

**Supporting Information to *Provenance of Tibetan Geoid Ridge and its  
Implication to the Collision Evolution between India and Tibet***

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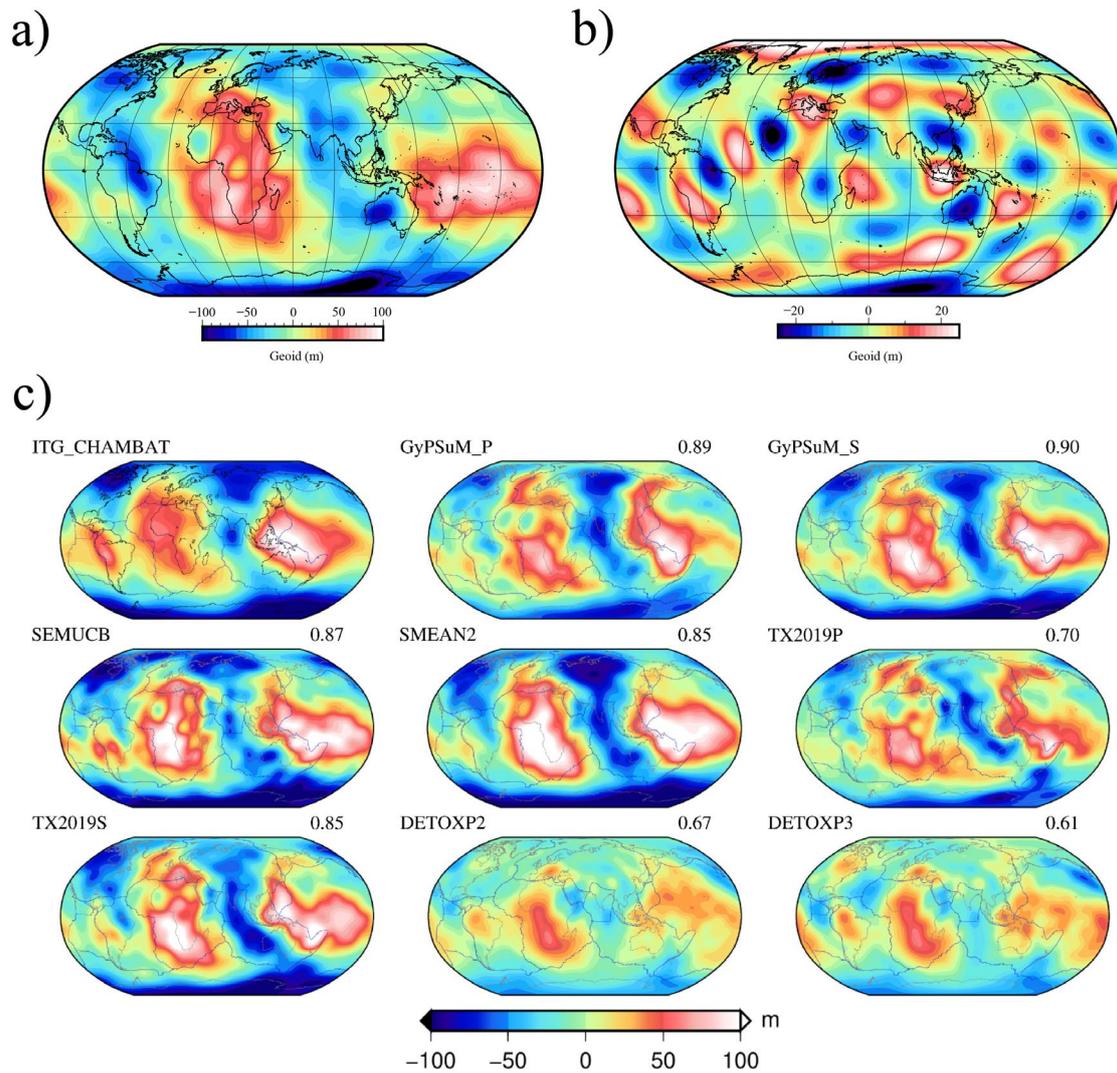
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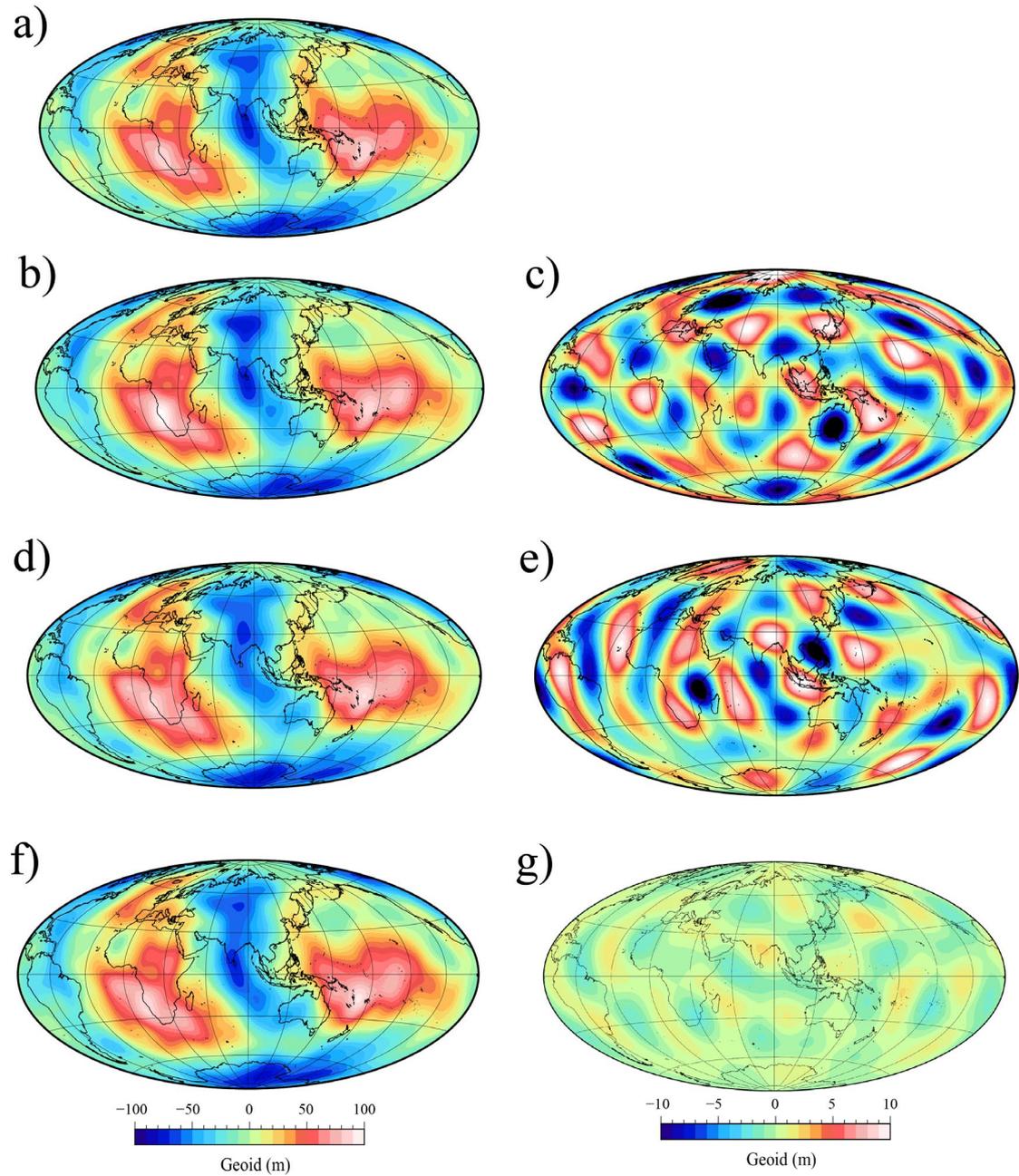
