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Joint inversion of the lithospheric density struture in the North China Craton based on GOCE satellite gravity gradient data and surface gravity data

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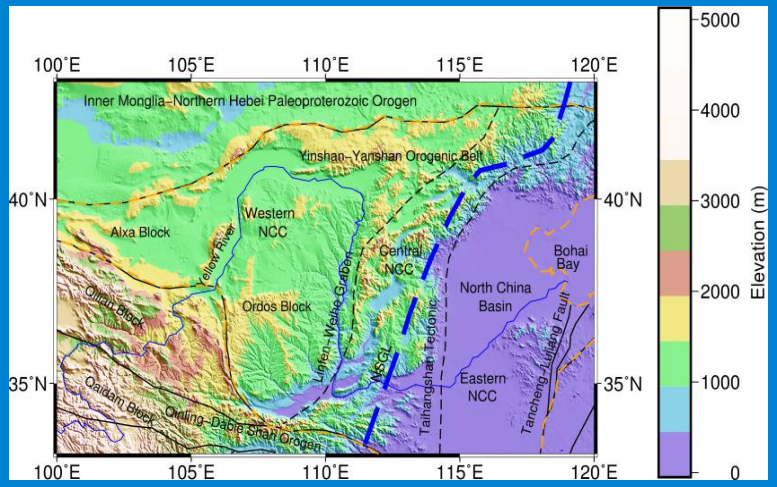
1. The study area-North China Craton



(1) One of the oldest cratons in the world.

(2) The destruction mechanism and geodynamics remain controversial.

(3) Declamination (Gao et al., 2009) or thermal erosion (Zhu er al., 2012)?

Fig.1 Topography of the study area.

2. The collected data-corrected gravity data and on orbit GOCE gravity gradient data (T_{xx}, T_{xz}, T_{yy}, T_{zz})

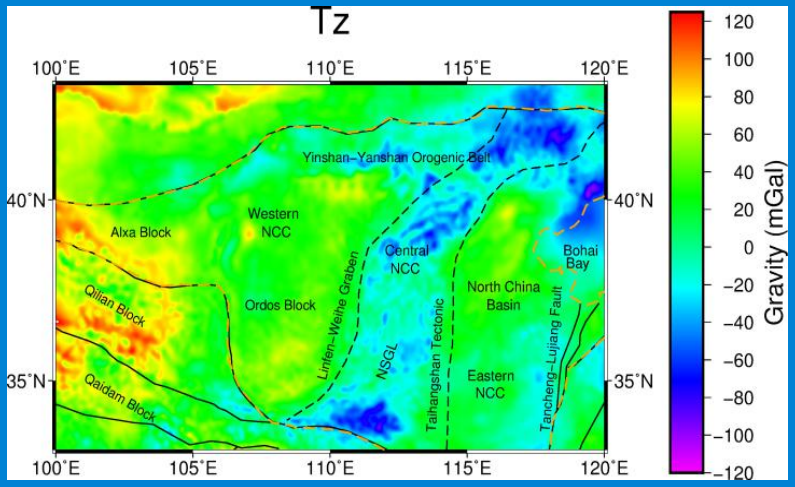


Fig.2 Corrected gravity data.

