

COSC-2 and its well-preserved Lower Palaeozoic sedimentary succession – an unexpected treasure beneath the Caledonian nappes

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The COSC (Collisional Orogeny in the Scandinavian Caledonides) project focuses on processes related to the closure of the Iapetus Ocean causing the Ordovician-Silurian continent–continent collision between Baltica and Laurentia. The rock succession in the second drill core (COSC 2) from the Jämtland County, central Sweden, provides the base for a detailed sedimentological, stratigraphic, geophysical, geochemical, geothermal and structural studies. The basement, comprising a 1.66–1.65 Ga Transscandinavian Igneous Belt (TIB) porphyries intruded by 1.47 Ga and 1.27–1.26 Ga mafic dykes and sills, is heavily weathered towards the top. Here it grades into typical saprock and saprolite (including an immature soil reflecting the Sub-Cambrian peneplain). The overlying sedimentary sequence starts with basal conglomerates and heterogeneous sediments

with shell fragments, indicating a Lower Cambrian rather than a Neoproterozoic age for a marine transgression in the area. The developing early Cambrian basin was rapidly filled, initially by mostly coarse-grained sediment gravity flows. These strata are covered by sandstone turbidites that show an upward transition into the Alum Shale Formation representing a tectonically more quiet period (Middle Cambrian/Maolingian through Lower Ordovician/Tremadocian). The upper part of the Alum Shale Formation is overlain by a late Early Ordovician turbidite succession. Local sources of sediments below the Alum Shale Formation and the extended time of deposition may indicate continuous sedimentation in a pull-apart basin preserved in a window beneath the Caledonian thrust sheets.

Keywords: Caledonian Orogeny in the Scandinavian Caledonides (COSC), ICDP, Baltica, Cambrian, Ordovician, Sweden.