

Late Cretaceous provenance change in the Jiaolai basin, East China: Evidences from detrital zircon U-Pb ages from the Wangshi Group

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The provenance history of Jiaolai basin is of great significance to the paleogeographic and tectonic pattern in Jiaodong Peninsula, East China. Previous studies had suggested that the detrital zircons of sandstones of Early Cretaceous (130 Ma) Laiyang Group mainly came from granites in Sulu orogenic belt. However, the source provenance of the Late Cretaceous Wangshi Group has not been determined. Here, we apply integrated methods including conglomerate clast analysis, heavy mineral analysis, sandstone petrographic analysis, and U-Pb detrital zircon analysis to sandstone samples of Late Cretaceous Wangshi Group from a borehole (Luke-1) in Jiaolai basin, Shandong. The results indicate that the peak age of U-Pb detrital zircons of these samples is about 115 Ma. The compositions are dominated (60–80 %) by basic-intermediate volcanic clasts (e.g. andesite, basalt, tuff, basaltic andesite, and rhyolite), similar to the the compositions of Qingshan Group. In addition, the heavy mineral assemblages of our samples also show a basic-intermediate volcanic origin, also consistent with that of the Qingshan Group. Our results suggest that the provenance of Jiaolai basin had changed during the Late Cretaceous, from the relatively distal Sulu orogenic belt granite to the intra-basinal Qingshan group basic-intermediate volcanic rocks. We attribute this provenance change to a sudden NW-SE shortening event and uplift caused by the collision between the Okhotsk block and East Asian margin between 98–80 Ma.