



Phase-equilibrium modelling of blueschists from the Vestgötabreen Complex (SW Svalbard)

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In Svalbard Archipelago, blueschists are known from Motalafjella area (Oscar II Land). They belong to the Vestgötabreen Complex, which is divided into a Lower (LU) and Upper Unit (UU). The former is composed of high pressure-low temperature (HP-LT) metasediments. The latter consists mainly of blueschists and eclogites. Various radiometric dating yielded an age of c. 470 Ma for the HP-LT metamorphism in the Motalafjella area. The pressure-temperature (P-T) conditions for carpholite-bearing schists from LU have been estimated to c. 16 kbar and 330-450°C (Agard et al., 2005), whereas eclogites from UU indicate peak conditions of 18-24 kbar and 580-640°C (Hirajima et al., 1988). During the fieldwork in 2011, blueschists were also discovered at the western coast of Nordenskiöld Land. They form isolated bodies enclosed within metasedimentary units, but their tectonic position is still under debate. Preliminary P-T estimates indicate peak pressure conditions of c. 17 kbar and 480°C (Kościńska et al., in revision). The age of metamorphism is unknown, however P-T conditions as well as metamorphic assemblage suggest that the blueschists from Nordenskiöld Land may be an equivalent of these in the Vestgötabreen Complex.

Samples of blueschists from UU have been collected on Skipperryggen. They consist mainly of glaucophane, garnet, white micas (phengite and paragonite), rutile, lawsonite and chlorite. The garnet typically forms euhedral to subhedral porphyroblasts which contain voluminous inclusions. Its composition varies from Alm63Prp13GrS22Sps2 in the cores to Alm60Prp19GrS20Sps1 in the rims. The change in chemical zoning is rather gradual. The garnet shows bowl-shaped pyrope profiles and opposite almandine trends. The P-T conditions were estimated using phase equilibrium modeling. Preliminary modeling in the NCKFMmASHTO system yields peak pressure conditions at c. 20 kbar and 520°C.

The estimated P-T conditions for the blueschists from Skipperryggen are in agreement with previous studies on the Vestgötabreen Complex and with the results from the Nordenskiöld Land blueschists. More regionally, these HP-LT lithologies may be correlated with the ophiolitic sequence in the Pearya Terrane of northern Ellesmere Island. Detailed tectonic, petrological and geochronological studies are in progress. This project is partially financed by AGH research project No 11.11.140.319 and partially by Swedish Polar Research Secretariat - NOA Svalbard program.

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