

**Experiment name\*** North China Interior Structure Project-Experiment 7 (NCISP7)

**Names of Principal Investigators and their institutions\*** Yinshuang Ai, Institute of Geology and Geophysics, Chinese Academy of Sciences (IGGCAS)

**Mobilization date\*** 2008-06-03

**Demobilization date\*** 2009-08-23

**Number of stations:** 64

**Network Code and Years:** 8B, 2008-2009

**A brief summary of the experiment:**

We have deployed a 1200-km long temporary seismic array in central China, extending from Inner Mongolia in the north to Hubei province in the south, including 64 broadband seismic stations. From this array, we have gotten more than 390GB raw seismic data, and studied the deep structure using receiver function, shear wave splitting, Rayleigh wave tomography methods, obtained many new results.

**Preliminary scientific results, if any:**

We applied the stacking of receiver functions to estimate crustal thickness (H) and average  $V_p/V_s$  ratio (k) as well as upper mantle structure in the central and western North China Craton (NCC) and adjacent regions. Thin crust and low k are found at the southern edge of the central NCC, suggesting crustal modifications such as delamination, especially in the lower crust, which may be related to collision of the NCC and Yangtze Block. The lower crust beneath the southern NCC is thin, and the Moho dips northward, which present evidence of the Yangtze craton subduction beneath the NCC.

The teleseismic shear wave splitting study showed the central North China Craton spatially coherent fast directions and the shear wave velocity anomalies within the upper mantle. Our results suggest that the dynamic processes beneath the central North China Craton are not directly related to the India–Eurasia collision. The Trans-North China Orogen (TNCO) is generally characterized by low-velocity anomalies but exhibits great heterogeneities. We propose that a small-scale mantle upwelling is present, confined to the north of the TNCO.

**Approximate amount of data (in MB):** 392000

**Describe any known problems with the data or particular problems encountered during the experiment:**

**List of publications submitted:**

1. Zheng, T., Zhu, R., Zhao, L., Ai, Y., Intralithospheric mantle structures recorded continental subduction, *Journal of Geophysical Research*, VOL. 117, B03308, doi:10.1029/2011JB008873, 2012.

2. Zhao, L., Zheng, T., Lu, G., Ai, Y., No direct correlation of mantle flow beneath the North China Craton to the India-Eurasia collision: constraints from new SKS wave splitting measurements, *Geophysical Journal International*, 187(2), 1027-1037, 2011.
3. Shen, Z., Ai, Y., He, Y., Jiang, M., A study on inner core boundary properties of East China using pre-critical PcP-PKiKP data, *Chinese Journal of Geophysics (in Chinese)*, 56(10), 3324-3333, doi:10.6038/cjg20131009, 2013.
4. Cheng, C., Chen, L., Yao, H., Jiang, M., Wang, B., Distinct variations of crustal shear wave velocity structure and radial anisotropy beneath the North China Craton and tectonic implications, *Gondwana Research*, 23(23), 25-38, 2013
5. Jiang, M., Ai, Y., Chen, L., Yang, Y., Local modification of the lithosphere beneath the central and western North China Craton: 3-D constraints from Rayleigh wave tomography, *Gondwana Research*, 24(24), 849-864, 2013.
6. Wang, B., Chen, L., Ai, Y., He, Y., Crustal structure and mantle transition zone thickness beneath the northeastern area of the North China Craton and adjacent region, *Chinese Journal of Geophysics (in Chinese)*, 56(1), 60-68, doi:10.6038/cjg20130107, 2013.

Main PI's e-mail address\* [ysai@mail.iggcas.ac.cn](mailto:ysai@mail.iggcas.ac.cn)