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东南极普里兹带多期变质作用及其对罗迪尼亚和冈瓦纳超大陆重建的启示

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摘要：

东南极普里兹带是一条经受格林维尔期和泛非期高级构造热事件影响的多相变质带,其构造演化过程与罗迪尼亚和冈瓦纳超大陆的形成密切相关。新的岩石学和年代学资料表明,普里兹带中的格林维尔期高级变质作用是区域性的,并经历了>970Ma和930~900Ma两个演化阶段(期),变质条件达到相对高温高压的麻粒岩相。格林维尔期造山作用起始于活动大陆边缘或岛弧环境下的岩浆增生,最后发展到陆陆碰撞,从而使印度、东南极西陆块和非洲的卡拉哈里克拉通拼合在一起,构成了罗迪尼亚超大陆的重要组成部分之一。普里兹带中的泛非期高级变质作用并不象前人认为的那样只发生在中低压麻粒岩相条件下,而是达到高压麻粒岩相,并具有近等温减压的顺时针*P-T*演化轨迹。格林维尔期变质先驱的普遍存在说明泛非期碰撞造山事件主要叠加在印度-南极陆块东缘的基底杂岩之上,所以其主缝合线的位置应该在现今普里兹带的东南方向,并可能向南极内陆延伸到甘布尔采夫冰下山脉。对不同类型岩石的精细定年揭示,普里兹带中泛非期造山作用过程从570Ma一直持续到490Ma,这与东非造山带的晚期碰撞阶段大致相吻合。因此,冈瓦纳超大陆的最后拼合可能是通过西冈瓦纳、印度-南极陆块和澳大利亚-南极陆块等三个陆块的近于同期碰撞来完成的。

英文摘要：

The Prydz Belt in East Antarctica is a typical polymetmorphic belt that experienced Grenvillian and Pan-African high-grade metamorphism. The tectonic evolution of the belt is closely related to the formation of the supercontinents Rodinia and Gondwana. New petrological and geochronological data suggest that the Grenvillian metamorphism involving two episodes at >970Ma and 930~900Ma spreads over the main part of the Prydz Belt. Metamorphic peak during this peroid reaches relatively high temperature and high pressure granulite facies conditions.The Grenvillian orogenesis underwent long-term magmatic accretion along an active continental margin or arc and the final collision of Indian, Kalahari craton and the western portion of East Antarctica, which forms an important part of the Rodinia supercontinent. The Pan-African metamorphism in the Prydz Belt reaches high-pressure granulite facies conditions, accompaning a near isothermal decompressional *P-T* path, rather than low-to medium-pressure granulite facies conditions as previously thought. The widespread Grenvillian metamorphism in the Prydz Belt indicates that the Pan-African tectonothermal event may have developed on the eastern margin of the Indo-Antarctica continental block, and the real suture should be located southeastwards of the present Prydz Belt. Further to the Antarctic inland, it might pass through the Gamburtsev Subglacial Mountains. The precise dating for different rock types reveals that the Pan-African orogenesis of the Prydz Belt commenced at 570Ma and lasted to 490Ma, which is roughly contemporaneous with the late collisional stage in the East African Orogen. Therefore, the final assembly of Gondwana may have been completed by the collision of West Gondwana, Indo-Antarctica and Australo-Antarctica continental blocks during the same time.

关键词：格林维尔期 泛非期 高级变质作用 普里兹带 东南极 超大陆

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