the experimentalists. Washington DC American Geophysical Union Geophysical Monograph Series, 138, 83–105. https://doi.org/10.1029/138GM06	