

Remarks: This formation is characterized by the occasional occurrences of big colonial rugose *Argutastrea* corals (LIAO & HUBMANN, 2006).

Complementary references: HUBMANN & MESSNER (2007).

Fahrneck-Formation / Fahrneck Formation

BERNHARD HUBMANN

Validity: Valid; first description and formalization by EBNER (1998: p. 128–129).

Type area: ÖK50-UTM, map sheet 4222 Leoben (ÖK50-BMN, map sheet 163 Voitsberg).

Type section: Due to bad outcrops no type section published so far; according to EBNER (1998) outcrops are in the area around the farmstead “Reicherhöhe” (at altitude 999 m) north of Übelbach (30 km northwest of Graz) on ÖK50-UTM, map sheet 4222 Leoben (ÖK50-BMN, map sheet 163 Voitsberg) (N 47°25'34" / E 15°26'45").

Reference section(s): See above.

Derivation of name: After Fahrneck near Übelbach, approximately 40 km northwest of Graz.

Synonyms: Kalkschiefer im allgemeinen (WAAGEN, 1937).

Lithology: Alternating sequence of grey-blue limestones, flaser limestones, argillaceous shales and greenstones.

Fossils: Conodonts.

Origin, facies: Open marine environment?

Chronostratigraphic age: Frasnian–Famennian.

Biostratigraphy: Conodonts indicate do I and do II (= *Manticoceras* and *Cheiloceras* ammonite zones) according to TSCHLAUT (1985).

Thickness: About 60–80 m.

Lithostratigraphically higher rank unit: Lantsch Group.

Lithostratigraphic subdivision: -

Underlying unit(s): Rotmüller Formation.

Overlying unit(s): -

Lateral unit(s): -

Geographic distribution: Styria, highland in the surroundings of Graz; ÖK50-BMN, map sheet 134 Passail.

Remarks: TSCHLAUT (1985) supposed an affiliation of this succession to the Hochlantsch Nappe due to the existence of Middle to Upper Devonian volcanoclastic sediments within the formation.

Complementary references: FLÜGEL (2000).

Hochlantsch-Formation / Hochlantsch Formation

BERNHARD HUBMANN

Validity: Valid; first description by CLAR (1874: “Hochlantschkalk” Sic! typological error); formalized by FLÜGEL (2000: p. 35; Hochlantschkalk-Formation); change of name into Hochlantsch-Formation by EBNER et al. (2001).

Type area: ÖK50-UTM, map sheet 4223 Weiz (ÖK50-BMN, map sheet 134 Passail).

Type section: At the Hochlantsch, a mountain 40 km north of Graz (N 47°21'46" / E 15°25'28").

Reference section(s): -

Derivation of name: After Hochlantsch (1,720 m), a mountain approximately 40 km north of Graz.

Synonyms: Hochlantsch-Kalk (H. FLÜGEL, 1975); Hochlantschkalk (FLÜGEL & NEUBAUER, 1984); partly: Quadrigemminum-Kalk (PENECKE, 1890); Stringocephalenschichten (HERITSCH, 1906).

Lithology: Massive and bedded grey-blue limestones with rare fossils.

Fossils: Rugose and tabulate corals, stromatoporoids, conodonts.

Origin, facies: Lagoonal environment with some patch reefs.

Chronostratigraphic age: Givetian–Frasnian (? lower Famennian)

Biostratigraphy: Conodonts indicate upper Givetian to “do I and do II/III” (= *Manticoceras* and *Cheiloceras/Platyclymenia* ammonoid zones) according to GOLLNER & ZIER (1985: p. 52).

Thickness: Variable in thickness; up to 800 m.

Lithostratigraphically higher rank unit: Lantsch Group.

Lithostratigraphic subdivision: -

Underlying unit(s): Tyrnaueralm Formation.

Overlying unit(s): Steinberg Formation.

Lateral unit(s): Tyrnaueralm Formation, Zachenspitze Formation.

Geographic distribution: Styria, highland in the surroundings of Graz; ÖK50-BMN, map sheet 134 Passail.

