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The upper mantle velocity variations and its implications for the volcanism nearby the north edge of Songliao Basin, China

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Northeast China is a natural experimental site for studying Cenozoic intraplate volcanism. On the basis of crustal and mantle structures, several models for volcanism in Northeast China have been proposed in previous studies. However, these models put a weak constraint on the volcanism in north edge of Songliao Basin, due to few seismic stations in north edge than other parts. We conducted a tomographic study using teleseismic body wave traveltime recorded by broadband seismic stations covering the north edge of Songliao Basin, and inverted the traveltime residuals to image crustal and mantle structure down to 800 km depth. The main conclusion is as follows: Nuomin River and Wudalianchi volcanic sites share a common mantle magma chamber at 200 - 300 km depth beneath volcanic cones. The magma chamber shows a slow velocity anomaly in the horizontal direction, and only exists in a local area within the upper mantle without extending to mantle transition zone. Combined with previous results, we propose this horizontal low velocity structure is due to asthenospheric upwelling triggered by lithospheric delamination during late Mesozoic.