



The Pinkie Unit of the Southwestern Svalbard Caledonian Province and its bearing on distribution of the Torellian-Timanian basement in the High Arctic

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Here we present for the first time petrological characteristics of metapelites from the Pinkie Unit (Prins Karls Forland, western Svalbard). Rocks belonging to the Pinkie Unit are represented mainly by laminated quartzites, siliciclastic rocks (sometimes with garnet) and garnet-bearing mica schists. They are overthrust by the lower grade lithologies of the Grampian Group. The mineral composition confirmed by preliminary microscopic observations suggests that the Pinkie rocks were subjected to at least amphibolite facies metamorphism. The metamorphic zoning from chloritoid through staurolite, up to kyanite zone is apparent. This indicates Barrovian type metamorphism. The rocks are strongly deformed, M1 assemblages and D1 structures are overprinted by pervasive D2 mylonitic pattern.

This study is focused on kyanite-bearing schists. They consist mainly of garnet, plagioclase, biotite, muscovite, kyanite, quartz and tourmaline. Garnet forms anhedral crystals. Its chemical composition is characterized by Alm₇₉₋₈₄Sps₁₋₅Prp₅₋₁₁Grs₅₋₁₀. The profiles through the garnets are almost flat and they seem to be homogenized most probably during peak temperature at an early stage of retrogression. The Si content in muscovite varies from 3.06 to 3.13. Biotite is characterized by X_{Fe} in the range of 0.53 – 0.66. The garnet-biotite-muscovite-plagioclase (GBPM) geothermobarometer (Holdaway, 2001; Wu, 2014) has been used for estimation of pressure – temperature conditions. Preliminary calculations indicate peak metamorphic conditions at 8 - 9 kbar and 650 - 700°C.

Our P-T calculations provide further evidence for the Barrovian type of metamorphism along the western coast of Svalbard. The correlation of the Pinkie Unit with other higher grade complexes within Southwestern Svalbard Caledonian Province is still difficult, but the studied rocks resemble the Isbjørnhamna Group of Wedel Jarlsberg Land. This is based on the metamorphic grade, mineral assemblage and probable protolith age (post-950Ma; Kościńska, unpublished data). If this is a case, the Pinkie Unit will provide another evidence of the Torellian-Timanian (late Neoproterozoic, e.g. Majka et al. 2008) tectonothermal event within the Svalbard's Caledonides. In turn, it can bear important implications for Arctic tectonic reconstructions.

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