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On constraining the Pan-African high-grade metamorphism time of the Larsemann hills, East antarctica

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Up to now, both the basement and cover sequences of the Larsemann Hills have been involved in the high-grade deformation and metamorphism in the Pan-African event, which was widely accepted peaking at 550-530 Ma and was responsible for the widespread granitic magmatism at 525-500 Ma. The late Neoproterozoic-Paleozoic (Pan-African) orogenesis was thus constrained in the period of 550-500 Ma. Our studies demonstrate that the zircons of the garnet-biotite-plagioclase gneiss were severely disturbed and reset in the Pan-African high grade metamorphism. The Pan-African metamorphism and granites can obliterate and reset the older magmatic or metamorphic zircons, and the zircons produce complex inner textures and the real metamorphism age is hardly to obtain. But the actual metamorphic rims are seldom present and the reset zircons give the average age of 522.7±6.6 Ma. Granite postdating the peak metamorphism has the crystallizing time of 545±9 Ma, and some younger granites of c 500 Ma. The peak metamorphism should be older than the oldest granite in the Pan-African. The determination of the feature and time of the Pan-African peak metamorphism is of significant in understanding the Pan-African orogeny in the East Antarctica. The Pan-African metamorphism and associated granites seem to have been derived from special intra-continental reactivation mechanism of older continental materials, not inter-continental subduction-collision as conventionally considered.

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