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**The timing of the closure of southern Tianshan Paleozoic Ocean: evidence from detrital zircon dating in Northwestern Tarim margin**

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The southern Tianshan Paleozoic Ocean separated Tarim continental block in the south from Yili block, part of Kazakhstan paleoplate, in the north, is considered as the last closing branch of Paleozoic ocean in the central Asian. But, about the exact timing of its closure, some authors think that it is the middle Carboniferous based on the data of high and ultra-high pressure metamorphic rocks in the northern South Tianshan orogenic belt. Some considered that it is the late Carboniferous based on data about the granite intruded into south Tianshan mélangé. But some argued that it is the latest Permian to Early Triassic based on the so-called later Permian radiolarian fossils and Triassic zircon ages from south Tianshan. However, all data based by those various viewpoints can be given another interpretation. So, we need to find out one way to deal further with this debated issue.

In this work, we carried out the studies on the sources of debris of Silurian to Permian sedimentary rocks in the northwest margins of Tarim basin, which are considered to be deposited in the Tarim continental margin faced to the Paleozoic South Tianshan Ocean. Detrital zircon dating reveal that early Late Carboniferous sandstones contain late Ordovician and more old debris zircon, and latest Late Carboniferous sandstones contain late Carboniferous, Early Devonian, Silurian, Ordovician and more old debris zircons, and Permian sandstones contains only Early Permian debris zircons. Further collecting and synthesizing of data on regional magmatic activities and metamorphism which may lead to zircon crystallization, we found out Early Permian and Late Carboniferous magmatic activities took place only in the south Tianshan region, Devonian and Silurian magmatic activities occurred in the Tianshan and northern margin of Tarim basin, and Ordovician magmatic activities may be found in the Tianshan, northern margin of Tarim basin and West Kunlun mountains. In combination of those data, it is easier to get the following conclusion that the debris from Tianshan had not arrived at Tarim northwest margin until the latest Late Carboniferous, in the other word, that the south Tianshan Ocean was closed before the latest Late Carboniferous, probably in the middle Late Carboniferous. The single source of debris zircons in the Permian sandstones implies that a Permian foreland basin of Tianshan orogenic belt occurred in the Tarim northwest margin.

For testing above conclusions, we studied relative data in the available publications and found out that so-called Permian radiolarian fossils in the publications have neither surface features nor internal structure, and it is worthy to note that all of other Radiolarian fossils, except for the above only one so-called Late Permian fossil, have very good surface features and internal structure, shows their age is the early Early Carboniferous, very similar to ones in the other regions of South Tianshan orogenic belt. The metamorphic timing of high- and ultra-high metamorphic rocks has been determined to be middle

period of the Carboniferous by recent studies, and the Triassic age of ultra-high pressure metamorphism in some publications is probably the records of retro-metamorphism during the examination of the rocks similar to ones in the Dabieshan in central east China. Thus, we believe that the issue of closure timing of the South Tianshan Ocean has become a historical one. Following its closure in the late Carboniferous, Tarim block became the part of Laurasia, and possibly marks the finishing of amalgamation of the Pangea.

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