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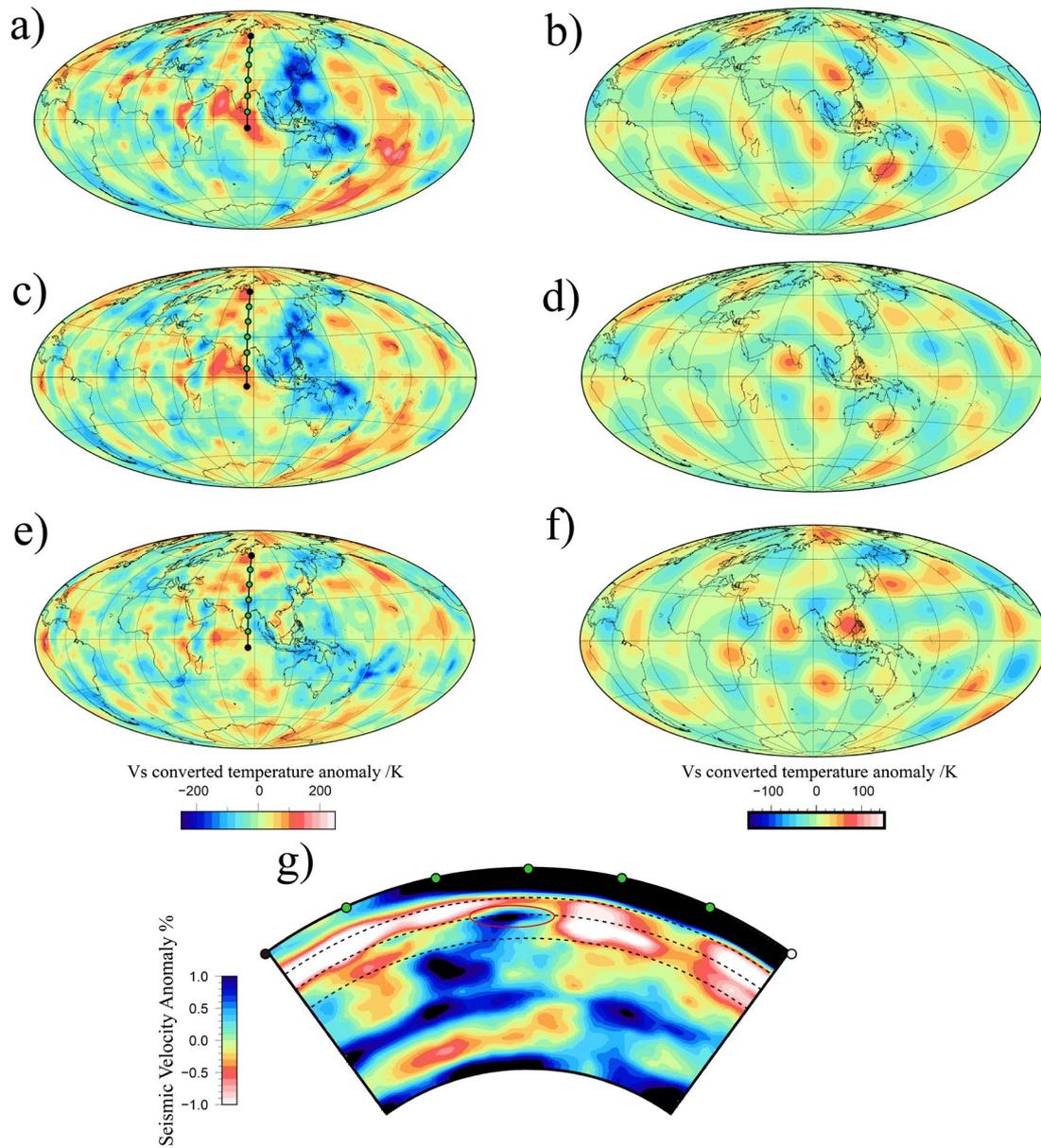
**Supplementary Figures: Figure S1-Figure S4**



