The formation of North-South Seismic Zone and Emeishan large igneous province in Western China: Insight from teleseismic tomography

Chuansong He[1, 2*]

[1]*Institute of Geophysics, CEA, Beijing 100081, China*

[2]*Key Laboratory of Continental Collision and Plateau Uplift, Institute of Tibetan Plateau Research, Chinese Academy of Sciences, Beijing 100101, China*

* Corresponding author. Email address: hechuansong@aliyun.com

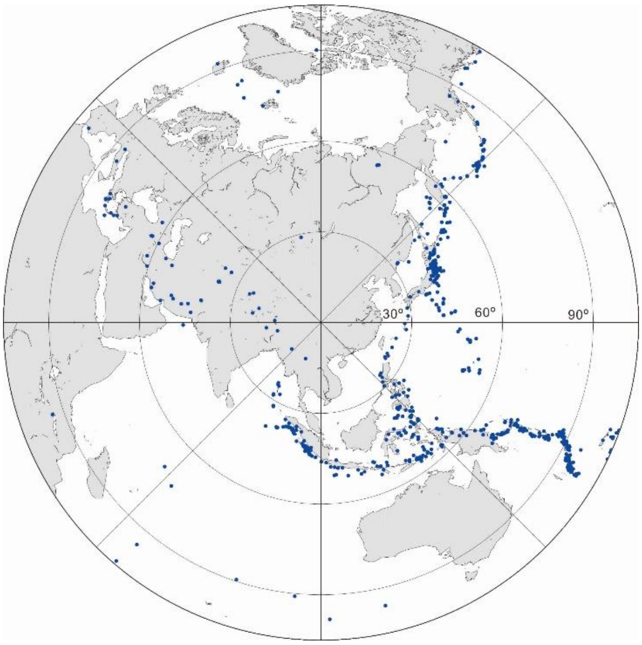


Figure S1. Events recorded by the permanent and temporary stations. The epicentral distances ranged from 30° to 85° and earthquake magnitudes >6.0 (The figure was generated using the Generic Mapping Tool (http://gmt.soest.hawaii.edu/) provided by Chuansong He).

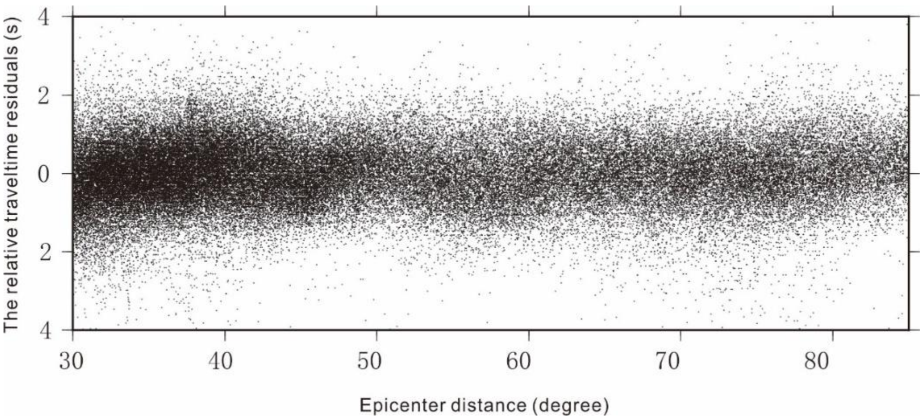


Figure S2. Relative traveltime residuals, which range from -3 to +3 s, used in the tomographic inversion (The figure was generated using the Generic Mapping Tool (http://gmt.soest.hawaii.edu/) provided by Chuansong He).

