

Ber. Inst. Erdwiss. K.-F.-Univ. Graz	ISSN 1608-8166	Band 21	Graz 2015
STRATI 2015		Graz, 19 – 23 July 2015	

Lithostratigraphy in low-grade metamorphic rocks – Examples from the Upper Austroalpine Stolzalpe Nappe and Bundschuh Nappe (Eastern Alps/Europe)

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The lower limits of metamorphism around 300° C, respectively the differences and transitions from diagenetic to metamorphic rocks are well approached (Frey, 1986; Arkai et al., 2003; Bucher & Grapes, 2011). More controversy is the terminology of lithostratigraphic units in (low-grade) metamorphic rocks and areas influenced by tectonics. In former works it was suggested to formalize irregular formed, lithologically mixed and structurally complicated rock assemblages as complexes (Murphy & Salvador, 1999; Steininger & Piller, 1999). However, the huge masses of intrusive igneous, metamorphic or mixed nonstratiform rocks need a more detailed subdivision and the lithodemic units proposed by the North American Commission on Stratigraphic Nomenclature (2005) seems to be a proper tool.

Some significant differences between traditional lithostratigraphic and lithodemic units are recognized: a) lithodemic units do not conform to the law of superposition; b) they are penetratively deformed with (highly) complicated structural relations; c) they have lost their primary structure of stratification and position within a stratified sequence through metamorphism or tectonic processes.

In addition, the varying applications of “historically grown” terms (series, zone), terminology (none or not specified use of geographic type localities), as well as the implementation of lithostratigraphic units without lateral extend and mapped areas are difficult to interpret in further improve- and development.

Especially work in polyphase overprinted metavolcanic-metasedimentary areas (sediments, pyroclastics) sometimes interbedded, intruded and interfingered with effusive and intrusive (volcanic) igneous rocks at (sub-) greenschist facies (low-grade metamorphic) conditions is challenging. In Austria such rock assemblages are recognized in several tectonic subunits of the Upper Austroalpine Unit (Koralpe-Wölz, Greywacke zone, Tirolic-Noric and Drauzug-Gurktal nappe systems).

In this contribution we present examples from the Stolzalpe Nappe (Gurktal nappes) and the Bundschuh Nappe. In the Stolzalpe Nappe the subdivision of an Ordovician to Permian succession in lithostratigraphic and lithodemic units is in progress. A challenging problem is the subdivision of rock series which developed from similar precursor material by variable structural and metamorphic overprint. In the Permo-mesozoic cover of the Bundschuh nappe, schists and phyllites have been recently formalized as Bockbühel Lithodeme (Weissenbacher, 2015). The Bockbühel Lithodeme is suggested to be the greenschist-facies metamorphosed equivalent of the diagenetic Partnach beds in the Northern Calcareous Alps of Carnian age.

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