



Discovery of Paleozoic Fe-Mg carpholite in Motalafjella, Svalbard Caledonides: A milestone for subduction zone gradients

P. Agard (1), L. Labrousse (1), S. Elvevold (2), C. Lepvrier (1)

(1) Laboratoire de Tectonique, UMR 7072, Université Paris 6, France, (2) Norwegian Polar Institute, Norway (philippe.agard@lgs.jussieu.fr)

Paleozoic blueschist facies rocks are relatively scarce on Earth due to warmer geothermal gradients at that time and/or later reequilibration. Fe-Mg carpholite, the typical low-temperature blueschist facies index mineral in metapelites, was discovered only thirty years ago and is known only in Tethyan belts metamorphosed less than 80 m.y. ago. We here report the discovery of Paleozoic Fe-Mg carpholite in the ca. 470 Ma blueschists of Motalafjella, Svalbard Caledonides, which is the oldest known occurrence on Earth. The carpholite-bearing rocks reached $P - T$ conditions of 15–16 kbar and 380–400 °C and followed a nearly isothermal exhumation path. In the cooling earth perspective, these $P - T$ estimates for Motalafjella blueschists demonstrate the existence of cold subduction zone gradients (~ 7 °C/km) from the Middle Paleozoic onwards.