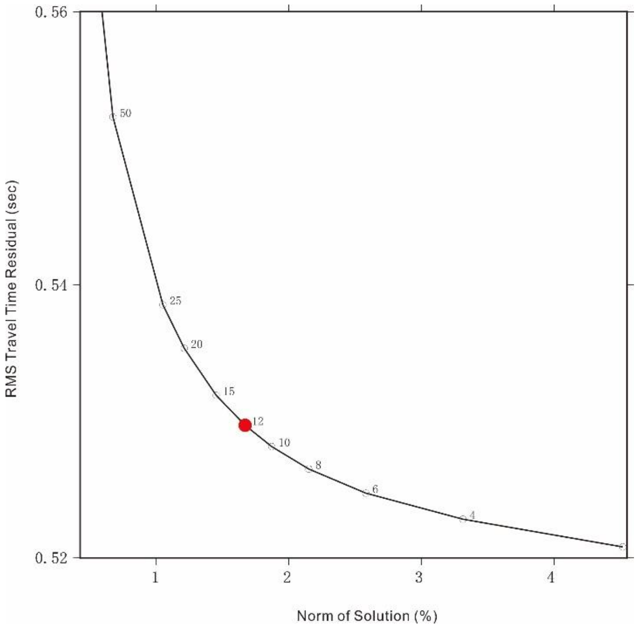


Figure S3. Damping value of 12.0 used to invert the final resolution model after many tests of the tomographic inversion (The figure was generated using the Generic Mapping Tool (http://gmt.soest.hawaii.edu/) provided by Chuansong He).

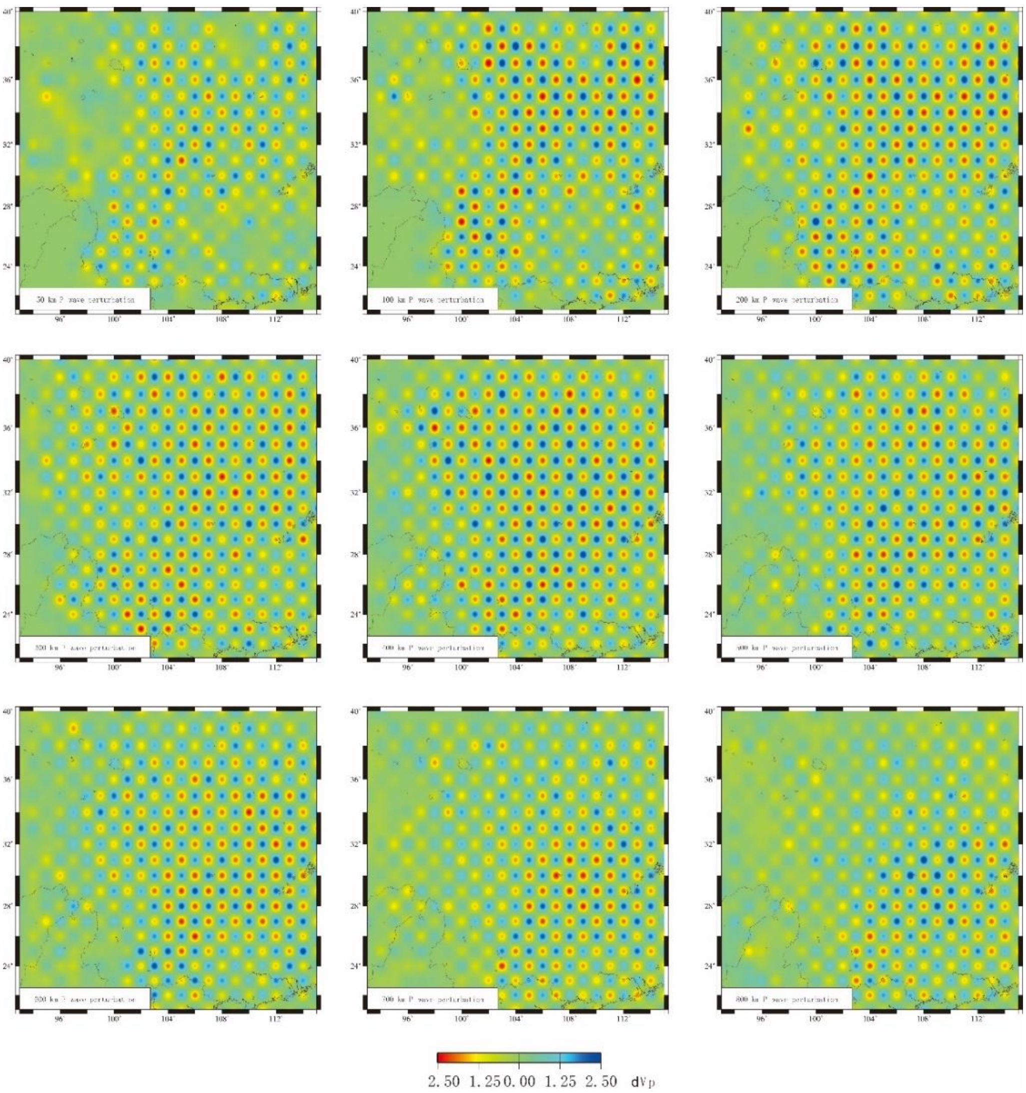


Figure S4. Checkerboard resolution tests at depths of 50, 100, 200, 300, 400, 500, 600, 700 and 800 km (The figure was generated using the Generic Mapping Tool (http://gmt.soest.hawaii.edu/) provided by Chuansong He).

