



## **How did the Tibetan Plateau growth outward to the southwestern Qinling?**

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In the northeast of the Tibetan Plateau and north of the Sichuan Basin, the topography is decreasing eastward smoothly from 4.5 km in the Ruoergai Basin to 1.5 km in the Qinling. This feature can be interpreted to indicate that lower crustal flow has been diverted around the Sichuan Basin and beneath the southwestern Qinling, resulting in plateau uplift and growth eastward in this area. To address the problem how the Plateau growth outward, we have carried out a dense 160-km long, W-E shot-period seismograph array during July and August 2015 with a station spacing of ~500 m and a total 380 shot-period seismographs. During one month observation, 35 teleseismic events with a magnitude larger than 5.0  $m_w$  and an epicentral distance of 30-90 degrees are recorded. P-wave receiver functions are calculated from 3-component-waveforms and used to image interfaces (or discontinuity of velocity of S-wave) in the crust and upper mantle. Our results show that the Moho is flat and imaged at 50 km depth by a strong P-to-S amplitude beneath the Ruoergai Basin. A weak interface can be found at depth ~20 km beneath the Basin. In contrast, a weak and flexural Moho is presented in a depth range of 40-50 km beneath the Minshan. A strong interface is also shown in the crust beneath the Minshan. The interface is west dipping steeply with a maximum depth of 40 km beneath the Minjiang Fault, and eastward becomes flat with a depth of 15 km beneath Minshan. This structure feature can be interpreted to indicate thrusting block by block eastward rather than lower crustal flow causing active plateau uplift in this area.