

Relict Paleo-Asian Ocean subduction zones within the continental lithosphere: Insights from deep seismic reflection profiles

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The Paleo-Asian Ocean (PAO), evolution from ocean opening at ca. 1020 Ma to final ocean closure in the Permian and collision of the North China, Siberia and Tarim cratons with formation of an orogenic collage lasted some 800 Ma (Kröner et al., 2014), and its subduction-accretion history is an important element to study the evolution of the Central Asian Orogenic Belt (CAOB). Although much remarkable progress has been made to study the closure of the eastern Paleo-Asian Ocean, the deep structure of the crust and its evolution is less constrained, and two outstanding issues need to be resolved (Wilde, S.A., 2015). One is to define the eastern limit of the CAOB, the other controversial issue is the view that the CAOB contains numerous Precambrian microcontinental blocks of mainly Neoproterozoic age, and their tectonic relationship still remains to be studied.

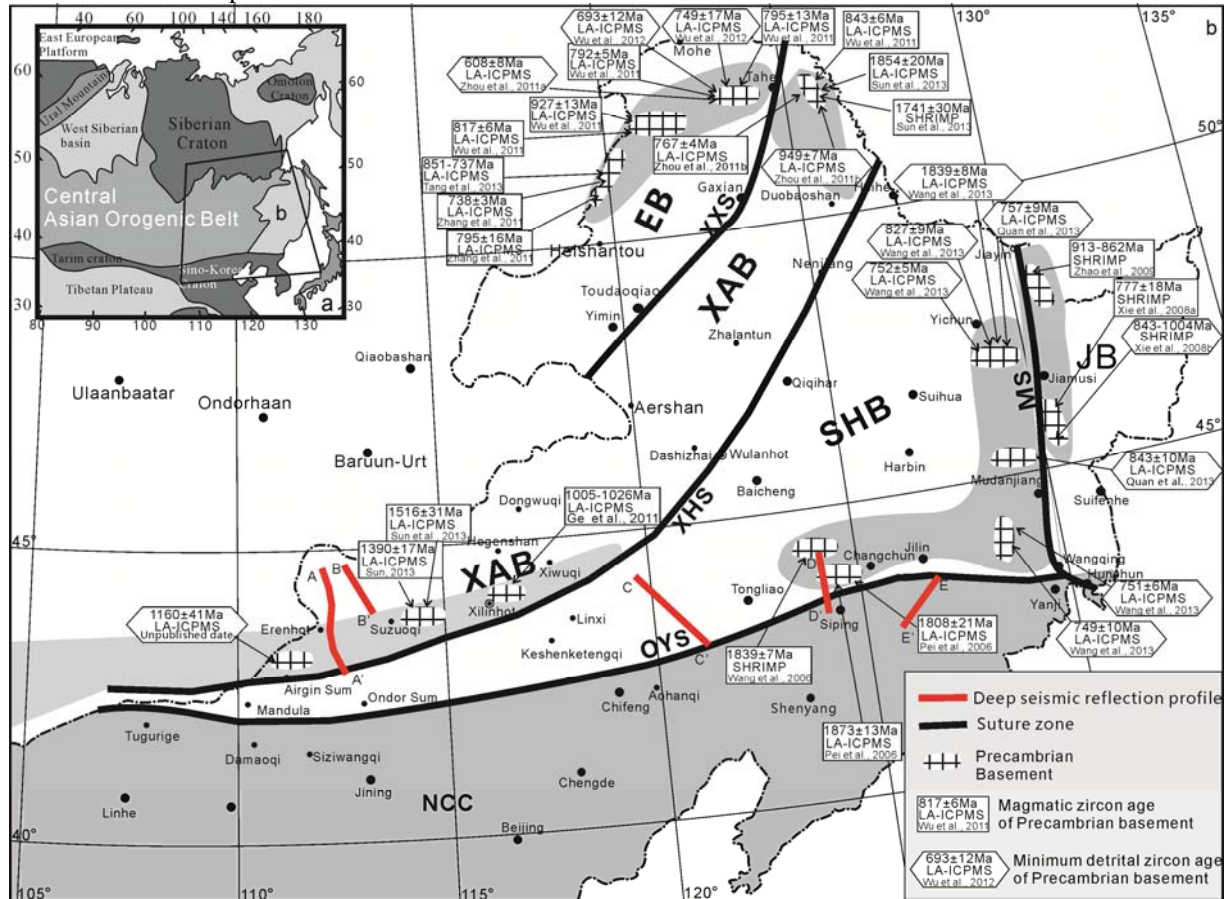


Figure 1. Pre-Devonian blocks in the Xing'an–Mongolia Orogenic Belt (XMOB) of northeast China. Inset (a) location of the Central Asian Orogenic Belt; inset (b) in (a) is location of Fig. 1 in northeastern China. The main map shows location of deep seismic reflection profiles deployed across various tectonic blocks in the XMOB. Modified from Xu et al. (2015). EB = Erguna Block; XAB = Xing'an-Airgin Sum Block; SHB = Songliao-Hunshandake Block; JB = Jamusi Block; XXS = Xinlin-Xiguitu suture; XHS = Xilinhot-Heihe suture; MS = Mudanjiang suture; OYS = Ondor Sum-Yongji suture.

The crustal and upper mantle structure and deformation was derived from a total of 660 km of 5 reflection seismic profiles in NE China, recently acquired or reprocessed with support of China Geological Survey and the Chinese SinoProbe Project. Many mantle reflections were identified, some reflective features represent ancient subduction, and some reflecting characteristics may characterize traces of mantle activity, revealing deep processes in the eastern CAO in northeast China.

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