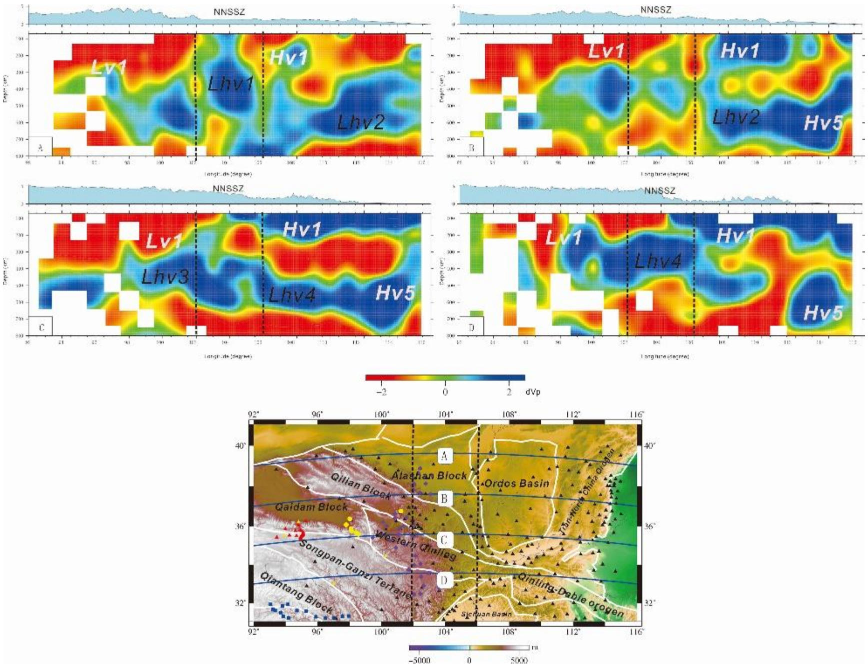


Figure S5. Profiles of P-wave velocity perturbations (He and Santosh, 2017b) (The figure was generated using the Generic Mapping Tool (http://gmt.soest.hawaii.edu/) provided by Chuansong He).

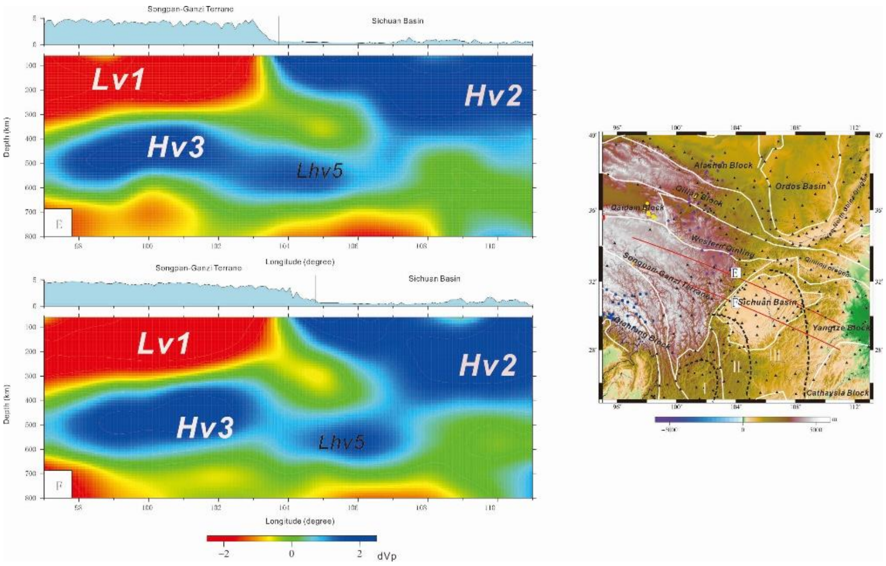


Figure S6. Profiles of P-wave velocity perturbations across the Longmenshan Orogenic Belt (He et al., 2019) (The figure was generated using the Generic Mapping Tool (http://gmt.soest.hawaii.edu/) provided by Chuansong He).

