Supporting Information: 'How sphericity combines with the age and width of slabs to dictate the dynamics and evolution of subduction systems on Earth'

Fangqin Chen[1], D. Rhodri Davies[1], Saskia Goes[2], Lior Suchoy[2], Stephan C.

Kramer[2]

[1]Research School of Earth Sciences, The Australian National University, Canberra, ACT, Australia

[2]Department of Earth Science and Engineering, Imperial College London, London, UK

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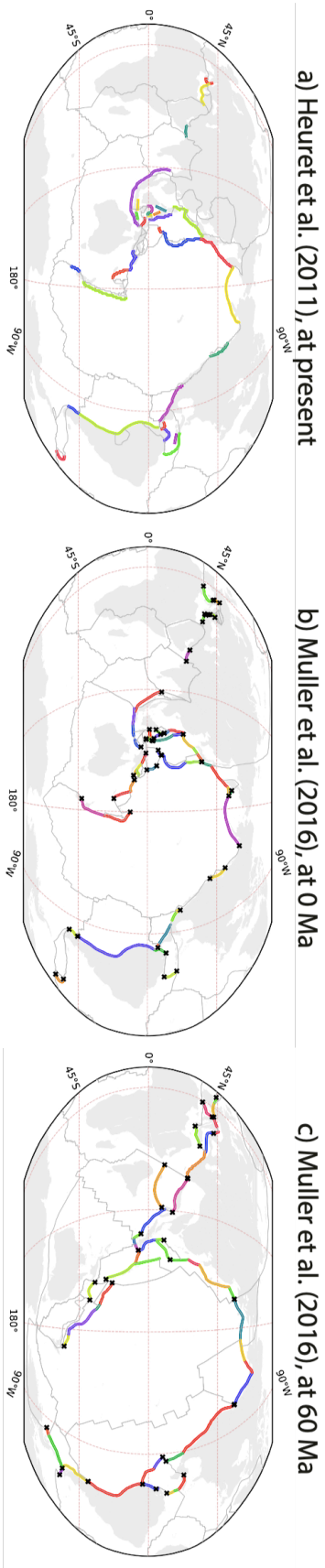
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Figure S1. (a) Map of subduction zones from Heuret et al. (2011). (b) and (c) Map of trench segments based on plate reconstruction at present and at 60 Myr by Müller et al. (2016). In (b) and (c), black crosses represent edges of subduction zones. Trench segments within each subduction zones were merged when calculating trench length.

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References

Heuret, A., Lallemand, S., Funiciello, F., Piromallo, C., & Faccenna, C. (2011). Physical characteristics of subduction interface type seismogenic zones revisited. *Geochemistry, Geophysics, Geosystems*, *12*(1).

