Mid-lithosphere discontinuities beneath the western and central North China Craton

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We image the mid-lithosphere discontinuity (MLD) beneath western and central North China Craton (NCC) by a new approach —seismic daylight imaging (SDI), which analyzes P reflectivity extracted from stacked autocorrelograms for teleseismic events recorded by a dense array. The array across the NCC extended west-to-east for about 1000 km with average station interval of about 15 km, and was deployed by Institute of Geology and Geophysics, Chinese Academy of Sciences under North China Interior Structure Project (NCISP).

With higher and broader frequency band (0.5-4Hz) than used with receiver functions, the SDI approach reveals finer scale components of multi-scale lithospheric heterogeneity. The depth of the MLD beneath the western and central parts of the NCC ranges from 80-120 km, with a good match to the transition to negative S velocity gradient with depth from Rayleigh wave tomography. The MLD inferred from SDI also has good correspondence with the transition from conductive to convective regimes estimated from heat-flow data indicating likely thermal control within the seismological lithosphere.

Keywords: Mid-lithosphere discontinuity, Seismic daylight imaging, Autocorrelogram

