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南天山洋古生代期间俯冲作用过程探讨

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摘要:

南天山洋的演化历史是中亚造山带研究中关键的问题, 目前对古生代期间南天山洋的俯冲极性、俯冲方式等问题仍然存在着争议。南天山造山带南部地区近东西向出露一系列中酸性侵入岩, 本文以其中的欧西达坂石英闪长岩为对象, 开展了系统的岩石学、地球化学和同位素年代学研究。地球化学特征显示其富集Rb、Ba、K、Pb等大离子亲石元素, 亏损Nb、Ta、Zr、Hf等高场强元素, 轻稀土元素较重稀土元素富集, 稀土配分曲线呈右倾的“海鸥”型, 为典型的俯冲成因钙碱性系列岩浆岩, 锆石LA-ICP-MS微区定年获得 418.4 ± 2.2 Ma的 $^{206}\text{Pb}/^{238}\text{U}$ 加权平均年龄。结合区域地质背景及前人成果, 初步认为塔里木板块北缘至少在志留纪时期已由被动大陆边缘转变成活动大陆边缘, 中泥盆世开始又转变为被动大陆边缘; 早古生代阶段南天山洋的演化以双向俯冲为主, 向南为短期、脉冲式或间歇式的正常高角度俯冲过程, 至中泥盆世结束; 向北则为长期、多阶段性的俯冲。

英文摘要:

The subduction process of South Tianshan Ocean is a significance aspect of Central-Asian Orogenic Belt research and there still exists a controversy concerning the way of subduction. A series of nearly east-west distribution of intermediate-acid intrusive rocks are exposed in southern margin of the South Tianshan and selected as the object of this research. Ouxidaban quartz diorite, located in the region, i.e. the north of Kuqa foreland basin, is studied in detail in this paper. Geochemical characteristics suggest that Ouxidaban quartz diorite has SiO_2 (54.23%~56.27%), Al_2O_3 (15.15%~16.03%), CaO (6.44%~7.56%), K_2O (1.51%~2.08%) and Na_2O (2.30%~2.62%) with A/NCK (0.77~0.91), high Al and low Ti with obvious depletion of Nb and Ta. Besides, the Ouxidaban pluton is enriched in large ion lithophile elements (K, Rb, Ba and Pb) and depleted in high field strength elements (Nb, Ta, Zr, Hf, Ti and P), with relatively more light rare earth elements than heavy rare earth elements with the chondrite-normalized rare earth element patterns of slightly right-dipping V-type. These features indicated that Ouxidaban quartz diorite is typical calcium-alkali magmatic rocks which was formed in a subduction stage with a zircon LA-ICP-MS micro area $^{206}\text{Pb}/^{238}\text{U}$ weighted average age of 418.4 ± 2.2 Ma. It's widely acknowledged that the north Tarim craton and the south Central-Yili block all have lots of rocks produced by subduction. The ages of the rocks distributed in the southern part of Central-Yili block, ranges from Precambrian to Late Carboniferous and this region does not have an obvious silent time of magma activity. However, the rocks distributed in north Tarim craton whose ages concentrate on 426~418Ma, except for a granite of 386Ma which is located in east of Ouxidaban pluton and produced by subduction as well. At the same time, there are not a broader magma arc and a peaceful magma activity time in the north Tarim craton. Although a complex tectonic deformation existed there, it wasn't caused by the southward subduction of South Tianshan Ocean. In conclusion, this paper proposes that northern Tarim plate has been transformed from the passive continental margin to active continental margin in Silurian at latest and then it returned to the passive continental margin in Devonian. The evolution of the South Tianshan Ocean during Early Paleozoic was dominated by bidirectional subduction but the southward subduction was short, intermittent or pulse type subduction process until the end of middle Devonian, and the north subduction was a long-term and multi-stage process until the beginning of collision between Central-Yili block and Tarim plate. It should also be noted that the southward subduction process of South Tianshan Ocean was mostly like a normal high-angle subduction.

关键词：[欧西达坂石英闪长岩](#) [双向俯冲](#) [南天山洋](#) [塔里木北缘](#)

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