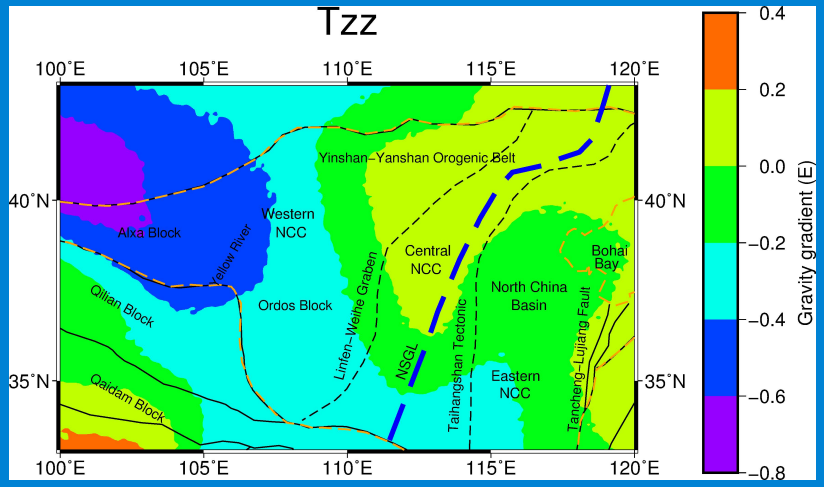


Fig.3 On orbit GOCE gravity gradient data

3. The inversion method-preconditioned conjugate gradient method

(1) The gravity and gravity gradient data obtained from measurements.

(2) The different observation plane height.

(3) Initial density model effects.

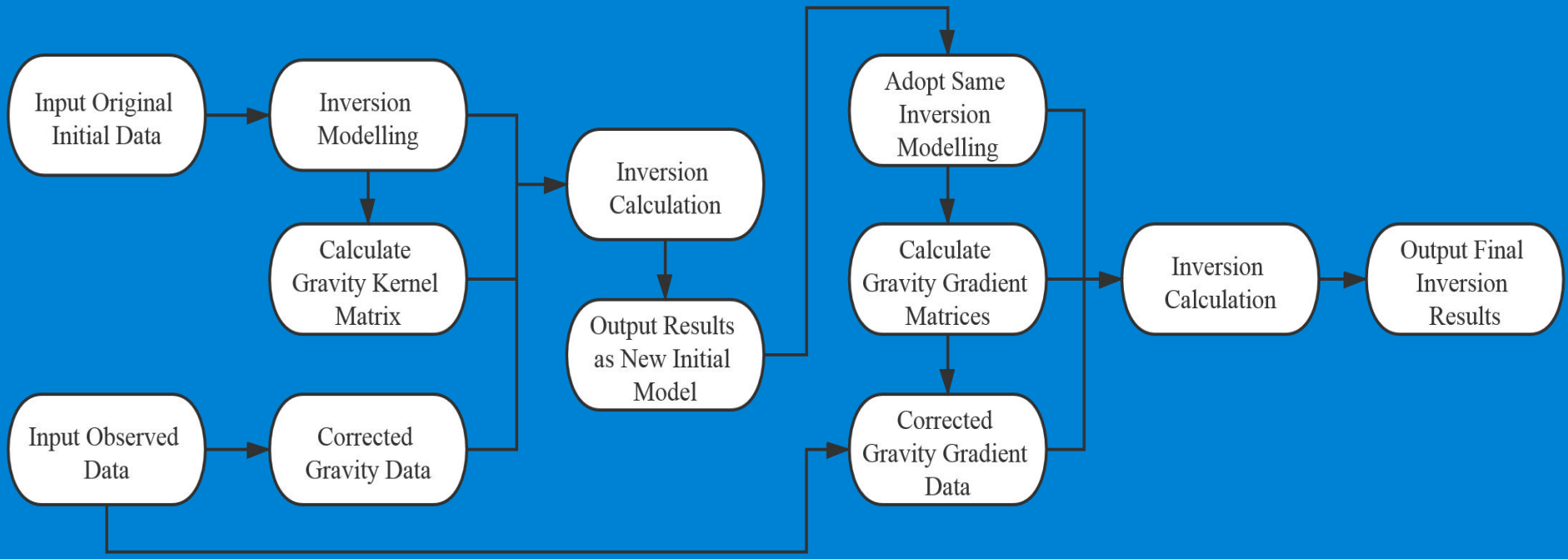
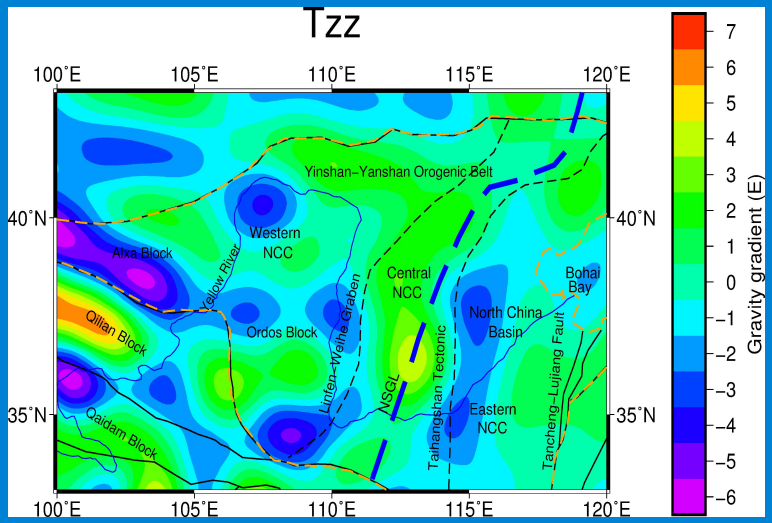
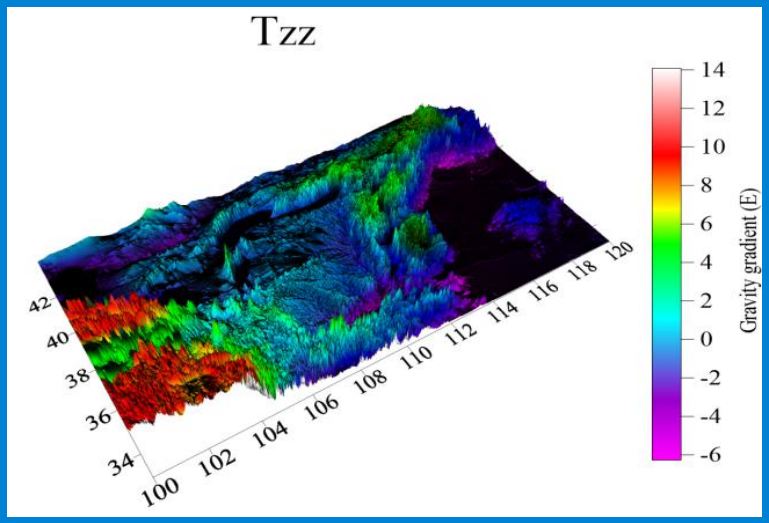


