



Supplementary Materials

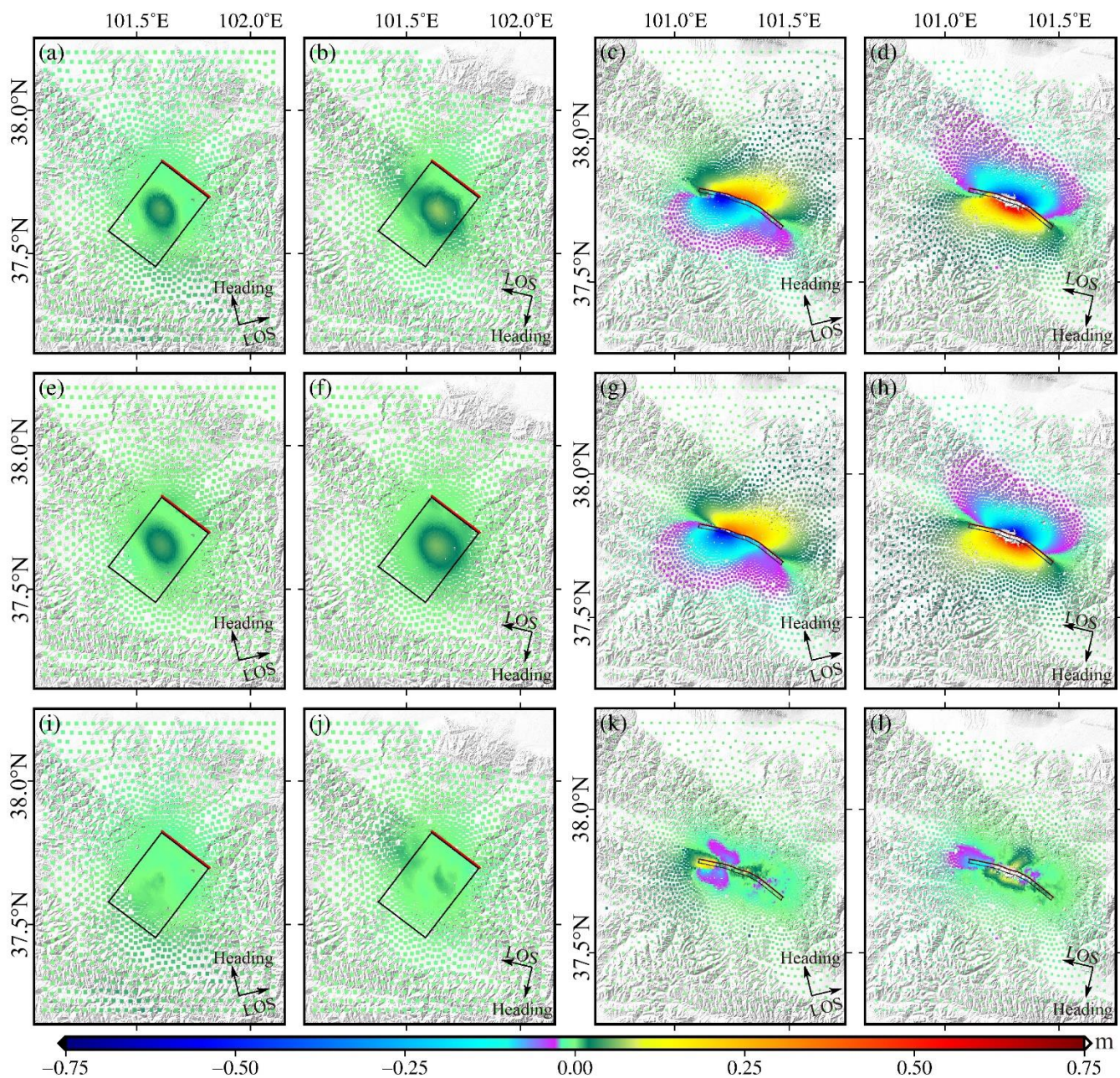


Figure S1. (a–b) Observations, (e–f) predictions, and (i–j) residuals from the MYDMPF model of the 2016 event on the ascending and descending tracks, respectively. (c–d) Observations, (g–h) predictions, (k–l) residuals from the one-fault model of the 2022 event. The solid red line marks the surface projections of the up-dip edge of the fault model. The black rectangle indicates the surface projection of the upper wall of the fault model.