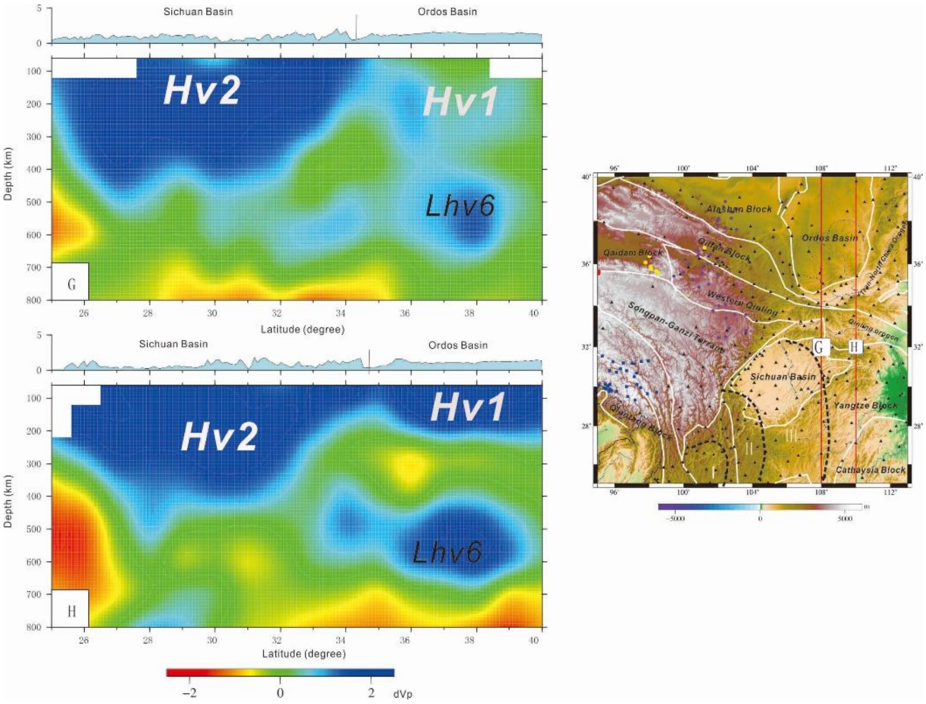


Figure S7. Profiles of P-wave velocity perturbations across the Ordos Basin and Sichuan Basin (He et al., 2019) (The figure was generated using the Generic Mapping Tool (http://gmt.soest.hawaii.edu/) provided by Chuansong He).