Müller, R. D., Seton, M., Zahirovic, S., Williams, S. E., Matthews, K. J., Wright, N. M., ... Cannon, J. (2016). Ocean basin evolution and global-scale plate reorganization events since Pangea breakup. *Annual Review of Earth and Planetary Sciences*, *44*, 107–138.
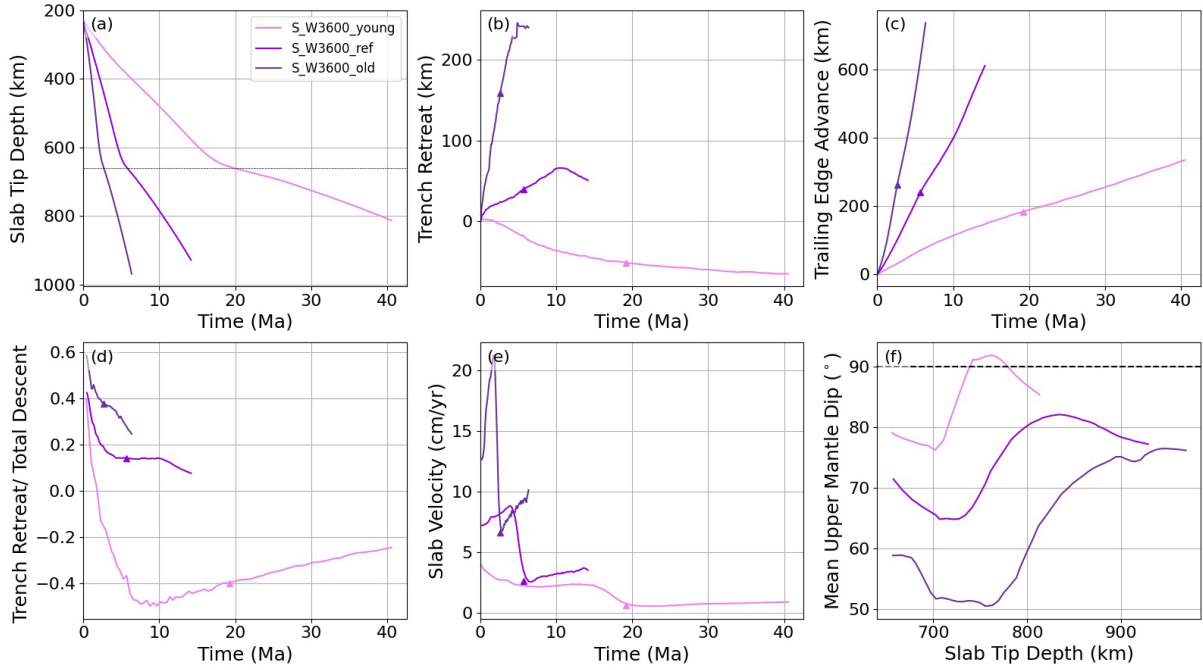
Figure S2. Comparison between spherical simulations with a plate width of 3600 km: (a) slab tip depth, as a function of time, where the upper–lower mantle boundary is indicated by the black dotted line at 660 km depth; (b) amount of trench retreat; (c) amount of plate advance, measured at the plate's trailing edge; (d) ratio of trench retreat to total descent, which is the sum of trench retreat and trailing edge advance; (e) slab sinking velocity; and (f) average slab dip in the upper mantle, with the black dashed line indicating a vertical slab with dip angle of 90°. Triangles indicate the time of slab tip transition-zone interaction. All measurements are taken at the symmetry plane.
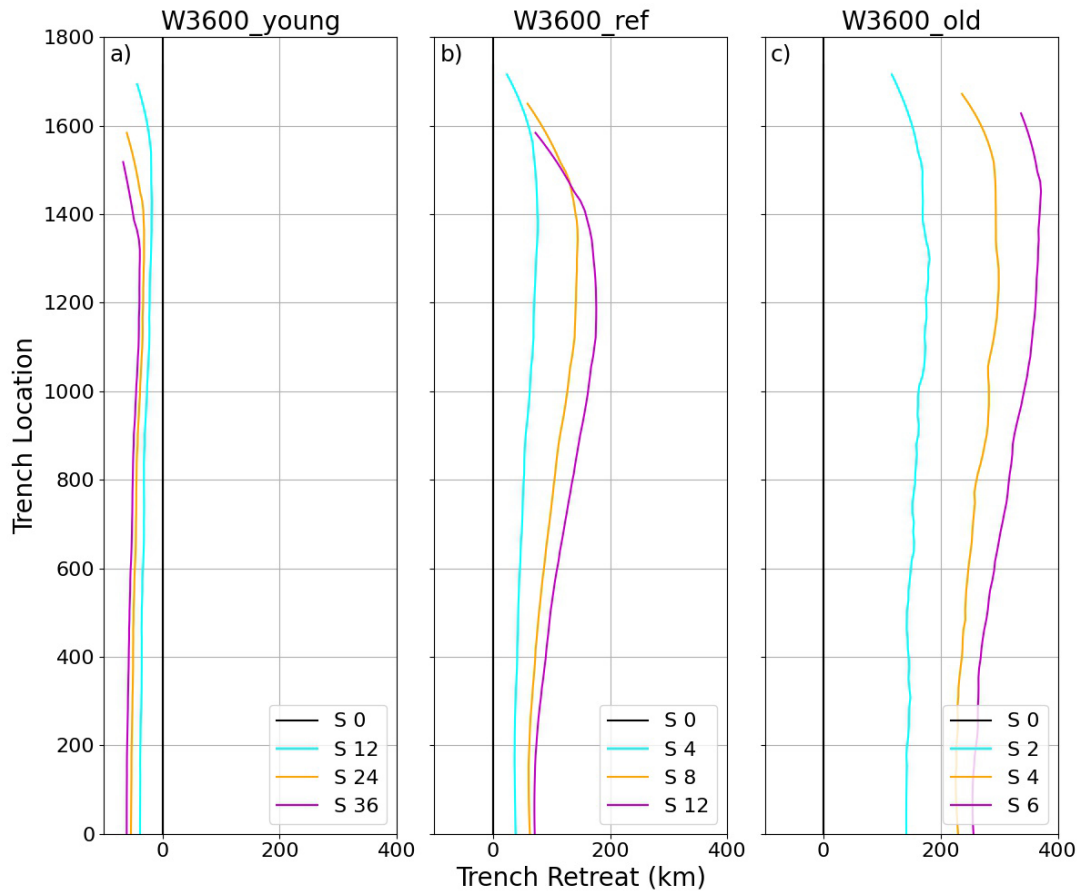
Figure S3.   Spatio-temporal evolution of trench location in spherical (S) simulations, at a plate width of $3600\,\mathrm{km}$. Times given in Myr since simulation initiation. (a) $H = 45\,\mathrm{km}$, $\Delta\rho = 40\,\mathrm{kg\,m^{-3}}$; (b) $H = 70\,\mathrm{km}$, $\Delta\rho = 80\,\mathrm{kg\,m^{-3}}$; (c) $H = 100\,\mathrm{km}$, $\Delta\rho = 120\,\mathrm{kg\,m^{-3}}$.