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SUPPLEMENTARY INFORMATION
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Penetration of crustal melt beyond the Kunlun Fault into northern Tibet

Supplementary Information

Supplementary Figure 1. Global Anisotropic Inversion Details. a, Sensitivity map for the model structures. Both xx and yy sensitivity maps have a good coverage of the models. The structures with high sensitivity values have a higher impact on the data fitting. This is the case for the main anisotropic feature observed on the models. **b**, Global data misfit for each station as well as the detailed misfit of the TE and TM apparent resistivity and phase.

Supplementary Figure 2. Local Crustal Anisotropic Inversion Details. a, Sensitivity map for the model structures. Both xx and yy sensitivity maps have a good coverage of the models. As for the global model, the structures with high sensitivity values have a higher impact on the data fitting as for the main anisotropic feature observed on the models. **b**, Global data misfit for each station as well as the detailed misfit of the TE and TM apparent resistivity and phase.

Supplementary Figure 3. Resolution Investigation for the deep structures. As the mantle structures are common for both isotropic and anisotropic models, their resolution is presented here for the isotropic model only. In order to investigate the resolution of those structures, their resistivity was modified. The RMS misfit for the modified models (red) is compared to the original isotropic model (Fig. 2) RMS misfit (blue). Four mantle structures are considered here: **a** – *the upper mantle resistivity:* when extending the crustal conductor to the upper mantle, the local and global RMS misfit increases. **b** - *the deep resistor at the south end of the profile:* when adding a more conductive deep mantle is the south part of the profile, the local and global RMS

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misfit increases. **c** - *the deep conductive structure in the middle of the profile:* when adding a more resistive mantle in the middle of the profile, the RMS misfit is not clearly affected. The resolution for deep mantle structures in the middle of the profile is then not really good. **d** - *the deep resistor at the north end of the profile:* when adding a more conductive deep mantle in the north part of the profile, the local and global RMS misfit increases. To conclude, most of the mantle features are not artefacts, however the deep (> 120 km) middle part of the profile is not well resolved.