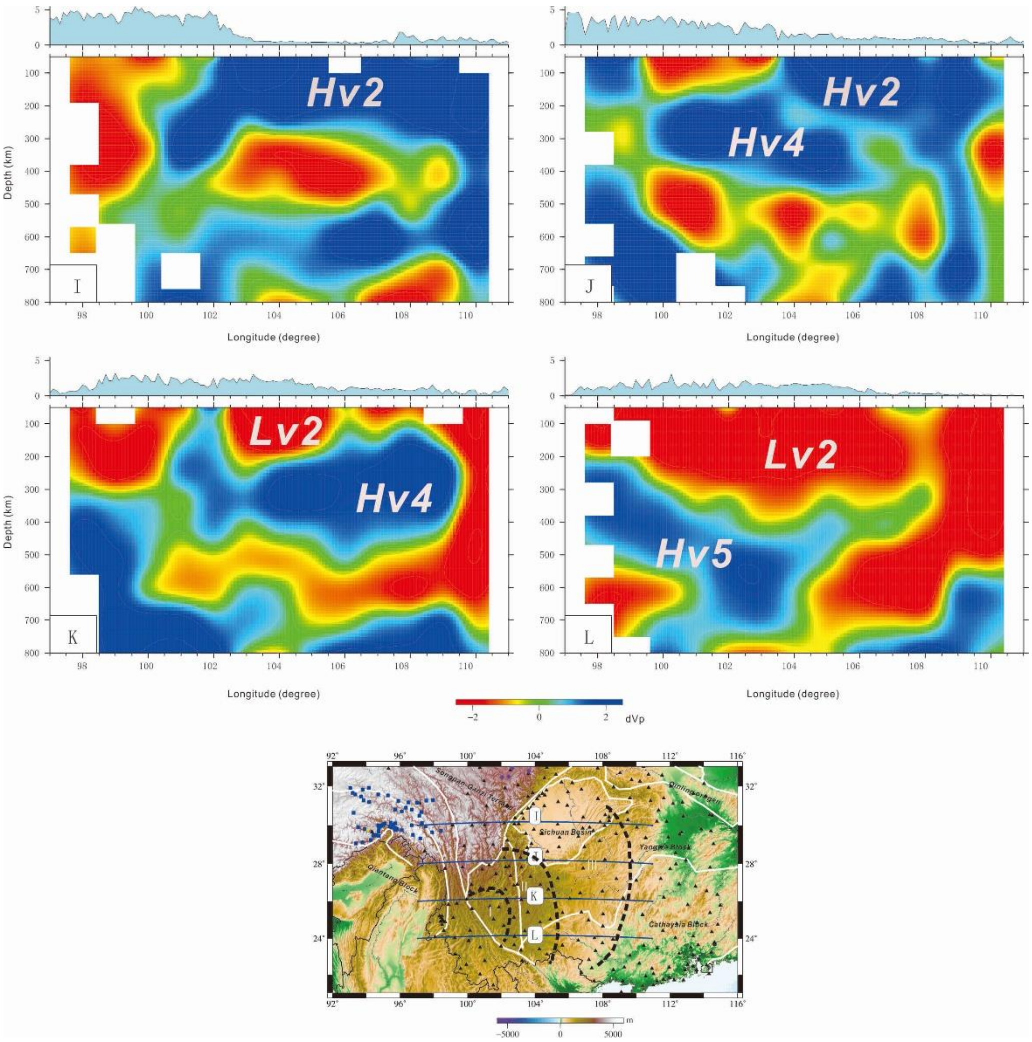


Figure S8. Profiles of P-wave velocity perturbations across the southern part of the NSSZ or ELIP. Lv2 may root from the lower mantle (L) (He and Santosh, 2017a) (The figure was generated using the Generic Mapping Tool (http://gmt.soest.hawaii.edu/) provided by Chuansong He).

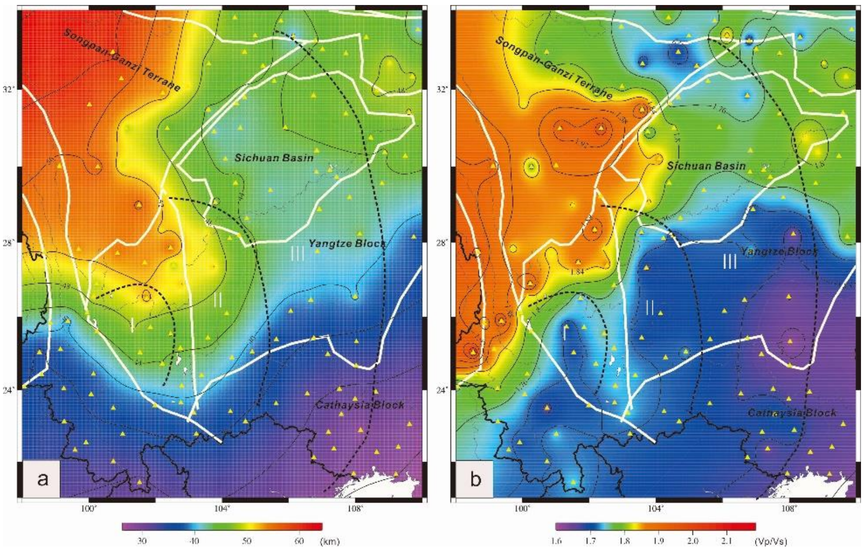


Figure S9. Crustal thickness (a) and crustal Vp/Vs ratio (b) in the northern part of the NSSZ. Yellow triangle: seismic station. I, II and III are the inner zone, intermediate zone and outer zone of the ELIP, respectively. The lower Vp/Vs ratios in the ELIP (b) represent the absence of the mafic/ultramafic lower crust, which may have delaminated into the mantle (He et al., 2014b) (The figure was generated using the Generic Mapping Tool (http://gmt.soest.hawaii.edu/) provided by Chuansong He).

