



## **Relationship between Earthquake Spatial Distribution and Tectonic Stress in North China Basin**

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Many devastating intraplate earthquakes, such as 1966 Xingtai earthquake and 1976 Tangshan earthquake, happened in North China Basin. It has been shown that earthquakes usually happen in that zone, where Moho depth is relatively thinner, or Moho depth changes sharply in North China Basin. It has also been noted that earthquakes usually occur at depth ranging between 10 and 25 km, while large earthquakes, including main shocks and large after shocks, locate at the depth ranging between 10 and 14 km with average Moho depth of nearly 40 km in North China Basin. This study aims to explain this earthquake spatial distribution in North China Basin through 3-D numerical modeling based on visco-elasticity and boundary conditions deduced by the focal mechanism. We calculate the stress accumulation in the lithosphere of North China Basin. It is shown that tectonic stress in the lithosphere results mainly from the compression of the Pacific Plate on North China Craton. Stress concentrates close to the bottom of the upper crust, where Moho depth is relatively thinner, and Moho depth changes sharply. Stress increases almost linearly in the brittle upper crust reaching the fault strength responsible for the big main shock. However stress increases exponentially to reach a steady level not large than the fault strength in the ductile middle and the lower crust. The after shocks in the middle crust could be triggered by the main shock in the upper crust.