

Role of large igneous provinces in lithospheric mantle evolution: A case study in North China

**PENG PENG^{1,2,3}, XIANGDONG SU⁴, CHONG WANG¹
AND XU LIU¹**

¹Institute of Geology and Geophysics, Chinese Academy of Sciences

²University of Chinese Academy of Sciences

³China-Brazil Joint Geoscience Research Center, State Key Laboratory of Lithospheric Evolution, IGGCAS

⁴Zhengzhou University

Presenting Author: pengpengwj@mail.iggcas.ac.cn

Large igneous provinces (LIPs) rise from subcontinental lithospheric mantle (SCLM) via giant mafic dyke swarms, and they act as a probe to the cratonic keel. The North China craton is featured by episodic triple-junction rifting associated with LIPs of bimodal compositions along its present margins: the 1.8-1.6 Ga Xiong'er to south, 1.7-1.2 Ga Yanliao to north, 1.2-0.9 Ga Xuhuai to east, and 0.9-0.7 Ga Langshan to west. The Xiong'er rift is genetically related with the LIPs represented by plumbing systems of the 1.79 Ga Xiong'er, the 1.77 Ga Taihang, the 1.73 Ga Miyun, the 1.68 Ga Laiwu, and the 1.63 Ga Taishan. The Yanliao rift is well-known for its developing of the 1.32 Ga Yanliao LIP. The Xuhuai rift is connected with the 1.23 Ga Licheng and the 0.92 Ga Dashigou LIPs. The Langshan rift is the center of the 0.82 Ga Qianlishan LIP. Spatial migration of these rifts and LIPs indicates their propagation from along one marginal side to the opposite side of the craton, which may have resulted in the sequentially metasomatizing of the SCLM during the Proterozoic. This is consistent with the observation that the SCLM has age information of 1.8-1.6 Ga, 1.3-1.2 Ga and 0.9-0.8 Ga. The contradictory degrees of deconstruction of the SCLM between the LIP-centered and LIP-crossed domains during the Mesozoic indicates an important role of LIPs in cratonic destability.