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The lithostratigraphic units of the Austrian Stratigraphic Chart 2004 (sedimentary successions) – Vol. I – The Paleozoic Era(them)

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In the late 1990's the Austrian Stratigraphic Commission (ASC) started to evaluate the common lithostratigraphic units in Austria with the intention to formalize those which are in accordance with the German/Austrian "Recommendations (guideline) to the use of stratigraphic nomenclature" (STEININGER & PILLER, 1999) and to redefine those which are not. After a series of workshops including also several field trips it became clear that this goal cannot be reached within the next decades. Therefore, in 2002 the ASC decided to compile a chart in which most lithostratigraphic units in use should be depicted in a modern chronostratigraphic/geochronologic frame. During general discussions on the content of the chart it turned out that the current state of knowledge does not allow to include crystalline rocks and, therefore, the content will clearly focus on sedimentary units (also including those with a low grade metamorphism).

At approximately the same time, but slightly ahead, the German Stratigraphic Commission compiled a stratigraphic chart of Germany which was published in 2002 (GERMAN STRATIGRAPHIC COMMISSION, 2002a). To make a comparison between the German and the Austrian charts easier the ASC agreed to use a format for the Austrian chart similar to the German one. The similarity concerns mostly general layout and colour/signature for the rock (facies) types (so far applicable). The chronostratigraphic/geochronologic base for the two charts, however, was different. While the German table is based on a combination and integration of international and national data (GERMAN STRATIGRAPHIC COMMISSION, 2002b), which ended up in a unique time scale, the Austrian chart consistently used the data of "A Geologic Time Scale 2004" (GRADSTEIN et al., 2004) as a reference. The German table also includes a variety of regional stages, characteristics and peculiarities, e.g., for the Paleozoic, Triassic, Jurassic, and Cenozoic. In the Austrian chart only for the Oligocene – Pliocene the regional stages of the Central Paratethys have been added to the international chronostratigraphic classification. The chart is, in fact, a regional (Austrian) lithostratigraphic compilation put into the international chronostratigraphic/geochronologic framework of 2004.

After less than 2 years of intense re-evaluation, discussion and compilation the Austrian Stratigraphic Chart has been finished and published in 2004 (PILLER et al., 2004) including about 660 lithostratigraphic units. The number of the units is not complete due to space. So far possible, the organization of the chart intended to depict these lithostratigaphic units in a geographical arrangement of tectonic units within Austrian territory from west to east. The Paleozoic and Triassic successions have been arranged in a widely consistent manner and time scale. Due to the basic change in the geodynamic evolution of the Eastern Alps a major break in the chart occurs at the Triassic/Jurassic boundary (expressed by a bold horizontal line in the chart). Another basic reorganisation occurs around the Eocene/Oligocene boundary and within the Pleistocene. Due to increasing time resolution the numerical scale changes at the Cretaceous/Paleogene and the Paleogene/Neogene boundaries as well as within the Pleistocene (at 1.01 Ma). A deviant representation has been applied to the Quaternary. Besides few exceptions (e.g., Höttinger Brekzie [Hötting Breccia]) no lithostratigraphic units have been implemented but only sediment bodies and lithologies related to glacial phenomena (e.g., moraines, terraces) were included. This follows the discussion and recommendation in PILLER et al. (2003). To underscore this deviation and point at the glacial events the oxygen-isotope-based temperature curve after RAYMO (1997) has been added for this time interval.

A stratigraphic chart, however, requires explanations and a description of the content. For such a description a variety of possibilities exists including very short notes like for the Stratigraphic Table of Germany 2002 (GERMAN STRATIGRAPHIC COMMISSION, 2002b) or its extended explanatory notes (MENNING & STEININGER, 2005). Since a comprehensive description of the lithostratigraphic units of Austria was published within the Lexique Stratigraphique International and dates back already to 1962 (KÜHN, 1962) the urgent need for an updated and enhanced version was evident. Strong pressure accrued also from the geoscientific community itself. Therefore, the ASC agreed to describe the lithostratigraphic units of the Austrian Stratigraphic Chart 2004 in a detailed way. Although the Austrian Stratigraphic Chart 2004 is in German language it was decided to publish the explanatory notes in English to provide better international access. During several meetings the concept for these descriptions was finalized in 2008. It was agreed that only those lithostratigraphic units have to be described which are also represented in the Austrian Stratigraphic Chart 2004. Exceptions are only necessary where single formations could not be depicted in the Austrian Stratigraphic Chart 2004 due to space limit (e.g., "Eggenburg Group" with several formations in the Burdigalian). Describing new units or formalizing existing units has been excluded. The arrangement of the subchapters should be in accordance with the chart, generally from older to younger and from left to right. Several lithostratigraphic units, however, occur repeatedly in different positions

in the chart and many of them cross chronostratigraphic boundaries. These units will be described only once with respective cross references. For each chapter a comprehensive introductory text has to be presented addressing general aspects.