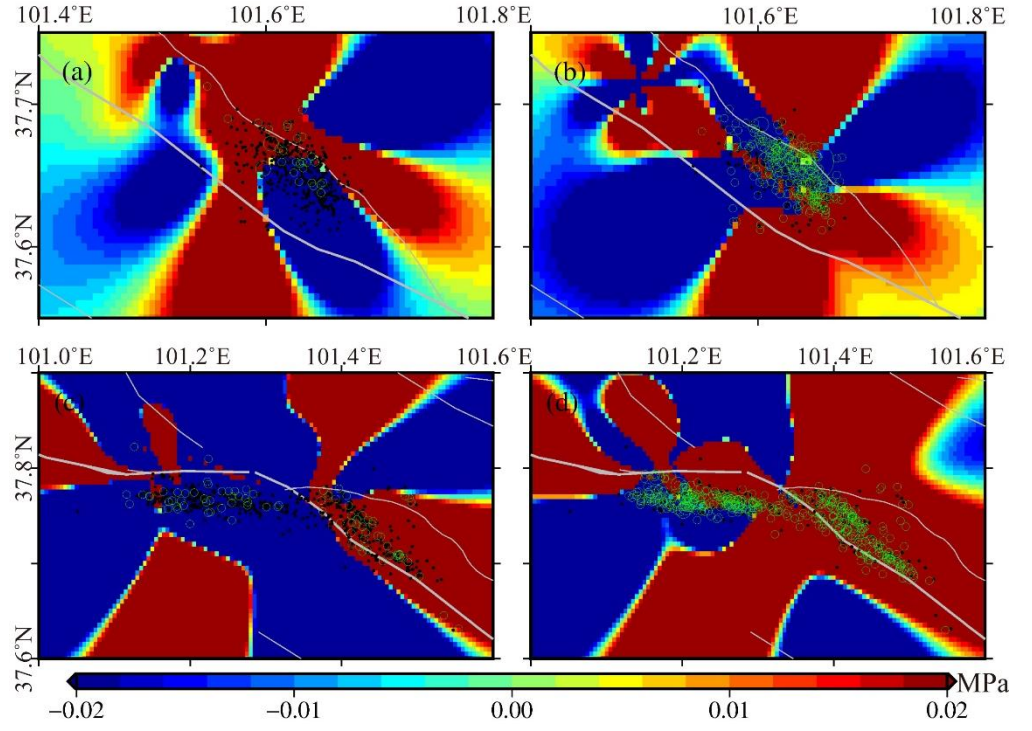


Figure S2. The relationship between coseismic ΔCFS and the aftershocks. (a, b) ΔCFS and aftershocks of the 2016 earthquake at depths 5 km and 10 km, (c, d) ΔCFS and aftershocks of the 2022 earthquake at depths 5 km and 10 km. The green circles are aftershocks that occurred near the corresponding depth (± 2.5 km), while the black dots represent aftershocks located at other depths.