Fig.4 The flowchart for the whole PCG inversion algorithm procedure.

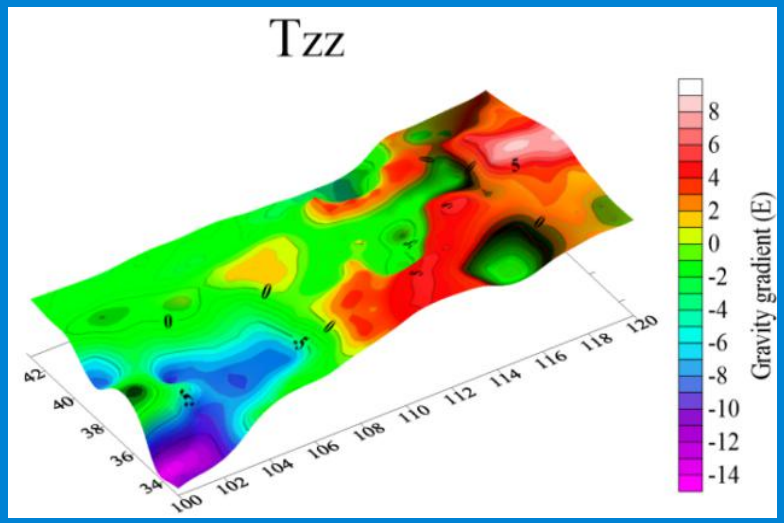
4. The GOCE gravity gradient data (T_{xx}, T_{xz}, T_{yy}, T_{zz}) processing



