



The Dynamic Variation of Gravity Field in Middle North China and its Implication for Seismic Potential

Yiqing Zhu (1,2)

(1) 1 [U+FF09] Second Crust Monitoring and Application Center, China Earthquake Administration, Xi'an 710054, China, China (zhuyiqing@163.com), (2) State Key Laboratory of Geodesy and Earth's Dynamics, Wuhan 430077, China

Based on the spatial-temporal dynamic variation of regional gravity field from absolute and relative gravity observation, combined with the regional GPS measurement data and active tectonic analysis, this paper studies the change characteristic of gravity field in middle north China for the period from 2009 to 2011, and discusses the implication of the dynamic change of the regional gravity field for seismic potential for strong earthquakes. The result mainly shows that: (1) The spatial distribution of the gravity field is very different on both sides of active block boundaries and some major active faults in middle North China. Where, on the northern portion of the Shanxi graben zone that is centered at the border region among Shanxi, Hebei and Inner Mongolia [U+FF0C] the gravity variation shows as a great area of negative anomaly, and on the northwestern margin and the southeastern margin of the region, two gradient zones with high gravity differences have formed along the NE-trending Daihai-Huangqihai fault zone and the NNE-trending Taihang mountain front fault zone, respectively, apparently suggesting that tectonic activity or active faulting in these two margin areas are significant. (2) The dynamic evolution patterns of the gravity differences of the northern segment of the Shanxi graben zone (or on the basin-and-range province northwest of Beijing) for various periods in the recent years seem to have displayed such a process that the total change of the gravity field seem to be in the order: quasi-homogeneous—non-homogeneous—significantly various on the bilateral sides of the northern segment of the Shanxi graben zone—locally 'hardening' (or changing little). (3) The patterns of the cumulated gravity variation with time are apparently able to be explained by such a process: strengthening of the regional stress field—strengthening of active faulting and movement or deformation between faulted-blocks—the movement being locked somewhere. (4) In the study region, those places where significant gravity anomalies have existed would be localities with mid-long-term seismic potential for strong earthquakes occurring in the future.