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中-新元古界标准剖面蓟县系首次高精度年龄制约——蓟县剖面雾迷山组 and 铁岭组磁脱岩锆石 SHRIMP-U-Pb 同位素定年研究

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摘要:

近期在蓟县中-新元古界标准剖面铁岭组和雾迷山组首次发现磁脱岩, 并测得其锆石 SHRIMP U-Pb 同位素年龄为 $\sim 1440\text{Ma}$ ($1439 \pm 14\text{Ma}$) 和 $\sim 1485\text{Ma}$ ($1483 \pm 13\text{Ma}$ 和 $1487 \pm 16\text{Ma}$), 这标志着这条传统的标准剖面上以碳酸盐岩为主体的蓟县系上部的两个重要组, 从此也获得了直接的、高精度的锆石 U-Pb 同位素年龄约束。这是华北中-新元古界标准剖面蓟县系相关地层单位首次获得直接而精确的锆石 U-Pb 同位素年龄约束, 也是在整個华北北缘燕山地区雾迷山组内部首次获得精确的直接定年。这一进展为闻名中外的天津蓟县剖面中-新元古界年代地层格架的正确厘定、以及今后继续作为华北该阶段的标准剖面, 并与国内外其他地区相关地层的正确对比等, 提供了新的、精确的年代学“锚点”, 因而具有重要的科学和实际意义。

英文摘要:

Although known as the Meso- to Neoproterozoic Standard Section of China for more than half a century, the age of the famous Jixian Section (Jixian County, Tianjin City) has been rather poorly constrained, mainly by Rb-Sr and K-Ar ages that have proven unreliable and inaccurate in most cases. In recent years, significant progress has been made in studying the Meso- to Neoproterozoic geochronology of the North China Craton. To date, however, only one accurate U-Pb zircon age of $1625 \pm 6\text{Ma}$ from volcanic rocks of the Dahongyu Formation, and two duplicate zircon U-Pb ages of about 1635Ma from mafic sills crosscutting the Chuanlinggou Formation of the Changchengian System in the lower part of the Jixian Section, has been reported. In addition, no one until now has obtained this kind of age dates directly from carbonate-dominated parts of the succession at the Jixian Section. Fortunately, bentonite beds were recently discovered for the first time in the Tieling and Wumishan formations at the Jixian Section, and ages of $\sim 1440\text{Ma}$ ($1439 \pm 14\text{Ma}$) and $\sim 1485\text{Ma}$ ($1483 \pm 13\text{Ma}$ and $1487 \pm 16\text{Ma}$) for the bentonite beds were obtained by means of SHRIMP zircon U-Pb dating. This achievement means that the shallow-marine, carbonate-dominated Tieling and Wumishan formations, the upper two stratigraphic units of the conventional Jixian System at the Jixian Standard Section, are now temporally constrained by direct zircon U-Pb dating. Furthermore, it is the first time that the Wumishan Formation from the entirety of the North China Craton has been precisely dated. Moreover, the current SHRIMP zircon age of about 1440Ma for the bentonite in the Tieling Formation at the Jixian Standard Section is the same as the age reported earlier in Pingquan County, Hebei Province, in the east Yanshan Mountains on the northern margin of the NCC. Consequently, this progress in age dating of the bentonite beds in the carbonate-dominated succession provides new, accurate, benchmark ages for further clarification of the chronostratigraphic framework of the well-known Jixian Meso- to Neoproterozoic Standard Section and helps to consolidate its position for correct correlation with relevant strata, both regionally and internationally.

关键词: [蓟县剖面](#) [磁脱岩](#) [铁岭组](#) [雾迷山组](#) [SHRIMP U-Pb同位素测年](#) [中元古界](#) [华北克拉通](#)

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