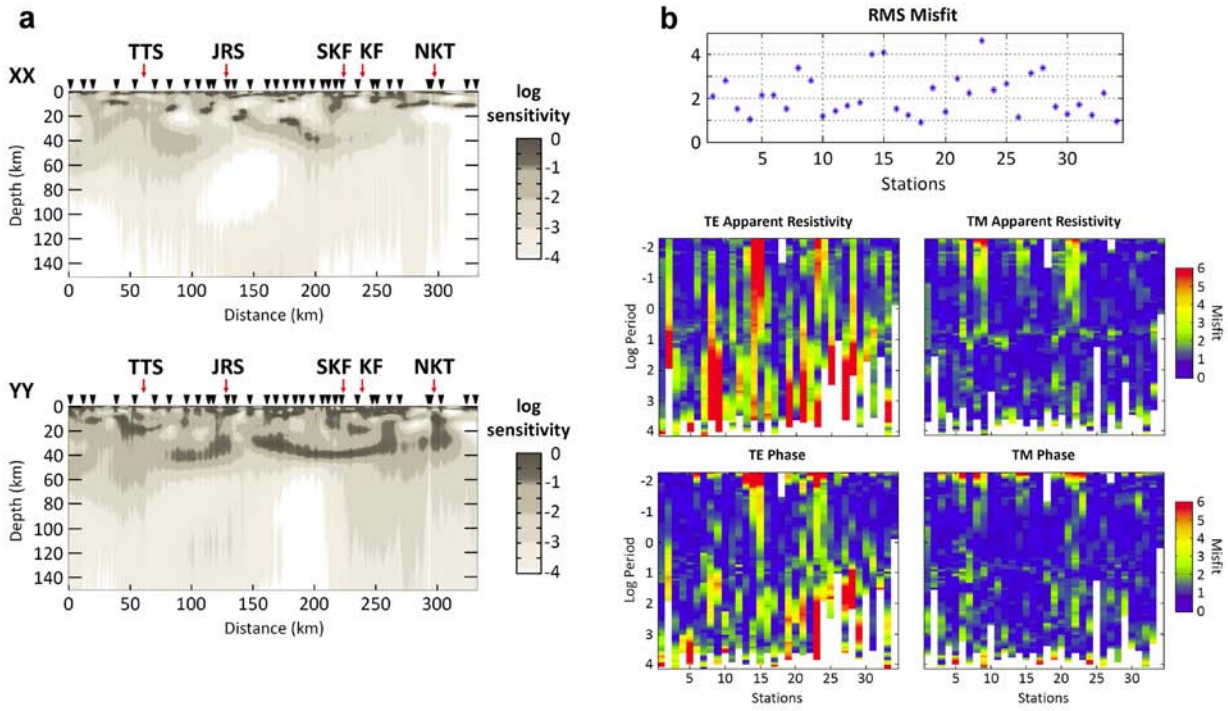

Fig1

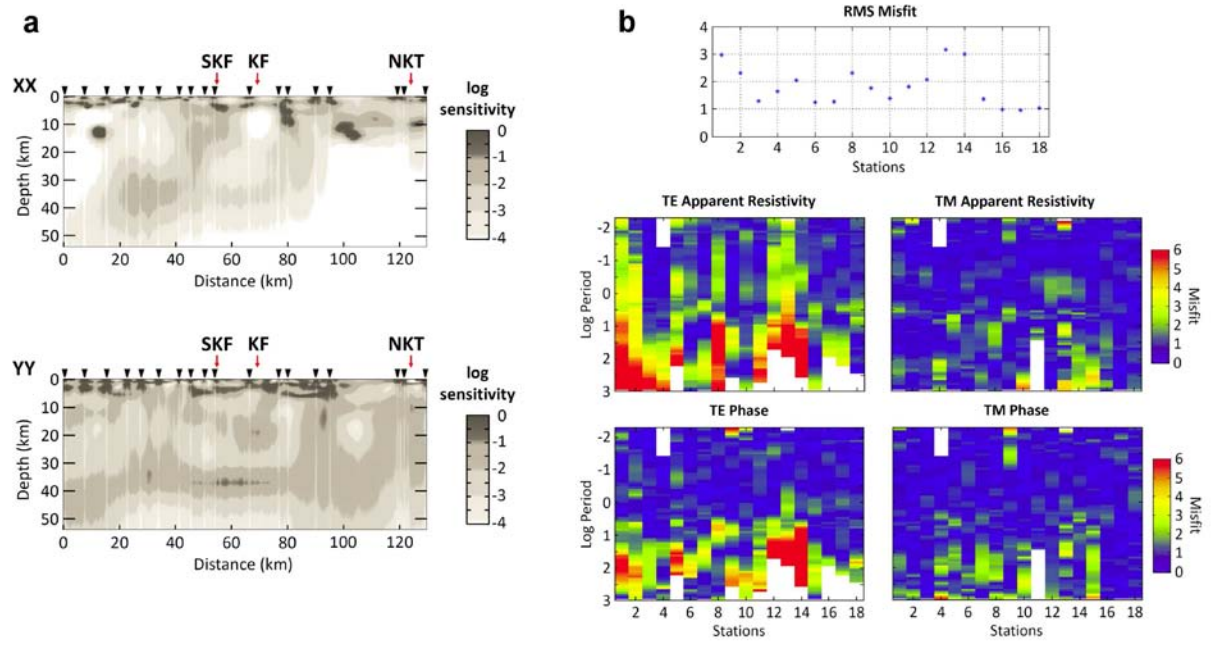

Fig2

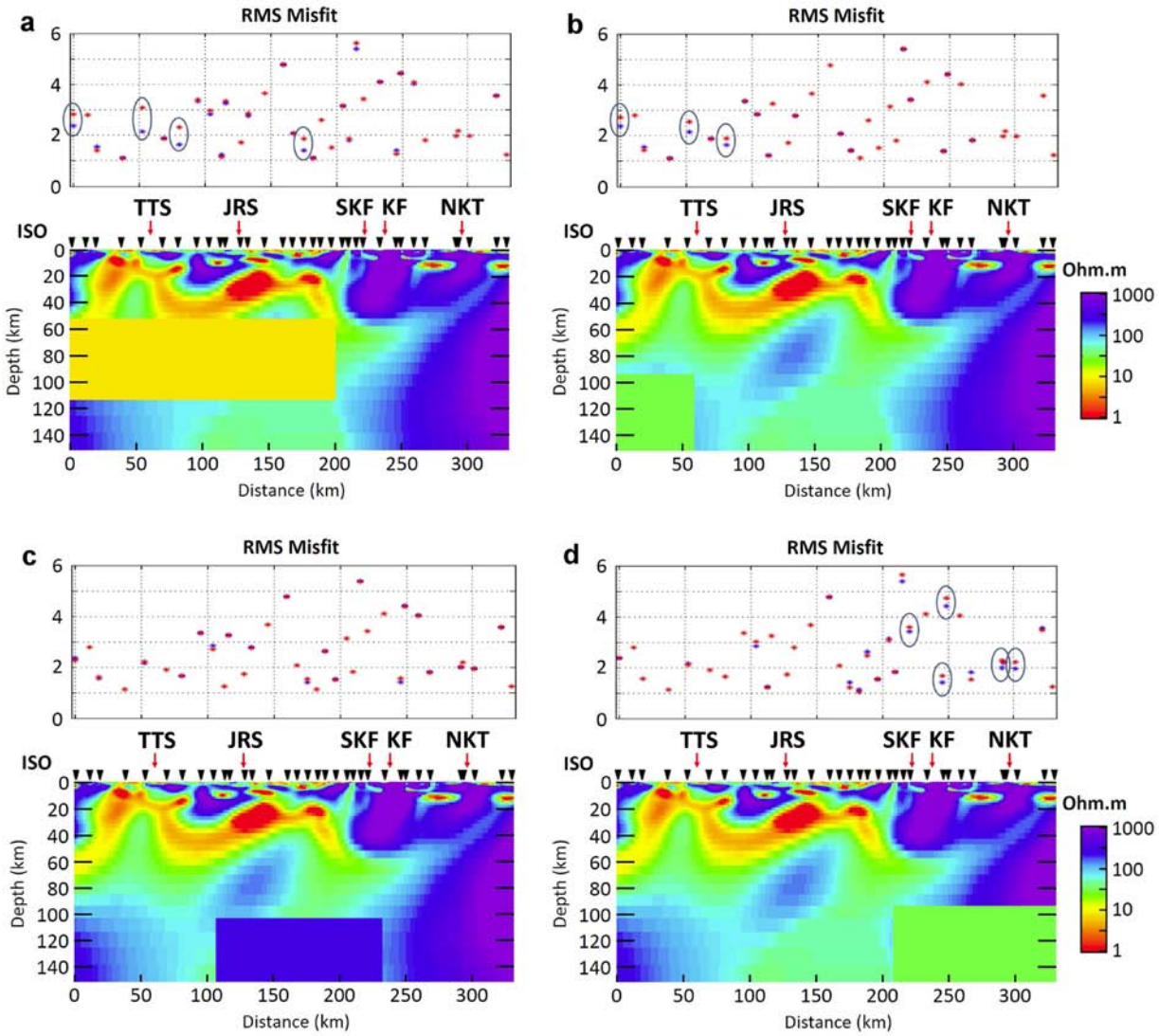

Fig3