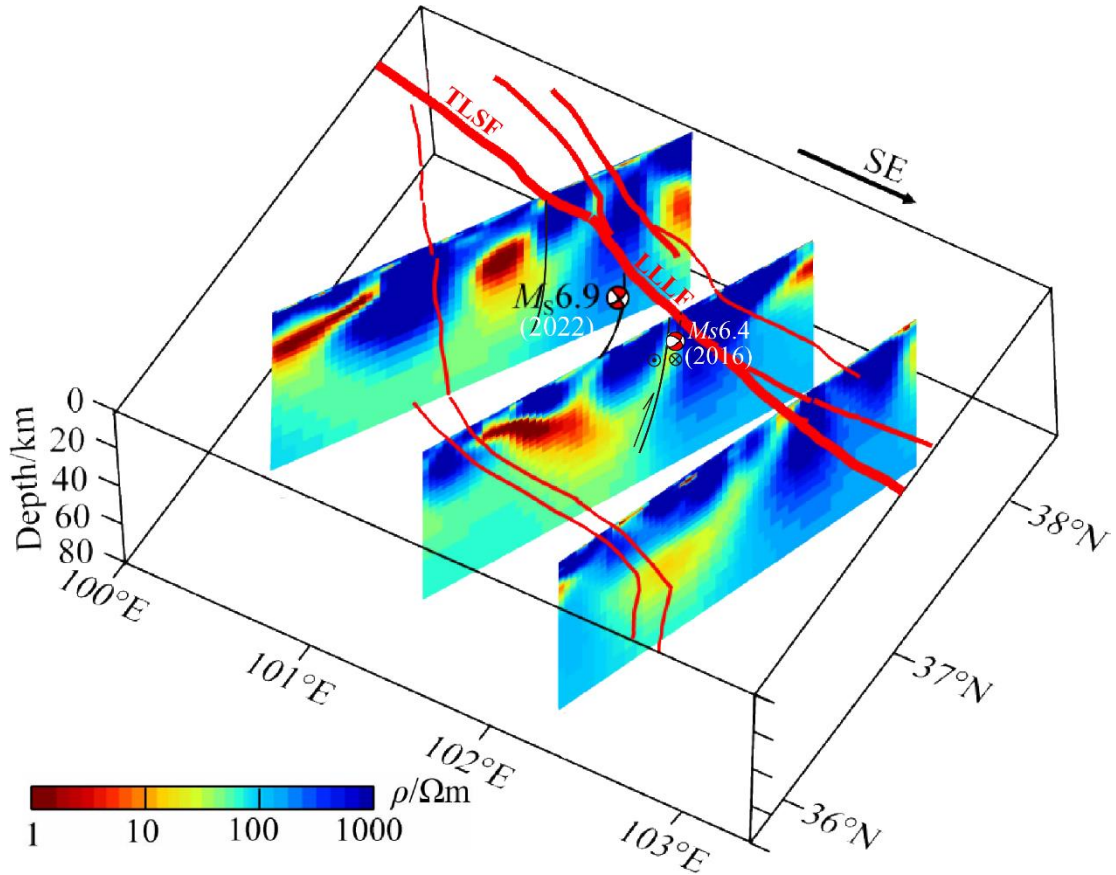


Figure S3. The magneto-telluric profiles along the Qilian-Haiyuan fault (modified from Zhao et al. [63]).

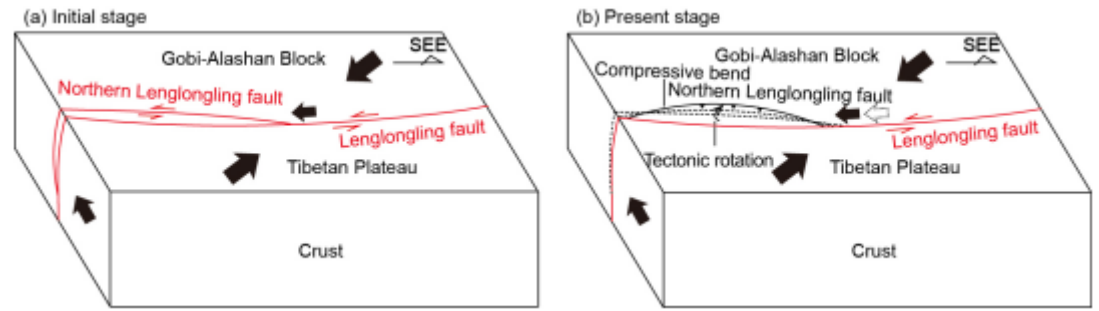


Figure S4. The tectonic evolution and dynamic relationship between the NLLLF and LLLF (reprinted with permission from Guo et al., Science China Earth Sciences, published by Springer Nature, 2017 [36]).

