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High pressure assemblages from the Lower Unit of the Vestgötabreen Complex, Oscar II Land, Svalbard's Caledonides

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Even though the high pressure – low temperature (HP-LT) metamorphism on Svalbard has been documented already in 1960' in its type locality on Oscar II Land, still little is known about the metamorphic history of these HP-LT lithologies. The Vestgötabreen Complex is divided into two units based on relative differences in lithological assemblage and metamorphic grade. The Lower Unit consists mainly of phyllites with lenses of dolomite, quartzite, metabasite and serpentinite, whereas the Upper Unit comprises blocks of blueschist, eclogite, and lenses of marble surrounded by garnet-mica schist (Ohta et al. 1986).
The suite of HP-LT lithologies from the Lower Unit was collected during the summer 2018 from three areas: 1) an unnamed peak, further called here as "Anticline" mountain, 2) Skipperryggen, and 3) Motalafjella. The collected rocks are composed of sodic amphibole, white mica, epidote, chlorite and minor rutile. Mica, defining the S1 foliation, is phengitic in composition and characterized by high Si content ranging from 3.39 to 3.48 apfu. Sodic amphibole is classified as glaucophane with Na content increasing from the core (1.76 apfu) to the rim (1.86 apfu). The rim of glaucophane is partly replaced by late actinolite. Two generations of chlorite have been identified. Chlorite-I forms flakes inside glaucophane and chlorite-II overgrowths Na-amphibole and mica. Rutile is partly replaced by titanite. The studied samples represent the HP-LT rocks which were formed under lower blueschist facies conditions (M1) and overprinted by greenschist facies assemblages (M2). The latter is demonstrated by growth of chlorite-II, actinolite and titanite.
Our preliminary observations confirm that the Lower Unit was metamorphosed along a very low temperature gradient as previously proposed by Agard et al. (2005). The main future focus of this study is to reconstruct detailed pressure-temperature evolutionary path of this unique unit, characterize geochemically protoliths of especially metabasites and calculate subduction-exhumation rates.

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