Mesozoic decratonization of the Sino-Korean Craton by lithospheric delamination

JIN-HUI YANG[12]*, YU-SHENG ZHU[1], FU-YUAN WU[12]

[1]State Key Laboratory of Lithospheric Evolution, Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing 100029, China.
(*correspondence: jinhui@mail.igcas.ac.cn)
[2] University of Chinese Academy of Sciences, Beijing 100049, China.

Decratonization of the Sino-Korean Craton has been recognized more than twenty years, however, its mechanism is still debated, protracted thermal erosion or rapid physical delamination? One of the best methods to resolve the issue is to know the nature of the lithospheric mantle and to trace the recycled ancient lithospheric component within the lithospheric mantle or asthenospheric mantle.

Geochemical and Sr-Nd-Hf-Os isotopic data of mantle xenoliths transported by Cenozoic Yangyuan alkaline basalts in the central part of the Sino-Korean Craton indicate that the subcontinental lithospheric mantle had experienced variable degrees of melt extraction and mantle metasomatism by the silicate melts derived from recycled ancient lower crust (Yang et al., 2017). Moreover, zircon in-situ Hf-O isotopes of Triassic alkaline rocks suggest that these rocks were derived from small-degree partial melting of metasomatized ancient lithospheric mantle by recycled ancience continental materials (Zhu et al., 2017). Identification of recycled ancient crust in the subcontinental lithospheric mantle beneath the central and eastern parts of the Sino-Korean Craton during Triassic to Cenozoic provides a strong evidence for lithospheric delamination to drive the decratonization. Combined with the previously-published data of mantle xenoliths in the Triassic to Cenozoic alkaline rocks (Yang et al., 2010 and references therein), we suggest that the decratonization of Sino-Korean Craton occurred over a prolonged interval (i.e., 220 Ma to 110Ma) and evolved from east to west related to subduction of the Paleo-Pacific oceanic plate.

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