

Sedimentary response to the tectonic evolution of the southern North China Craton during the late Paleozoic and Mesozoic

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With the aim of constraining the influence of the surrounding plates on the Late Paleozoic–Mesozoic paleogeographic and tectonic evolution of the southern North China Craton (NCC), we undertook new U–Pb and Hf isotope data for detrital zircons obtained from ten samples of upper Paleozoic to Mesozoic sediments in the Luoyang Basin and Dengfeng area. Samples of upper Paleozoic to Mesozoic strata were obtained from the Taiyuan, Xiashihezi, Shangshihezi, Shiqianfeng, Ermaying, Shangyoufangzhuang, Upper Jurassic unnamed, and Lower Cretaceous unnamed formations (from oldest to youngest). These results, together with previously published data, indicate that: (1) Upper Carboniferous–Lower Permian sandstones were sourced from the Northern Qinling Orogen (NQO); (2) Lower Permian sandstones were formed mainly from material derived from the Yinshan–Yanshan Orogenic Belt (YYOB) on the northern margin of the NCC with only minor material from the NQO; (3) Middle–Upper Permian sandstones were derived primarily from the NQO, with only a small contribution from the YYOB; (4) Upper Triassic sandstones were sourced mainly from the YYOB and contain only minor amounts of material from the NQO; (5) Upper Jurassic sandstones were derived from material sourced from the NQO; and (6) Lower Cretaceous conglomerate was formed mainly from recycled earlier detritus. The provenance shift in the Upper Carboniferous–Mesozoic sediments within the study area indicates that the YYOB was strongly uplifted twice, first in relation to subduction of the Paleo-Asian Ocean Plate beneath the northern margin of the NCC during the Early Permian, and subsequently in relation to collision between the southern Mongolian Plate and the northern margin of the NCC during the Late Triassic. The three episodes of tectonic uplift of the NQO were probably related to collision between the North and South Qinling terranes, northward subduction of the Mianlue Ocean Plate, and collision between the Yangtze Craton and the southern margin of the NCC during the Late Carboniferous–Early Permian, Middle–Late Permian, and Late Jurassic, respectively. The southern margin of the central NCC was rapidly uplifted and eroded during the Early Cretaceous. This work was financially supported by the NSFC (41472052, 41722204) and the Basic Scientific Research Foundation of Central Universities of China (Jilin University).