

Rapid UHT metamorphism and exhumation of the Lützow-Holm Complex in Antarctica

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The Lützow-Holm Complex in Antarctica is a part of Neoproterozoic-Cambrian (c.650-500 Ma) collisional orogen to form Gondwana supercontinent. It is characterized by progressive metamorphism from upper amphibolite facies in the eastern part of the Prince Olav Coast to upper granulite facies in the southern Sørkysten Coast (e.g., Hiroi et al., 1991). UHT metamorphism is evidenced by such diagnostic mineral assemblages as Opx + Sil + Grt + Rt + Qz and Spr + Qz in Mg-Al-rich pelitic granulites in Rundvågshetta. Intimate intergrowths of Ky + Spr + Grt and Sil + Spr + Grt as well as andalusite-bearing falsite-nanogranite inclusions are included in the same porphyroblastic garnet, which is compositionally zoned, with Mg-rich core, Fe-Mn-rich rim, and core-to-rim oscillation of Ca. Integration of these new data with those previously documented leads to the inference of a rapid change in pressure-temperature conditions during regional UHT metamorphism in this part of the late Neoproterozoic to early Paleozoic 'large and hot orogen'. Several lines of evidence indicate that partial melting and melt extraction took place even in mafic granulites of fragmented gabbro origin.

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