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塔里木地块奥陶纪古地磁新结果及其构造意义

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摘要 本文报道塔里木地块阿克苏—柯坪—巴楚地区奥陶纪古地磁研究新结果.对采自44个采点的灰岩、泥灰岩及泥质砂岩样品的系统岩石磁学和古地磁学研究表明，所有样品可分成两组：第一类样品以赤铁矿和少量磁铁矿为主要载磁矿物，该类样品通常可分离出特征剩磁组分A；第二类样品以磁铁矿为主要载磁矿物，系统退磁揭示出这类样品中存在特征剩磁组分B.特征剩磁组分A分布于绝大多数奥陶纪样品中，具有双极性，但褶皱检验结果为负，推测其可能为新生代重磁化.特征剩磁组分B仅能从少部分中晚奥陶世样品中分离出，但褶皱检验结果为正，且其所对应古地磁极位置（40.7° S，183.3° E，d*p*/d*m*=4.8° /6.9° ）与塔里木地块古生代中期以来的古地磁极位置显著差别，表明其很可能为岩石形成时期所获得的原生剩磁.古地磁结果表明塔里木地块中晚奥陶世位于南半球中低纬度地区，很可能与扬子地块一起位于冈瓦纳古大陆的边缘；中晚奥陶世之后，塔里木地块通过大幅度北向漂移和顺时针旋转，逐步与冈瓦纳大陆分离、并越过古赤道；至晚石炭世，塔里木地块已到达古亚洲洋构造域的南缘.

关键词 塔里木地块 奥陶纪 古地磁 构造演化 古地理

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New paleomagnetic result for Ordovician rocks from the Tarim Block, Northwest China and its tectonic implications

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Abstract This paper reports new Ordovician paleomagnetic results from the Aksu-Kalpin-Bachu area of the Tarim Block. Based on the systematic study of rock magnetism and paleomagnetism with limestone, argillaceous limestone, and argillaceous sandstone specimens from 44 sampling sites, all the samples could be divided into two types: the predominant magnetic minerals of the first type are hematite and subordinate magnetite. For the specimens from this type, characteristic remanent magnetization (ChRM) could generally be isolated by demagnetization temperatures larger than 600 ℃; we assigned this ChRM as component A; whilst magnetite is the predominant magnetic mineral of the second type; progressive demagnetization yielded another ChRM (component B) with unblocking temperatures of 550~570 ℃. The component A obtained from the majority of Ordovician specimens has dual polarity and a negative fold test result; we interpreted it as a remagnetization component acquired during the Cenozoic period. The component B can only be isolated from some Middle-Late Ordovician specimens with unique normal polarity, and has a positive fold test result at 95% confidence. The corresponding paleomagnetic pole of this characteristic component is at 40.7° S, 183.3° E with d*p*/d*m*=4.8° /6.9° and is in great difference with the available post-Late Paleozoic paleopoles for the Tarim Block, indicating that the characteristic component B could be primary magnetization acquired in the formation of the rocks. The new Ordovician paleomagnetic result shows that the Tarim Block was located in the low- to intermediate- latitude regions of the Southern Hemisphere during the Middle-Late Ordovician period, and is very likely to situate, together with the South China Block, in the western margin of the Australian-Antarctic continents of East Gondwana. However, it may have subjected to a large northward drift and clockwise rotation after the Middle-Late Ordovician period, which resulted in the separation of Tarim from the East Gondwanaland and subsequent crossing of the paleo-equator; by the Late Carboniferous period the Tarim Block may have accreted to the southern margin of the Altaids.

Key words Tarim block; Ordovician; Paleomagnetism; Tectonic evolution; Paleogeography

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