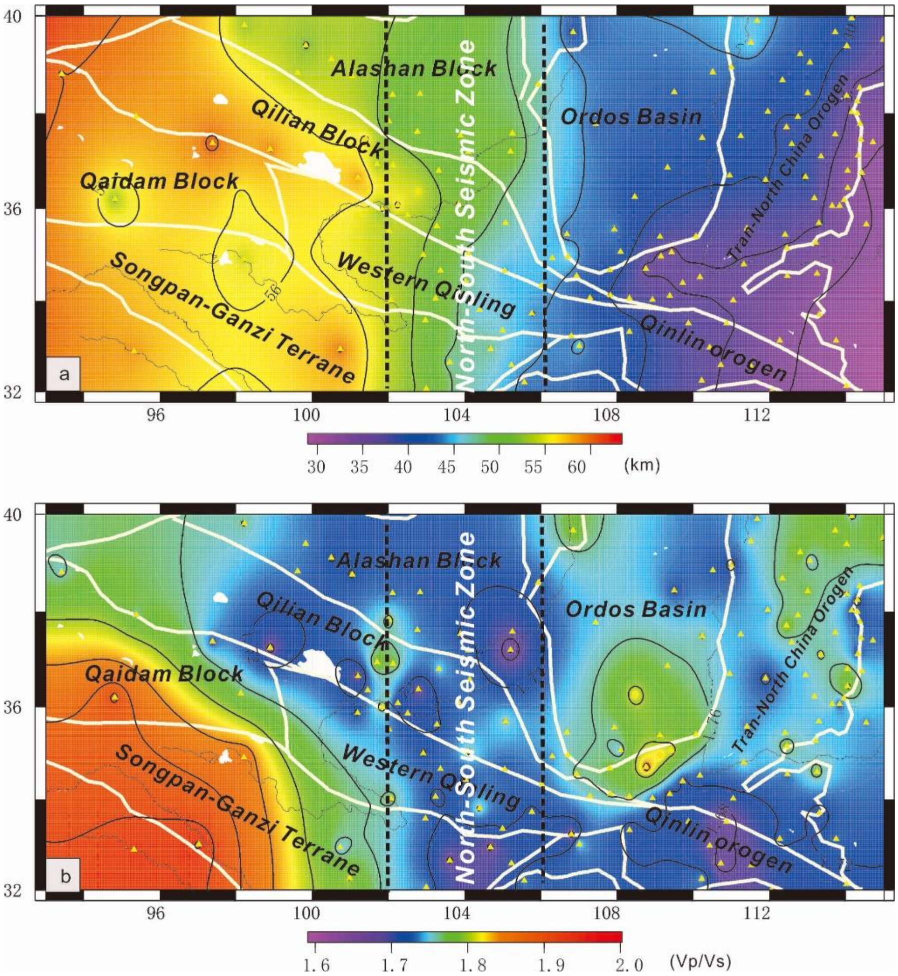
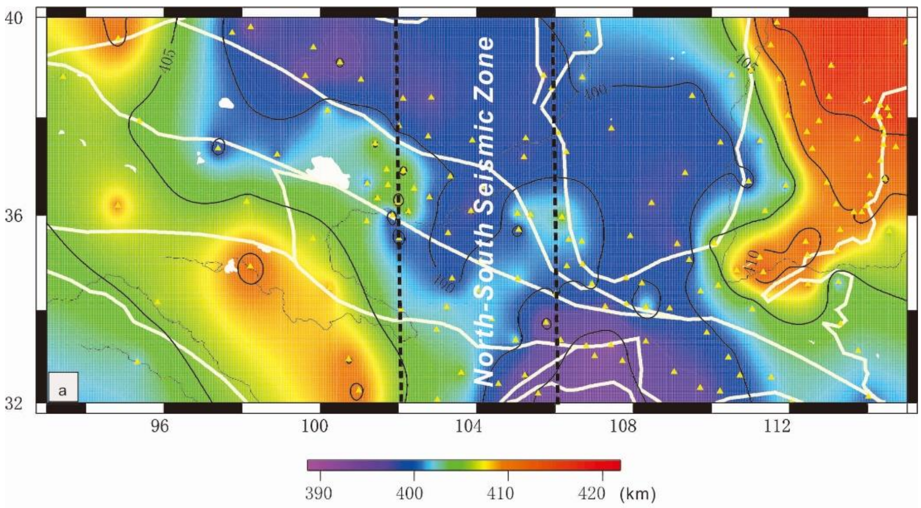


Figure S10. Crustal thickness (a) and Vp/Vs ratio (b) in the northern part of the NSSZ. Yellow triangles: seismic stations. Lower Vp/Vs ratios in the northern part of the NSSZ are generated by a deep process of delamination (He et al., 2014a) (The figure was generated using the Generic Mapping Tool (http://gmt.soest.hawaii.edu/) provided by Chuansong He).



