

Diachronous closure of the Mongol-Okhotsk Ocean (MOO) during Middle Mesozoic

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The Mongol-Okhotsk suture belt (MOSZ) is an integral part of the Central Asian orogenic belt (CAOB), the formation and evolution of MOSZ are significant factors contributing to the geotectonic framework of northeast Asia. However, there has been ongoing debate about the closure timing of MOO, particularly given the absence of petrogeological data in Northeastern Mongolia (NE Mongolia). This paper provides new zircon U-Pb dating, whole-rock elemental and Hf-Sr-Nd isotope data of two granodiorite plutons at Tsav (198 Ma) and Nomint (173–171 Ma), NE Mongolia, located in the central segment of the MOSZ. Both plutons are I-type granodiorites, but the Nomint granodiorites have high Sr/Y values, indicating an affinity to adakite. The 198 Ma Tsav granodiorites originated from partial melting of mafic lower crust within an Andean-type active continental margin setting, while the 173–171 Ma Nomint granodiorites derived from the thickened lower crust within the post-collisional setting. During the Early-Middle Jurassic, the central segment of MOO (C. MOO) might have closed. Combined with published data, we propose that the MOO closed through diachronous, southward subduction, with the closure of its eastern segment later than the western segment by 40 million years.