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# Crustal Structure of Qilian orogen by Multi-scale seismic tomography

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The Qilian orogenic zone located in the Northeastern margin of Tibet Plateau, where is the key region to understand the dynamics of Tibet. Numerous geologic and geophysical studies engaged in the mechanics of the Tibetan Plateau deformation and uplift, but the detail structure and deformation style of the Northeastern Tibet remain uncertain due to poor
geophysical data coverage. Between 2013 and 2015, The XMLY Seismic Array experiment operated 670 broadband seismic stations with an average station spacing of 35km. This seismic array located in northeastern Tibet and covered the Qilian Mountains, Qaidam Basin, and part of Songpan-Ganzi, Gobi-Alashan, Yangzi, and Ordos. We obtained high-resolution P-wave velocity structure beneath northeastern Tibet using the P-wave arrival time data recorded by the XMLY seismic array and multi-scale seismic traveltime tomography technique. The seismic tomography algorithm employs sparsity constrains on the wavelet representation velocity model via the L1-norm regularization. This algorithm can efficiently deal with the uneven-sampled volume, and give multi-scale images of the model. Our preliminary results can be summarized as follows: 1) the crustal velocity structure is strongly inhomogeneous and consistent with the surface geological setting; 2) significant low-velocity anomalies exist beneath the northeastern Tibet, and slight high-velocity anomalies beneath the Qaidam basin and Gobi-Alashan; 3) the boundary between Tibet and Gobi-Alashan located in Haiyuan faults belt in eastern Qilian and in North Qilian faults belt in west Qilian; 3) the pattern of Qilian crustal structure implies different deformation mechanism in west Qilian and eastern Qilian region.