Paleoproterozoic Tectono-thermal evolution of the Jiao-Liao-Ji Belt, North China Craton

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The North China Craton formed by the amalgamation of two discrete blocks, named the Eastern and Western Blocks, along the Trans-North China Orogen at 1.85 Ga. There has been much increased knowledge concerning the pre-collisional history of the late Archean to Paleoproterozoic rocks along the western margin of the Eastern Block. However, the tectonic history of the Paleoproterozoic rocks along the eastern margin of the Eastern Block is still poorly known. The Paleoproterozoic lithostratigraphic units along the eastern margin of the Eastern Block include the Jingshan and Fengzishan Groups in eastern Shandong Province, the Liaohe Group in eastern Liaoning Province, the Ji'an and Laoling Groups in southern Jilin Province, and the Macheonayeong Group in North Korea. Associated with these sedimentary volcanic rocks are large amounts of A-type granites and mafic layered intrusions, and they together constitute a Paleoproterozoic mobile belt, herein named the Jiao-Liao-Ji Belt. A multi-disciplinary study indicates that the tectono-thermal evolution and deep processes in the Jiao-Liao-Ji Belt can be summarized as following. The early (2.53 to 2.36 Ga) mantle-plume-related underplating led to the formations of the 2.47~2.33 Ga alkaline granite, bi-modal volcanics and mafic dyke swarms. The later extensional event resulted in the formations of the 2.2-2.0 Ga A-type Liaoji Granites and the pegmatite, associated with bedding-parallel deformation. The main metamorphic and deformational event occurred in the period 1.91-1.88 Ga. During the period of 1.87-1.66 Ga, delamination beneath the Jiao-Liao-Ji Belt occurred and led to the emplacement of anorogenic rocks including rapakivii granites, syenites, pegmatite veins and mafic dyke swarms.

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Thermochronological constraints to Two-stage Indosinian extrusion of the HP-UHP terranes in the Dabie-Sulu orogen, central China

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The Qinling-Dabie-Sulu Orogen is the world's largest belt of ultra-high pressure metamorphic rocks yet the timing and mechanisms of partial subduction then uplift of the HP-UHP rocks are poorly known. This paper summarizes published and new geochronologic data to test a new tectonic model for the uplift and exhumation of HP-UHP rocks in the western Dabie orogen. This model is called the two-stage exhumation model, and includes two different stages and types of extrusion for exhumation of HP-UHP rocks in east central China. Mica $^{40}Ar/^{39}Ar$ ages, ranging from 241 to 231 Ma, indicate a general middle Triassic cooling probably driven by an early upward extrusion during the collision between the North and South China blocks. Late Triassic–early Jurassic slow cooling is associated with later eastward extrusion, ranging from 200 to 184 Ma. This second event is recorded also in mica in the regions not affected by later deformation and magmatism. This lateral movement along lithospheric-scale faults resulted in the eastward extrusion of the HP-UHP metamorphic terrane, which was followed, in Late Triassic–early Jurassic times, by a major contractional event. These two extrusion events are correlative with two stages of rapid exhumation of the western Dabie HP-UHP rocks, respectively. The UHP rocks in the area were exhumed at a rate of 3-4 mm/year from the mantle (about 80-100 km below the Earth's surface at about 240 Ma) to the lower crust (at the depth of about 20-30 km at 220 Ma), and at a rate of 1-2 mm/year to the middle crust (at the depth of about 15 km at 213 Ma), and then at the rate of less than 1 mm/year to the upper crust about 10 km deep at about 204 Ma.

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