

Late Mesozoic Volcanism Across E, Mongolia and Da Hinggan Mts, NE China: Timing Constraint on the Closure of Mongol-Okhotsk Sea

XIHUA ZHOU¹, JIFENG YING¹, FEI WANG¹,
LIANGCHANG ZHANG¹, S.A. WILDE², J. BADAMGARAV³,
G. BADARCH³

¹Institute of Geology and Geophysics, Chinese Academy of
Sciences, Beijing 100029, China,
xhzhou@mail.igcas.ac.cn

²Curtin University of Technology, GPO Box U1987, Perth,
WA 6845, Australia

³Institute of Geology and Geophysics, Mongolia Academy of
Sciences Ulaanbaatar 210351, Mongolia

Late Mesozoic calc-alkaline volcanic rocks are extensively spread in the eastern section of Central Asia Orogenic Belt(CAOB) and constitute major part of Da Hinggan Mountains(DHAM) in NE China, as well as in eastern Mongolia and adjacent to the border of Russia. The volcanism is dominated by high-K calc-alkaline series with rock types ranging from basaltic andesites to trachytic basalts. Jurassic–Cretaceous collision of an amalgamated North China–Mongolian plate with the Siberian plate is widely believed to have accompanied closure of a Mongolo-Okhotsk sea. However, timing of this geological event are still poorly constrained, which has hampered to better understand the geodynamic processes of CAOBS in the region.

A recent study on Late Mesozoic volcanic rocks collected from both sides of E. Mongolia and Da Hinggan Mts. NE China, presents a series of new isotopic age data by Ar-Ar and in-situ zircon U-Pb techniques and provides the well-documented chronological boundaries. The results show that data fall in four periods: 164-160 Ma, 147-140 Ma, 125-120Ma and 116-113Ma, respectively. There are quite different opinions regarding the terrestrial Jurassic-Cretaceous boundary in China geological community, 135 Ma is the most widely and traditionally accepted, while 145 Ma was also adopted recently to keep consistent with international definition. The results of our studies indicate that no matter which criteria we adopt, the volcanism initialized in later Jurassic and peaked in early Cretaceous and there is also a younging trend for volcanisms from west to east. i.e. the later Jurassic volcanics can only be observed in the eastern Mongolia and the west flank of DHAM.

We proposed that the eastward closure of Mongol-Okhotsk sea and subsequent amalgamation of North China/Mongolia and Siberia plate are closely related with these volcanisms, the extensional regime developed during the post-orogenic stage after the collision of North China/Mongolia and Siberia plate triggered the widespread volcanisms. Thus these late Jurassic-early Cretaceous volcanisms placed a timing constraint on the evolution of CAOBS and can be interpreted as a geological response of the closure of Mongolo-Okhotsk Sea. Coupled geochemical investigation of these volcanics in future will further our understanding of the geological evolution of this region.