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Gravity anomaly and crustal structure characteristics in North-South Seismic Belt of China

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The North-South Seismic Belt (NSSB) is the binary system boundary what is formed by the western Indian plate subduction pushing and the eastern west Pacific asthenosphere rising, and it is one of the three major seismic belts (Tianshan, Taiwan and NSSB) and mainly located between E102°and E107°. And it is mainly composed of topographic gradient zones, faults, cenozoic basins and strong earthquake zones, which form two distinct parts of tectonic and physical features in the west and east. The research results of geophysical and deep tectonic setting in the NSSB show that it is not only a gravity anomaly gradient zone, it is but also a belt of crustal thickness increasing sharply westward of abrupt change. Seismic tomography results show that the anomaly zone is deeper than hundreds of kilometers in the NSSB, and the composition and structure of the crust are more complex.
We deployed multiple Gravity and GNSS synchronous detection profiles in the NSSB, and these profiles crossed the mainly faults structure and got thousands of points data. In the research, source analysis, density structure inversion, residual gravity related imaging and normalized full gradient methods were used, and analyzed gravity field, density and their structure features in different positions, finally obtained the crustal density structure section characteristics and depth structure differences.
The research results showed that the gravity Bouguer anomaly is similar to the existing large scale result. The Bouguer anomaly is rising significantly from west to east, its trend variation coincides well with the trend change of Moho depth, which is agreeing with the material flows to the peripheral situation of the Tibetan plateau. The obvious difference changes of the residual anomaly is relative to the boundary of structure or main tectonics, it's also connected with the stop degree of the eurasian plate when the material migrates around.
The density structure of the gravity profiles mainly reflects basic frame work of the regional crust structure. The earth's crust basically present three layer structure, nearly horizontally distributes, undulation of Moho is obvious, which is consistent with the results of seismic sounding and seismic array detection; in the local area, there are lower density layer zonal distribution in the earth's crust what accelerates the lateral movement in up and middle crust; when the substance of the Tibetan plateau spreads around, the integrity in up and middle crust is well, and it is basically a coupling movement together; in the lower crust, the thickness of the Tibetan plateau is outward gradually thinning, there is decoupling phenomenon in crust-mantle; The results of the gravity and the crustal density structure show that the research area can be divided into several part such as Qinghai-Tibet Plateau, Sichuan-Yunnan block, Ordos block and Alxa block, the transitional zones of the Qinghai-Tibet Plateau and Sichuan basin, and Alxa and Ordos are complex, and Moho slope is bigger, where is the part of strong tectonic activity and strong earthquakes occur easily. The research is of great significance for study the crustal deep structure, geodynamic evolution process and environment of earthquake gestation of the NSSB region.