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Lithotectonic Units as Classification Element in Lithostratigraphy at the Geological Survey of Austria

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Lithostratigraphic (as well as lithodemic and lithogenetic) units within legends of geological maps (as well as sections, stratigraphic charts, 3D-Models, etc.) can be classified by employing many different categories, like stratigraphic age, rock type, occurrence in particular geographical regions, tectonic units or sedimentary cycles. Generally, a mixture of such categories can be observed in most geological/lithostratigraphical maps, reflecting the theoretical framework, concepts and models applied by the authors. Such mixtures of categories appear unproblematic, as long as those maps and their legends remain to be used in printed formats. However problems are quickly arising, when geologic information of maps and legends is to be transferred into (GIS-)databases. This is especially true in areas or countries with a complicated tectonic setting. Therefore a group of geologists at the Geological Survey of Austria developed a hierarchic classification scheme for the “Lithotectonic Units” of Austria (and the relevant neighborhood, in the sense of this very topic). The uppermost hierarchical level discriminates between the “Alpine Orogen”, the “Adriatic Plate”, the “Eurasian Plate”, and “Upper Pliocene to Quaternary Sediments”. The latter item demonstrates, that by definition also certain depositional cycles are regarded as “Lithotectonic Units“, which is also the case for syn- and postorogenic igneous rock-bodies. The “Alpine Orogen”, for example, includes twelve “Superunits”, in particular the “Internal Western Carpathians”, “South Alpine Superunit”, “Meliatric Superunit”, “Austroalpine Superunit”, “Intramontane basins“, “Allochthonous Molasse”, “Penninic Superunit”, “Sub Penninic Superunit”, “Parautochthonous Molasse”, “External Massifs”, “Helvetic Superunit”, and “Cenozoic igneous rocks in the Alpine Orogen”. All these concepts and terms are administrated in an Online-Thesaurus of the Geological Survey of Austria, using the SKOS-RDF ontology data model for machine-readability and semantic web technology (Linked Open Data) (<http://resource.geolba.ac.at/>). Huge efforts have already been invested to visualise the spatial representation of all defined lithotectonic units, stored and structured in a GIS dataset, based on a topographic map of the scale 1:200.000. The multilayer structure of this GIS model allows to display the respective lithotectonic units of all hierarchic levels in variable combinations. Further efforts aim to implement also lithostratigraphic, lithodemic and lithogenetic units successively into the GIS dataset. In addition, for the legends of printed geological maps of the Geological Survey of Austria the concept of “Lithotectonic units” is used as the basic classification scheme since several years. However, for reasons of better readability not all hierarchical levels of the tectonic GIS dataset structure are necessarily reflected in the headline-hierarchy of the printed geological maps.