The genesis of the late Jurassic coarse granite in northern Greater Khingan Range: The evidence from Zircon U-Pb dating and Hf isotope

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The late Jurassic coarse-grained monzogranites pluton of the Northern Greater Khingan Range distributes in the east of the Central Asian orogenic belt, belongs to East-Ujimqin of inner-Mongolia in China. The coarse-grain monzogranites pluton consists of orthoclase and quartz, and accessory minerals comprising biotite and muscovite. Zircon CL (cathodoluminescence) images of the monzogranites show magmatic oscillatory typical zoning structure with the lower Th/U (0.5-1.1, average 0.7). LA-ICP-MS zircon U-Pb dating result indicates that the monzogranites can be divided into two stages, the first stage is 152 Ma, the second stage was 161 Ma. The geochemical characteristics show that the monzogranites are high potassium calc-alkaline series, high content of Al_2O_3, extreme low content of TiO_2, FeO^T and P_2O_5, medium content of total REE, high LREE and HREE fractionation degree, enriched in LREE and large ion lithophile elements, depleted in high field strength elements, medium of negative anomaly δEu, which belongs to the collision or post-collision A1-type granites. Harker diagrams, incompatible elements and MgO contents indicate that the original magma mainly affect by fractional crystallization. ε_{Hf} (t) (6.0-9.0) and two stage model ages of 579 Ma-738 Ma show that the original magma originate from depleted mantle resources, and might be contaminated by the ancient upper crust. The old inherited zircon(171 Ma) has positive ε_{Hf}(t) value (7.9), also hinted that the initial substance derived from depleted mantle. The late Jurassic coarse-grained monzogranites of the Northener Greater Khingan Range display material of lithospheric mantle imprint, and have closely relationship with garnet-iherzolite which are interpreted as metasomatism of mantle source subduction fluids. Therefore, the late Jurassic coarse-grained monzogranites of the Northener Greater Khingan Range is a product of partial melting of newborn crust-mantle lithosphere at the background of the subduction of the paleo Asian ocean.