The description of the lithostratigraphic units has to follow a fixed scheme. The name of the unit has to appear in identical wording and spelling as in the chart followed by an English version of this name. The authorship for the description of each unit has to be explicitly stated. Within the text the English version of unit names has to be used. A fixed number and sequence of characteristics for each lithostratigraphic unit has been developed following the recommendations of STEININGER & PILLER (1999) and the first applications by RASSER & PILLER (1999). The final version of this concept has been developed by Hans-Georg Krenmayr (Geological Survey of Austria) and Michael Wagreich (University of Vienna) together with the author. This list for each unit includes the following characteristics: Validity, Type area, Type section, Reference section(s), Remarks (concerning the type area, type section and reference sections), Derivation of name, Synonyms, Lithology, Fossils, Origin, Facies, Chronostratigraphic age, Biostratigraphy, Thickness, Lithostratigraphically higher rank unit, Lithostratigraphic subdivision, Underlying units, Overlying units, Lateral units, Geographic distribution, Remarks and Complementary references. For the locations of Type area, Type section and Reference section(s) international geographical coordinates (latitude, longitude) have to be provided. For map references both the international UTM-system and the old Austrian BMN-system with numbers and names of map-sheets have to be indicated since the numbers and names do not coincide in both systems.

Originally, a single volume for the entire explanatory notes was planned. However, during compilation it became clear that for some time intervals compilation was faster than for others and also the volume would become bulky when all c. 660 lithostratigraphic units will be included. Fortunately, the Geological Survey of Austria agreed to split the explanatory notes into three volumes according to the three era(them)s – Paleozoic, Mesozoic and Cenozoic – and to publish each of them as a separate volume in the "Abhandlungen der Geologischen Bundesanstalt". In addition, the respective part of the Austrian Stratigraphic Chart 2004 will be added to each volume as an attachment. This extracted part is identical with those in the chart 2004 but the unit names are in English according to the names in the description. Only formal errors (such as wrong calculations of numerical ages or some typographical errors) have been corrected in the added English version.

Acknowledgements

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Remark on the 2nd edition of "The lithostratigraphic units of the Austrian Stratigraphic Chart 2004 (sedimentary successions). Vol. I: The Paleozoic Era(them)"

The 1st edition of "The lithostratigraphic units of the Austrian Stratigraphic Chart 2004 (sedimentary successions). Vol. I: The Paleozoic Era(them)" has been published in 2013 in Abhandlungen der Geologischen Bundesanstalt, Band 66. Unfortunately one of the co-authors, Kathleen Histon, wanted her co-authorship eliminated and insisted to stop further delivery of this volume. This incident evoked publication of a 2nd edition. In this 2nd edition, published 2014, the entire content of the volume is identical with the 1st edition (2013), only the name of Kathleen Histon as a co-author has been obliterated as requested.

Werner E. Piller, editor
Graz, January 2014

Austrian Stratigraphic Chart 2004 - Paleozoic

(sedimentary successions)

Austrian Stratigraphic Commission

ASC

Legend

- pelagic, offshore, siliciclastic
- pelagic, nearshore, calcareous
- shallow marin, neritic
- terrestrial-continental, coarse clastic
- terrestrial-continental, fine clastic
- evaporite (chloride, sulphate)
- rhyolite, dacite
- (basaltic) andesite, trachyandesite
- basalt
- phyllite
- mixed-facies (in corresponding colors)
- ● coal (may include several seams)
- ? position/age doubtful/controversial
- equal units
- \ older unit left \ younger unit right
- hiatus
- unconformity
- ● GSSP

Fm. Formation

Ls. Limestone

Cutout and English adaptation of the "Die Stratigraphische Tabelle von Österreich 2004": Geological Survey of Austria

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