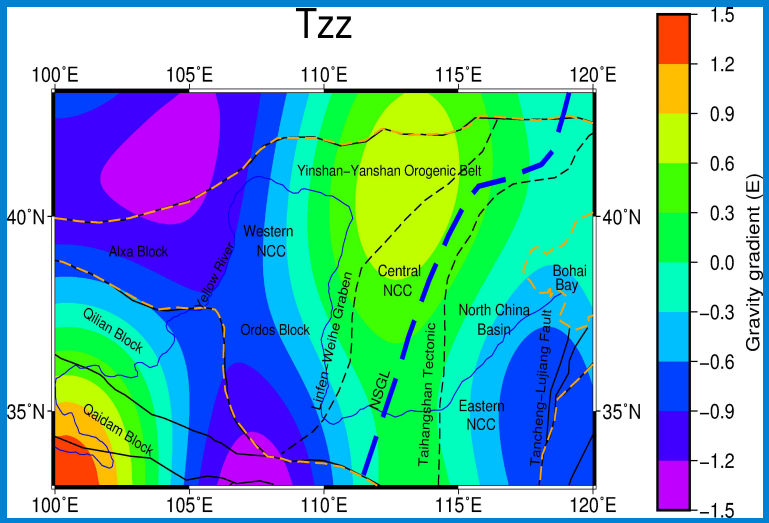
(a) Downward continuation



(b) Gravity gradient effect caused by topographic masses



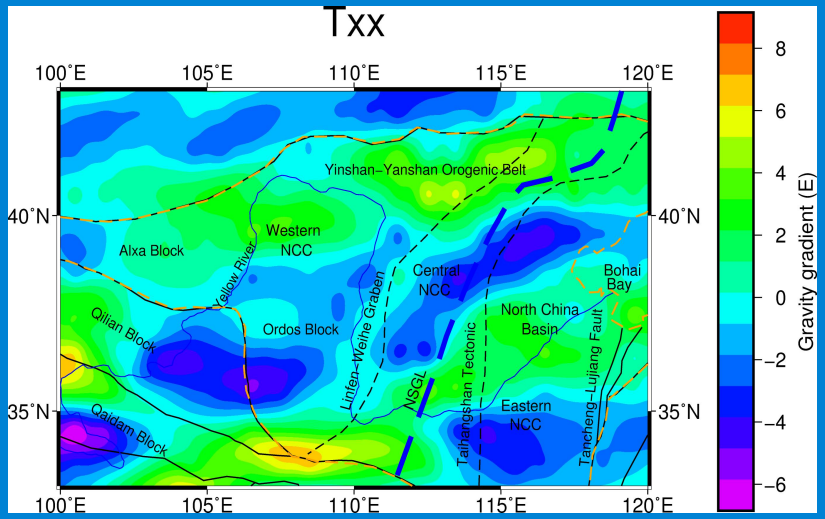
(c) Gravity gradient effect caused by interface undulation