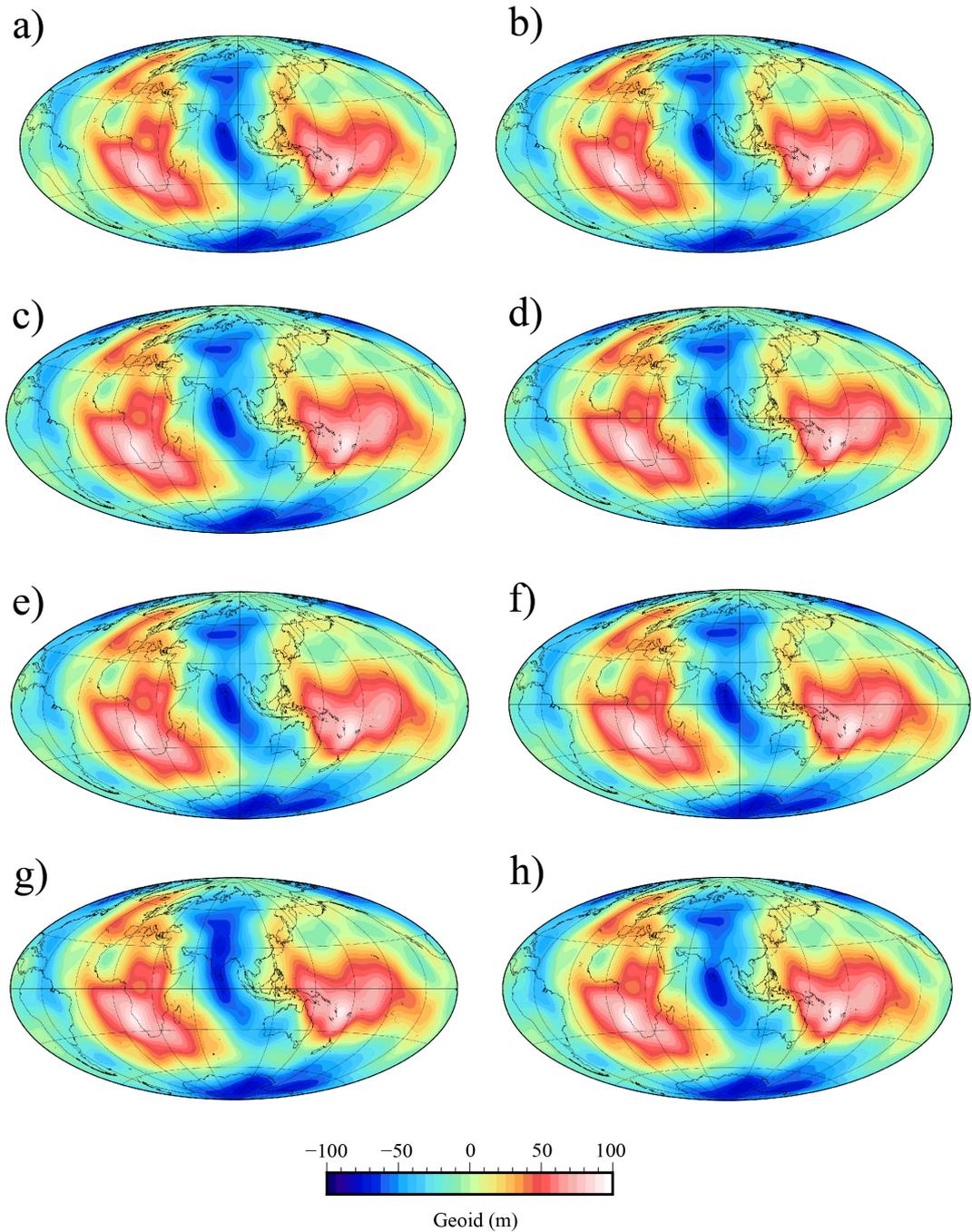
**Figure S1** a). Calculated global geoid by using the tomography model SEMUCB-WM1 only. b). The degree 7-10 components of a). c). Geoid calculation results conducted by Ghosh & Pal (2022) using different tomography models. Top left one is the geoid observation for comparison.



**Figure S2.** a): Calculated global geoid by using the tomography model GYPSUM-S. b): Geoid calculation result with the degrees 7-10 density structure in 150-410 km removed. c): Geoid generated by the degrees 7-10 density structure in 150-410 km only. d) and f): Same as b) but for 410-660 km depths (d), 660-1000 km depths (f). e) and g): Same as c) but for 410-660 km depths (e), 660-1000 km depths (g).



**Figure S3.** Left: seismic velocity anomalies of GYPSUM-S for 462 km (a), 600 km (c) and 660 km (e). Right: degrees 7-10 components of the seismic structures shown left side. g): a cross-section of the GYPSUM-S.



**Figure S4.** Left side: Geoid pattern calculated by a): only GYPSUM-S, c): SEMUCB-WM1 nested in GYPSUM-S, e): SL2013sv nested in GYPSUM-S and g): EARA2014 nested in GYPSUM-S. Right side shows the calculated geoid as the left one but with the low-density anomalies eliminated in Tibetan region.

## **References From the Supporting Information:**

Ghosh, A., & Pal, D. (2022). Do lower mantle slabs contribute in generating the Indian Ocean geoid low? *Tectonophysics*, 822, 229176. <https://doi.org/10.1016/j.tecto.2021.229176>