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内蒙古西拉木伦河河漫滩沉积物碎屑锆石U-Pb年龄、Hf同位素组成及其地质意义

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摘要：

本文利用LA-MC-ICP-MS分析技术,对内蒙古西拉木伦河河漫滩沉积物碎屑锆石进行了U-Pb年龄和Hf同位素研究。西拉木伦河河漫滩沉积物样品XL中的碎屑锆石年龄主要分为4个组:108~550Ma、699~918Ma、1789~2109Ma和2347~2633Ma;西拉木伦河河漫滩沉积物样品XL2中的碎屑锆石主要分为3个组:122~526Ma、1791~1969Ma和2176~2692Ma。1.8Ga和2.5Ga是华北板块的两个特征年龄,700~900Ma的碎屑锆石在兴蒙造山带中存在,华北板块北缘却不存在。 Lu-Hf同位素分析,西拉木伦河河漫滩沉积物大量碎屑锆石为t_{DM2}<1000Ma和$\varepsilon_{Hf}(t)$>0,部分碎屑锆石t_{DM2}分布在2.7Ga附近。以上特征均表明西拉木伦河河漫滩沉积物具有华北板块北缘与兴蒙造山带的混合特征。但是在有兴蒙造山带物质加入之后,样品XL2中却缺少700~900Ma的碎屑锆石,根据河漫滩沉积物的粒度分析及西辽河U-Pb年龄结果,原因可能是河流的分选作用。根据碎屑锆石U-Pb年龄和t_{DM2}累积曲线的线性混合,华北板块北缘与兴蒙造山带加入到西拉木伦河河漫滩沉积物的比例为1:1。依据前人公式计算了西拉木伦河河漫滩沉积物物源区各不同时期的重熔/增生比例。

英文摘要：

The Xar Moron River, which is the boundary between the North China plate and Xing-Meng Orogenic Belt, flows above the fault of the Xar Moron. In this paper, we applied the ICP-MS analytical techniques to date U-Pb ages and determine Hf isotopic composition of detrital zircons in the floodplain sediments from the Xar Moron River. The detrital zircons U-Pb ages of sample XL show 4 populations: 108~550Ma, 699~918Ma, 1789~2109Ma, 2347~2633Ma, and the detrital zircons U-Pb ages of sample XL2 show 3 populations: 122~526Ma, 1791~1969Ma, 2176~2692Ma, respectively. There does not exist zircons with 700~900Ma age in the sample XL2, and the detrital zircons with ages of 1791~1969Ma and 2176~2692Ma also belong to the North China plate. Therefore, the sample XL2 should have detrital zircons which originated from the North China plate. According to Lu-Hf isotopic composition, a large proportion of detrital zircons show the characteristic of Xing-Meng Orogenic Belt, whose Hf model ages (t_{DM2}) are less than 1000Ma and $\varepsilon_{Hf}(t)$ are greater than 0. t_{DM2} of some detrital zircons are close to 2.7Ga, which is the fastest growth period of the North China plate. From the above, floodplain sediments of the Xar Moron River have the common features between the North China plate and Xing-Meng Orogenic Belt. But the absence of detrital zircon with age of 700~900Ma in sample XL2 resulted from sorting of river through grain size analysis and Xiliao River U-Pb ages. Through linear mixing model of U-Pb ages and t_{DM2} of detrital zircons,fitted cumulative probability curve suggests that mixing ratio between the North China plate and Xing-Meng Orogenic Belt is 1:1. Furthermore, using formula of recycling ratio, ratios between remelting and juvenile crust with age have been calculated.

关键词：西拉木伦河 碎屑锆石 U-Pb Hf同位素 地球化学

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