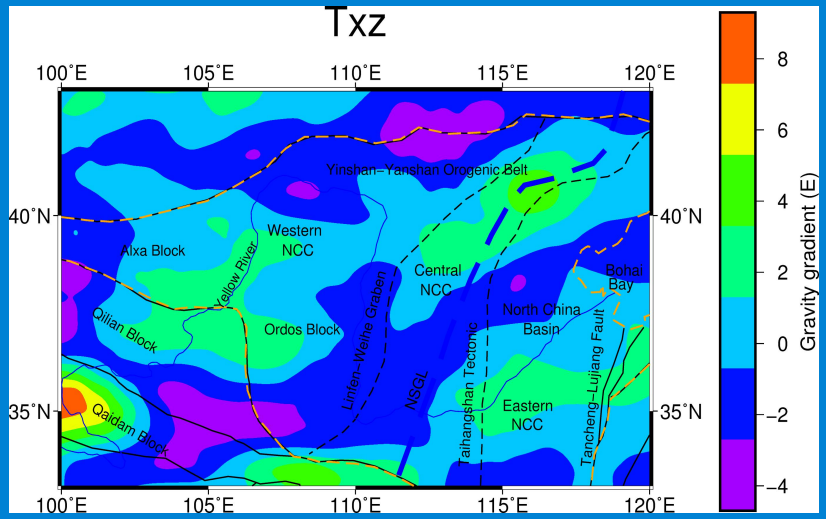


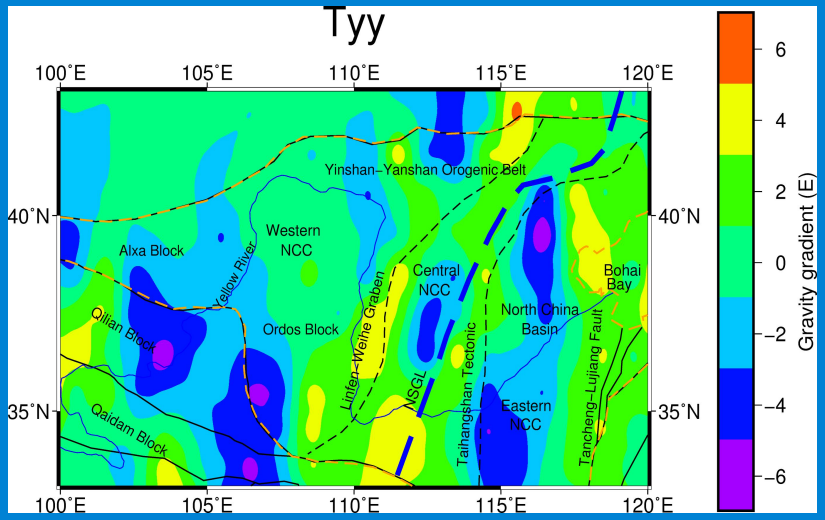
(d) Gravity gradient effect by the manle under 180km

Fig.5 The data processing results.

5. The corrected GOCE gravity gradient data (T_{xx}, T_{xz}, T_{yy}, T_{zz})







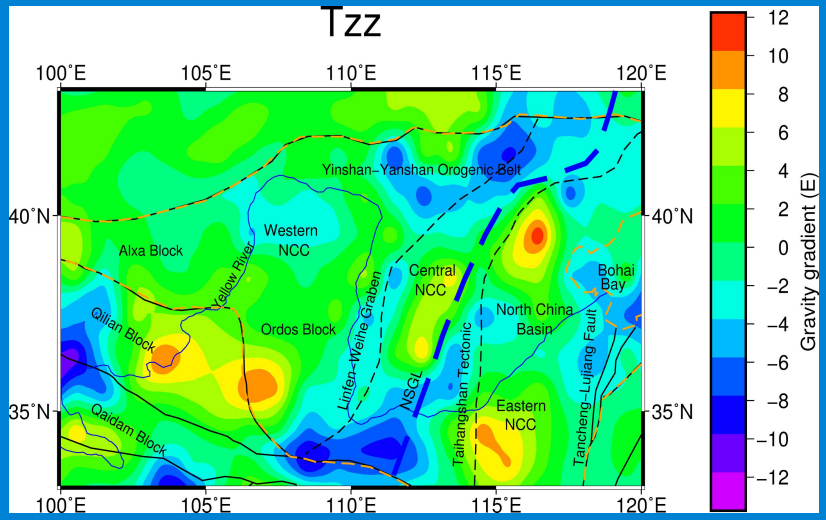


Fig.6 The corrected GOCE gravity gradient data.