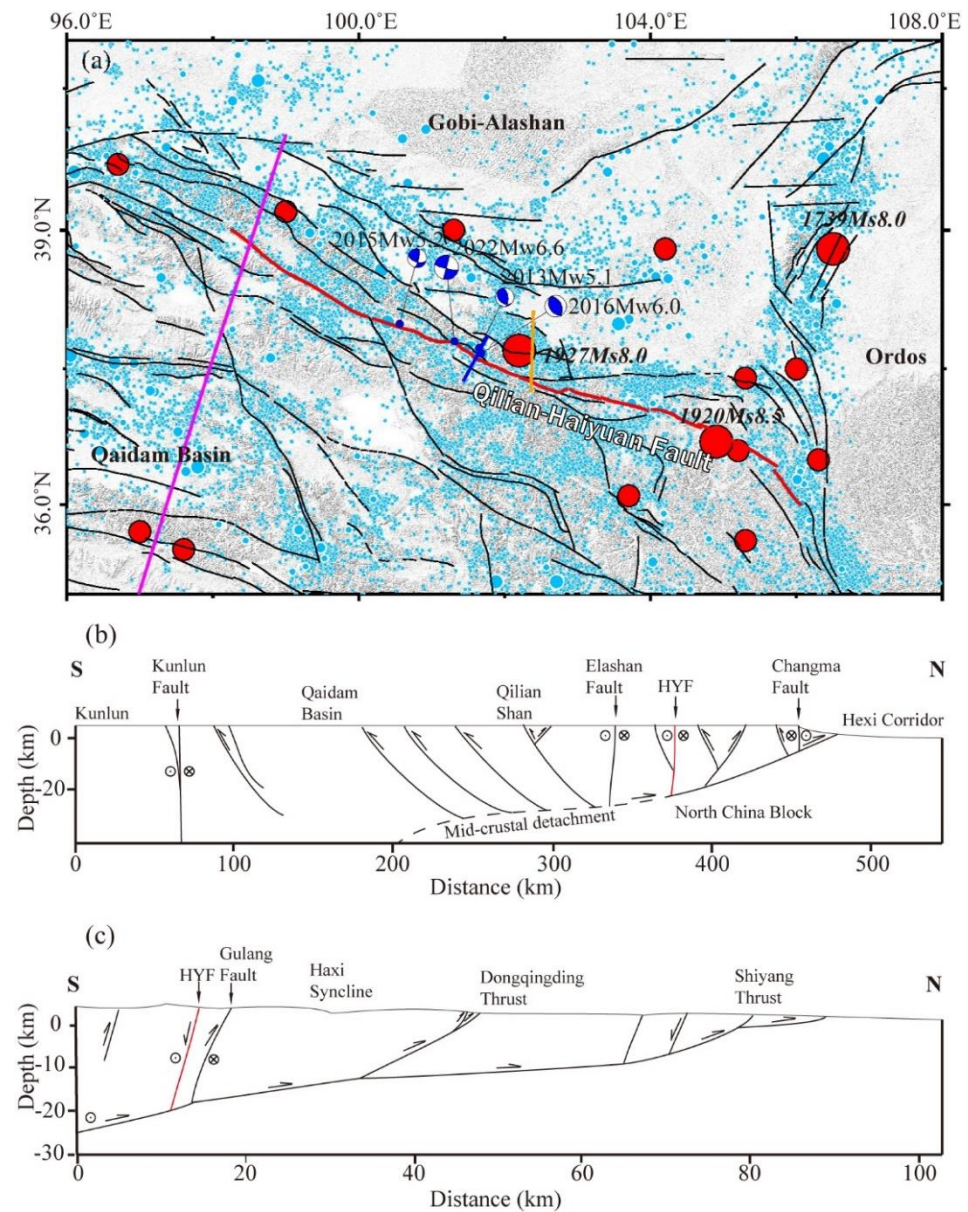


Figure S5. The topographic profiles near our study area. (a) The locations of the profile lines. The blue line indicates the profile line of Figure 9, while the magenta and orange lines indicate the profile line of Figure S6b, c. (b) The profile modified from Allen et al. [65]. (c) The profile modified from Gaudemer et al. [64]. HYF represents the Qilian-Haiyuan fault.