

A lithostratigraphic model for the Western Greywacke Zone and the Innsbruck Quarzphyllite Zone (Eastern Alps, Tirol, Salzburg, Austria)

Huet, Benjamin; Iglseder, Christoph; Schuster, Ralf

Department of Hard Rock Geology, Geological Survey of Austria, Neulinggasse 38, A-1030 Vienna, Austria.

The Western Greywacke Zone (WGZ) and the Innsbruck Quarzphyllite Zone (IQZ) are informal geologic units exposed in the Eastern Alps of Tirol and Salzburg. Depending on the authors, their definitions are based on lithological, stratigraphic and/or tectonic criteria. Both units are dominated by ductile and brittle deformed greenschist facies siliciclastic rocks, often lacking classical stratigraphic constraints. However, several units well characterized through sedimentology, palaeontology and/or geochronology could already be proposed or formally defined. We developed a stratigraphic model for the WGZ and the IQZ on mapsheets Neukirchen am Großvenediger, Kitzbühel and Zell am See, following the North American Stratigraphic Code and combining more than 40 years of geological investigations. First, a tectonic framework was established by identifying Alpine nappe contacts through mapping of deformation gradients, geochronology and petrology. We then formally defined large lithodemic units (complexes or lithodemes) in each nappe. Complexes were eventually subdivided in lithodemes and formations in case (even informal) units already existed or if lithic homogeneity justified it. In the process, we reused names of units that are accepted in the regional literature, provided they did not lead to confusion. The WGZ represents the basal part of the Stauffen-Höllengebirge Nappe and its top is defined by a Permian discordance. It is subdivided in four complexes corresponding to Variscan tectonic units: from top to bottom, the Wildseeloder, Hochhördler, Glemmtal and Uttendorf complexes. The Hochhördler and Uttendorf complexes derive from olisthostromes, which heterogeneity might have been intensified through tectonic processes. The four complexes and their internal subdivisions (e.g. Blasseneck Porphyroid, Löhnersbach Formation, Spielberg Dolomite, ...) are already defined in the explanatory notes of the mapsheet Kitzbühel as well as in "The lithostratigraphic units of the Austrian Stratigraphic Chart" and we follow this nomenclature. The IQZ is made up by (at least) three nappes in the following sequence from top to bottom. The Windau Nappe is built by the Glemmtal and Kreuzjoch complexes as well the Kellerjoch Orthogneiss. The Glemmtal Complex differs from its counterpart in the WGZ by a higher degree of metamorphism. The Kreuzjoch Complex contains monotonous metasedimentary rocks without preserved sedimentary structure and rare carbonate and mafic intercalations. The Kellerjoch Orthogneiss derives from a fine to middle-grained metamorphic granite of Lower-Middle Ordovician age and is mostly found between but also within the Kreuzjoch and Glemmtal complexes. The Wildkogel Nappe is made up by the Trattenbach Complex dominated by polyphase phyllonitic micaschist and quartzite. Therein, the Steinkogel Micaschist characterized by the occurrence of Variscan garnet and/or biotite makes a consistent domain. Additional lithologies are Lower-Middle Ordovician granitic/granodioritic orthogneiss, probably Silurian-Devonian calcite and dolomite marble (Gernkogel Lithodeme) and mafic rocks. The Königsleiten Nappe is made up by the Müllachgeier Lithodeme. It corresponds to interlayered micaschist, quartzite and rare metaconglomerate and is characterized by a single tectono-metamorphic imprint and partly preserved sedimentary structures. Detrital zircon geochronology suggests a Permian to Upper Triassic depositional age.