6. Final inversion results

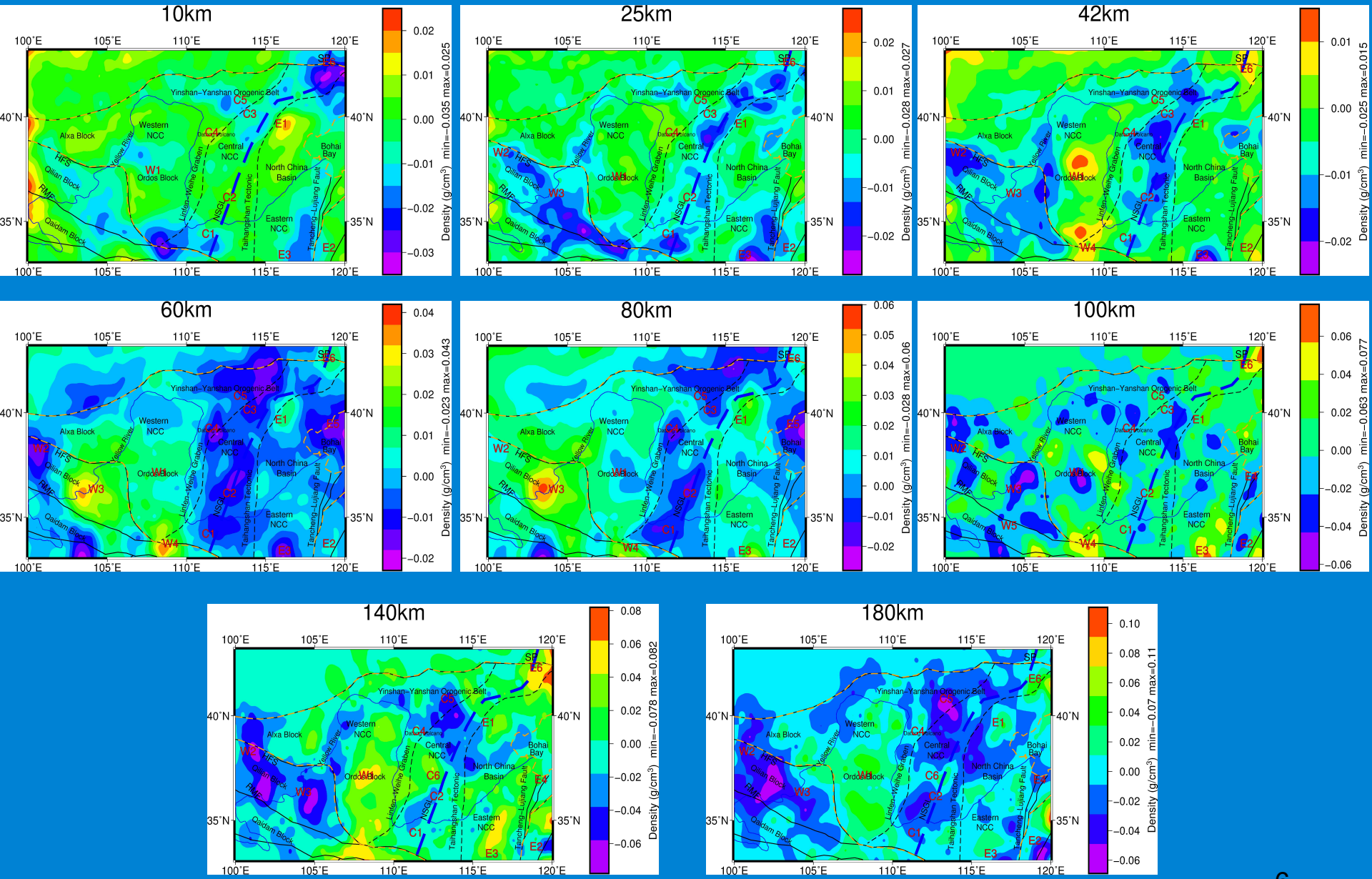


Fig.7 Final inversion results.

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Thanks for every piece of constructive suggestion!