

华北古陆中、新元古代年代地层框架SHRIMP锆石年龄新依据

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中文摘要:建立中国晚前寒武纪地层的标准剖面,并使其成为国际地层对比的参考标准,一直是中国地质学家的追求.华北蓟县中、新元古代地层一直作为这一标准地层的主要研究剖面,已进行了岩石地层、生物地层、化学地层、磁性地层和层序地层等多学科研究.但是,高质量的同位素年代学研究和以此为基础的年代地层框架的优化一直是华北古陆中、新元古界研究的薄弱环节.长期以来,由于关键层位和关键界而缺乏高质量的同位素年龄标定,致使蓟县剖面争取成为国际层面标准剖面的竞争力受到影响.近期,随着锆石SHRIMP年龄测定技术在华北古陆前寒武纪地层学研究中的成功应用,在几个关键层位定年研究中取得实质性进展.北京西山下马岭组中部班脱凝灰岩中获得锆石SHRIMP加权平均年龄为 (1370 ± 11) Ma,使得下马岭组这个青白口群的关键地层单位划归为中元古界.天津蓟县大红峪组碱性火山岩中获得锆石SHRIMP加权平均年龄为 (1625.9 ± 8.9) Ma.可用于标定华北古陆中元古代裂解时间得北京密云环斑花岗岩获得锆石SHRIMP加权平均年龄为 (1685 ± 15) Ma.这些SHRIMP测年结果使华北古陆中、新元古界年代地层划分与全球对比有了年龄“锚点”,必定有利于准确厘定华北地区中、新元古界的内涵.由于华北蓟县中、新元古界剖面是我国晚前寒武纪地层的标准剖面,因此上述年代地层框架的优化对于我国地质填图的修正和精确地层对比有着重要的促进作用.同时,对于我国前寒武纪生物演化,特别是宏观藻类发育的时间研究具有重要意义.这必定有助于提升华北中、新元古界剖面的国际地位.

中文关键词:华北古陆 中,新元古界 大红峪组 下马岭组 SHRIMP年龄

SHRIMP Zircon Ages: Basis for Refining the Chronostratigraphic Classification of the Meso-and Neoproterozoic Strata in North China Old Land

Abstract:An important progress has been achieved in the completion of the Meso-Neoproterozoic hypostratotype section in Jixian. However, lots of key horizons have not yet been calibrated with the high-quality isotopic ages, which has a remarkable influence upon the competitiveness of GSSA in the Jixian section. A zircon U-Pb age was first obtained for the ash bed in the upper part of the Jixian section, yielding a weighted mean $207\text{Pb}/206\text{Pb}$ age of (1368 ± 12) Ma (by Gao Linzhi et al., 2007; analyzed in Beijing SHRIMP Center). In addition, the new age of the Dahongyu Formation (1625.9 ± 8.9) Ma in the Jixian section and that of the Xiamaling Formation (1370 ± 11) Ma in Western Hills of Beijing were obtained and then examined by the SHRIMP Center in Curtin University, Perth, Western Australia. A breakthrough was made in Meso-Neoproterozoic chronostratigraphic research, and the location of the Jixian section was restored in the geological chart. At the same time, a new Meso-Neoproterozoic classification was advanced for the Jixian section. The SHRIMP zircon ages ((1368 ± 12) Ma and (1370 ± 11) Ma) have raised new problems before us, and Chinese geologists must face the following challenges: ① The top boundary age of the Tieling Formation is limited at 1400 Ma or younger. ② The time limit of the hypostratotype of the Changcheng and Jixian systems may be in 1800~1200 Ma, not in 1800~1000 Ma. According to the age of the Xiamaling Formation, the Changcheng System is limited in 1800~1600 Ma and the Jixian System is in 1600~1400 Ma, being respectively the lower and the middle part of Mesoproterozoic strata. ③ The dating serves as evidence of chronostratigraphy for diabase dikes, which are well developed in Meso- and Neoproterozoic strata in the North China Old Land. The strata of 1200~800 Ma in the Yangtze Platform and on the southern margin of the North China Old Land should be further investigated and interpreted. However, the zircon dating is an important achievement of the Precambrian chronostratigraphy in China, which increases the international competitiveness of the Jixian section.


keywords:[North China Old Land](#) [Meso-Neoproterozoic strata](#) [Dahongyu Formation](#) [Xiamaling Formation](#) [SHRIMP dating](#)

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