Table S2 Parameters of the materials in the numerical mode

Material	状态	ρ_0 (kgm^{-3})	Cp ($Jkg^{-1}K^{-1}$)	K[b] ($Wm^{-1}K^{-1}$)	$T_{solidus}$[c] (k)	$T_{liquidus}$[c] (k)	Hr (μWm^{-3})
Air	–	1	100	20	–	–	0
Water	–	1000	3330	20	–	–	0
Sediment	Soild	2700	1000	K1	TS1	TL1	2
	Liquid	2500					
Upper continental crust	Soild	2900	1000	K1	TS1	TL1	2
	Liquid	2500					
Lower continental crust	Soild	3000	1000	K2	TS2	TL2	0.5
	Liquid	2500					
Oceanic crust	Soild	3000	1000	K2	TS2	TL2	0.25
	Liquid	2900					
Mantle	Soild	3300	1000	K3	–	–	0.022
	Liquid	2700					
Weak mantle	Soild	3300	1000	K3	–	–	0.022
	Liquid	2700					
Upper oceanic plateau crust	Soild	2730	1000	K2	TS2	TL2	0.25
	Liquid	2900					
Middle oceanic plateau crust	Soild	2850	1000	K2	TS2	TL2	0.25
	Liquid	2900					
Lower oceanic plateau crust	Soild	3030	1000	K2	TS2	TL2	0.25
	Liquid	2900					
Oceanic plateau mantle 1	Soild	3290	1000	K3	–	–	0.022
	Liquid	2700					
Oceanic plateau mantle 2	Soild	3290	1000	K3	–	–	0.022
	Liquid	2700					

a. ρ0 = reference density; Cp = specific heat capacity; K = thermal conductivity; $T_{solidus}$ = Solidus temperature; $T_{liquidus}$ = iquidus temperature; Hr=ra
compressibility; sin (φ_{ff}) = effective friction coefficient.

b. K1=[0.64+807/(TK+77)]exp(0.00004P); K2=[1.18+474/(TK+77)]exp(0.00004P); K3=[0.73+1293/(TK+77)]exp(0.00004P)

c. P<1200 MPa, TS1=889+17900/(P+54)+20200/$(P+54)^2$; P>1200 MPa, TS1=831+0.06P. TL1=1262+0.09P

P<1600 MPa, TS2=973–70400/(P+354)+778×10^5/$(P+354)^2$; P>1600 MPa, TS2=935+0.0035P+0.0000062P^2. TL2=1423+0.105P

d. See Table S1.

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α (K^{-1})	β (MPa)	Viscosity[d]	$Sin(\varphi_{eff})$
0	0	A*	0
0	0	A*	0
3×10^{-5}	1×10^{-5}	B*	0.15
		G*	0.06
3×10^{-5}	1×10^{-5}	B*	0.15
		G*	0.06
3×10^{-5}	1×10^{-5}	C*	0.15
		G*	0.06
3×10^{-5}	1×10^{-5}	D*	0.15
		H*	0.06
3×10^{-5}	1×10^{-5}	E*	0.6
			0.06
3×10^{-5}	1×10^{-5}	F*	0.6
			0.06
3×10^{-5}	1×10^{-5}	D*	0.15
		H*	0.06
3×10^{-5}	1×10^{-5}	D*	0.15
		H*	0.06
3×10^{-5}	1×10^{-5}	D*	0.15
		H*	0.06
3×10^{-5}	1×10^{-5}	E*	0.6
			0.06
3×10^{-5}	1×10^{-5}	E*	0.6
			0.06

dioactive heat; α = coefficient of thermal expansion; β = coefficient of