



## **Is there a big mantle wedge under eastern Tibet?**

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The big mantle wedge (BMW) model was originally proposed to explain the origin of the intraplate Changbaishan volcano in NE China where the subducting Pacific slab becomes stagnant in the lower part of the mantle transition zone (MTZ). The BMW is defined as a broad region in the upper mantle and upper part of the MTZ overlying the long stagnant Pacific slab. Under eastern Tibet, prominent low-velocity (low-V) anomalies are revealed in the upper mantle, whereas an obvious and broad high-velocity (high-V) anomaly is imaged in the MTZ from the Burma arc northward to the Kunlun fault zone and eastward to the Xiaojiang fault zone. In addition, receiver-function analyses clearly illustrate a similar area with a thickened MTZ. Hence we conclude that there is a BMW structure under eastern Tibet. Such a BMW structure can explain the deep origin of the Tengchong volcano and generation of large crustal earthquakes in the region. The Tengchong volcano is caused by hot and wet mantle upwelling in the BMW and fluids from dehydration reactions of the stagnant Indian slab in the MTZ. The 2008 Wenchuan earthquake (Ms 8.0) took place in the transition zone from the low-V Songpan-Ganzi block to the high-V Sichuan basin, suggesting that the occurrence of the Wenchuan earthquake was affected by the BMW structure. These results shed new light on the mantle structure and dynamics under eastern Tibet.