Precambrian kyanite-sillimanite metamorphism in overthrust terranes of the Yenisey Ridge, Siberia

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Based on the results of petrological studies of four complexes in the vicinity of the regional faults of the Yenisey Ridge it can be shown that a Neoproterozoic medium-pressure metamorphism at *c.* 850 Ma overprinted regionally metamorphosed andalusite-bearing rocks of low pressures. The medium-pressure metamorphism was characterized by (1) the development of deformational structures and kyanite-bearing blastomylonites after andalusite-bearing rocks; (2) insignificant observed thickness of the zone of medium-pressure metamorphism (from 2.5 to 6-8 km), which was localized in the vicinity of the overthrusts; (3) a low geothermal gradient during metamorphism (from 1-7 to 12°C/km); and (4) a gradual increase in lithostatic pressure towards the thrust faults. These specific features are typical of collision metamorphism during overthrusting of continental blocks and are evidence of nearly isothermal loading in accordance with the transient emplacement of thrust sheet. The proposed model for tectono-metamorphic evolution of the study areas within a framework of crustal thickening at high thrusting rates and subsequent rapid tectonic exhumation, explain these features associated with this tectonic phenomenon. The data obtained allowed us to consider a medium-pressure rocks as a product of collision metamorphism, which were formed both by thrusting of rock blocks from Siberian craton onto the Yenisey Ridge in the zones of regional deep faults and by opposite movements in the zone of splay faults of higher orders.

Volatiles in the Loki's Castle and Jan Mayen vent fields of the ultra-slow spreading Knipovich and Mohns Ridges

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Hydrothermal fluids from the recently discovered Loki's Castle vent field located at 73°N in the Norwegian-Greenland Sea on the ultra-slow spreading southern Knipovich Ridge have volatile concentrations indicative of a sediment impacted hydrothermal vent system. Large parts of the rift valley floor in this area are covered by a sedimentary sequence several hundred meters thick, which likely influences hydrothermal circulation and certainly impacts fluid compositions. Hydrothermal input from the sediments is indicated by high concentrations of methane, hydrogen, and ammonia at Loki's Castle. Significant concentrations of C2+ hydrocarbons are also present at this site. In contrast, fluids from the Jan Mayen vent field on the Mohns Ridge south of the Knipovich Ridge contain volatile concentrations more typical of unsedimented, basalt-hosted mid-ocean ridge systems. Namely, high concentrations of carbon dioxide and low concentrations of methane and hydrogen. Fluid compositions from these two disparate systems will be discussed and put into the global context of sediment-impacted and sediment-free hydrothermal fluids.