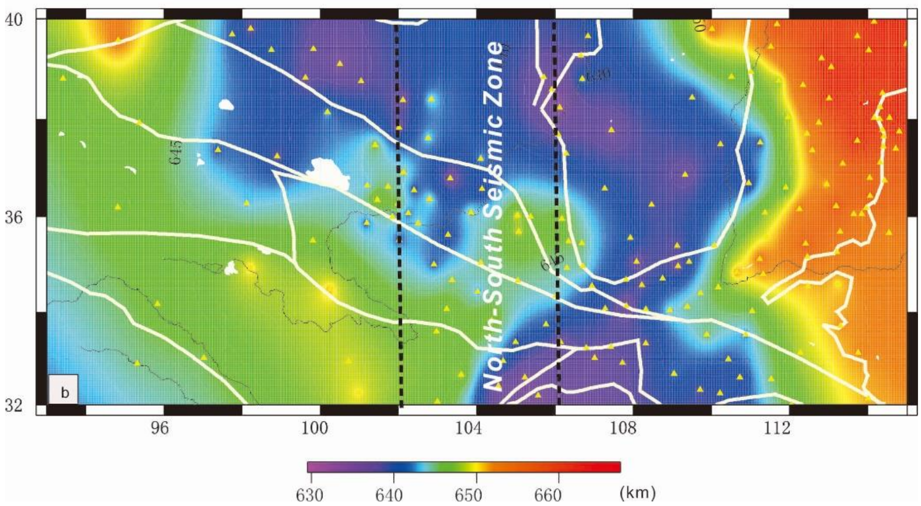


Figure S11. 410 and 660 km discontinuities of the upper mantle in the northern part of the NSSZ. Yellow triangles: seismic stations. Shallowing of both the 410 and 660 km discontinuities implies that the lower crust/lithosphere delaminated into the upper mantle transition zone, resulting in a cold domain there (He et al., 2014a) (The figure was generated using the Generic Mapping Tool (http://gmt.soest.hawaii.edu/) provided by Chuansong He).

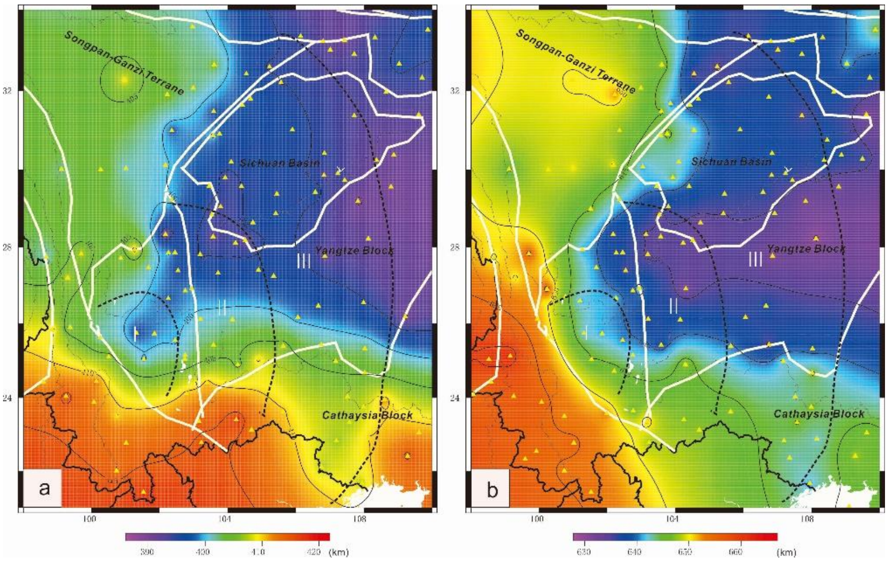


Figure S12. 410 and 660 km discontinuities in the upper mantle of the ELIP. Yellow triangles: seismic stations. I, II and III are the inner zone, intermediate zone and outer zone of the ELIP, respectively. Shallowing of both the 410 and 660 km discontinuities suggests that the lower crust/lithosphere delaminated into the upper mantle transition zone (He et al., 2014b) (The figure was generated using the Generic Mapping Tool (http://gmt.soest.hawaii.edu/) provided by Chuansong He).