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Three-dimensional radial and azimuthal anisotropy beneath the mid-east China

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The anisotropy media are very common in the Earth, which have been revealed by both seismological observations and laboratory studies. In a model with hexagonal symmetry, the anisotropy parameters will be reduced to three ones from 21 independent elastic moduli. In this work, we have attempted to study 3-D P-wave radial and azimuthal anisotropy beneath the mid-east China. In this region, there exist a mineralization zone in the middle and lower Yangtze region and an ultra-high pressure metamorphic belt in the Qinling-Dabie-Sulu Orogenic belt. Previous studies have shown that both might be caused by the rich exhalation of magma during the Mesozoic period, but various geodynamic models for explaining the mechanism of the Cretaceous magmatism are controversial and even contradictory. We have adopted the anisotropy tomography method of Wang and Zhao (2008, 2013) to the P-wave relative residuals from teleseismic travel time data. As a result, the anisotropy model clearly describes the fast-axis direction of P-wave with 50-700 km deep, which might represent the stress orientation or the motion of asthenospheric flow. The fast-axis direction changes gradually from the east-west at depths of 100-300 km to the north-south at depths of 400-700 km, which is very interesting and we will further explain this result combining with other previous geophysical, geochemical and geological results. This anisotropy result help us discuss the deep geodynamics beneath the mid-east China with more confidence.