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扬子西南缘盐边群时代及构造环境: 来自碎屑沉积岩的约束

作者	单位
杜利林	中国地质科学院地质研究所, 北京 100037 ; 中国科学院地质与地球物理研究所, 北京 100029
郭敬辉	中国科学院地质与地球物理研究所, 北京 100029
耿元生	中国地质科学院地质研究所, 北京 100037
杨崇辉	中国地质科学院地质研究所, 北京 100037
刘福来	中国地质科学院地质研究所, 北京 100037
任留东	中国地质科学院地质研究所, 北京 100037
周喜文	中国地质科学院地质研究所, 北京 100037
刘平华	中国地质科学院地质研究所, 北京 100037

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摘要:

出露于扬子地块西南缘的盐边群为一套火山-沉积岩系,其深入研究对探讨扬子西缘新元古代构造环境具有重要意义。本文对盐边群中碎屑沉积岩进行了较系统的岩石学、碎屑物质组成和地球化学研究,并从小坪组和乍古组中各选取了1件变质砂岩样品进行锆石U-Pb年龄和Hf同位素分析。变质砂岩主要由棱角状-次棱角状火山岩岩屑、石英和长石矿物碎屑组成。碎屑沉积岩 Al_2O_3/SiO_2 值为0.12~0.4, K_2O/Na_2O 值范围为0.14~9.45(其中板岩 K_2O/Na_2O 值多大于1.0,而变质砂岩中多数样品的 K_2O/Na_2O 值小于1.0)。所有样品具有轻-中等程度的轻重稀土元素分异($(La/Yb)_N=1.6\sim 9.37$),多数样品具有明显的负Eu异常。 $\epsilon_{Nd}(t)$ 值范围为-1.77~+5.01。变质砂岩碎屑锆石U-Pb年龄峰值为900~910Ma,同时存在少量太古代-古元古代碎屑锆石。小坪组和乍古组变质砂岩中年轻碎屑锆石 $^{206}Pb/^{238}U$ 年龄加权平均值分别为 888 ± 8 Ma和 884 ± 14 Ma。碎屑物质组成、地球化学和锆石U-Pb年龄结果共同表明,盐边群碎屑沉积为近源沉积,物源区主要为岛弧中酸性火山岩和花岗岩。结合关刀山岩体(857Ma)和荒田组玄武岩(880~830Ma)研究结果,进一步限定盐边群的时代为880~830Ma,形成于弧后盆地环境,其沉积物源区为华夏地块向扬子地块俯冲过程中,扬子西南缘形成的火山岛弧。

英文摘要:

The southwestern margin of the Yangtze Block is occupied by the thick volcanic-sedimentary rocks of the Yanbian Group, which is of significance in reconstructing the Neoproterozoic tectonic environment of this region. The clastic sedimentary rocks of the Yanbian Group have been studied on petrology, clastic composition and geochemistry. In addition, two sandstone samples are collected from the Xiaoping Formation and Zhagu Formation, respectively, for zircon U-Pb dating and Hf isotope analysis. In the metasandstone of the Yanbian Group many volcanic lithoclasts and mineral debris of quartz and feldspar have been discerned, which show poor sorting and roundness. In the clastic sedimentary rocks, Al_2O_3/SiO_2 is ranging from 0.12 to 0.4, and K_2O/Na_2O from 0.14 to 9.45, in which most slates with K_2O/Na_2O ratio over 1.0, while most sandstones less than 1.0. The LREEs and HREEs in the clastic sedimentary rocks are slightly to moderately differentiated with $(La/Yb)_N$ ratios from 1.6 to 9.37 and most with substantial negative Eu anomaly. The $\epsilon_{Nd}(t)$ gives the range of -1.77 to +5.01. The detrital zircons U-Pb result is mainly concentrated at 900Ma to 910Ma with minor ages of Archean to Paleoproterozoic. The weighted mean ages of the young detrital zircons of the Xiaoping and Zhagu formations are 888 ± 8 Ma and 884 ± 14 Ma, respectively. The clastic composition, geochemistry and zircon U-Pb ages all indicate that clastic sediments in the Yanbian Group are proximal deposits, and the sedimentary provenances are from intermediate-felsic volcanic rocks and granites in island arc environment. Combining with the results of the Guandaoshan diorite and the basalt in the Huangtian Fm., the age of the Yanbian Group is constrained to 880~830Ma, deposited in the back-arc basin environment. Provenance of the clastic sediments is from the volcanic arc at the western margin of the Yangtze Block when the Cathaysian Block was being subducted beneath the Yangtze Block.

关键词: [扬子地块](#) [盐边群](#) [碎屑沉积岩](#) [地球化学](#) [弧后盆地](#)

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单位地址：北京9825信箱/北京朝阳区北土城西路19号

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