Remarks: -

Complementary references: HUBMANN & MESSNER (2007).

Steinberg-Formation / Steinberg Formation

BERNHARD HUBMANN

Validity: Valid; first entry by ROLLE (1856: “Steinberger Kalke”); formalized by FLÜGEL (2000: p. 28) as Steinbergkalk-Formation; change of name into Steinberg-Formation by EBNER et al. (2000).

Type area: ÖK50-UTM, map sheet 4228 Voitsberg (ÖK50-BMN, map sheet 163 Voitsberg).

Type section: At the type region at Forstkogel north of village Steinberg, 15 km west of Graz (ÖK50-BMN, map sheet 163 Voitsberg) (N 47°04'14" / E 15°19'28"), FLÜGEL & ZIEGLER (1957) described a section on the southern slope of Forstkogel. BUCHROITHNER et al. (1979) studied five sections in that area, but due to bad outcrop situation and the fact of “considerable fluctuation of zone thickness”, they considered a type profile inappropriate.

Reference section(s): BUCHROITHNER et al. (1979) mentioned five sections at Forstkogel; further reference sections are west of Gratwein 17 km northwest of Graz at Weihermühle (N 47°07'51" / E 15°18'22") and Gratwein-Au (N 47°08'31" / E 15°19'13") (EBNER, 1980).

Remarks: Some sections in eastern parts of the Rannach Nappe feature stratigraphic gaps especially in their upper parts (BUCHROITHNER et al., 1979; EBNER, 1980; EBNER et al., 1980a, b).

Derivation of name: After the village Steinberg, 15 km west of Graz.

Synonyms: Steinbergkalk (H. FLÜGEL, 1975; BUCHROITHNER et al., 1979; EBNER, 1980; EBNER et al., 1980a, b; FLÜGEL & NEUBAUER, 1984); partly: Clymenienkalk (PETERS,

1867; VACEK, 1907); Kramenzelkalk (HERITSCH, 1917b), Manticoceraskalk (HERITSCH, 1927c), Kalkschiefer der Rannachwiese (CLAR, 1933), Oberdevonische Flaserkalke (KUNTSCHNIG, 1937), Bunte Flaserkalke (SCHÄFER, 1937), oberer Clymenienkalk (WAAGEN, 1937).

Lithology: Monotonous, well-bedded flaser limestones of variable colors.

Fossils: Conodonts and rare macrofossils (goniatites and clymeniids; solitary rugose corals).

Origin, facies: Depositions of a deeper shelf margin.

Chronostratigraphic age: Frasnian–Famennian (also may contain uppermost Givetian).

Biostratigraphy: *asymmetricus* to *praesulcata* conodont zones.

Thickness: Approximately 70 m.

Lithostratigraphically higher rank unit: Rannach Group.

Lithostratigraphic subdivision: FLÜGEL (2000) affiliates the “Flaserkalke des Höllerer-Kogel” of EBNER et al. (1979, 1980a) as a member to the Steinberg Formation. The Höllerkogel member comprises 20 to 30 m thick thin-bedded, yellow micritic flaser limestones that are developed at the base of the formation.

Underlying unit(s): Kollerkogel Formation, Hochlantsch Formation (conformable contact).

Overlying unit(s): Sanzenkogel Formation.

Lateral unit(s): Hochlantsch Formation.

Geographic distribution: Styria, highland in the surroundings of Graz; ÖK50-BMN, map sheets 134 Passail, 163 Voitsberg, and 164 Graz.

Remarks: -

Complementary references: EBNER (1978a), SURENIAN (1978), EBNER & HUBMANN (2012).

Sanzenkogel-Formation / Sanzenkogel Formation

BERNHARD HUBMANN

Validity: Valid; first description by NÖSSING (1975: Sanzenkogel-Schichten); formalized by FLÜGEL (2000: p. 29; Sanzenkogel-Formation).

Type area: ÖK50-UTM, map sheet 4228 Voitsberg (ÖK50-BMN, map sheet 163 Voitsberg).

Type section: At Sanzenkogel west of village Steinberg, 15 km west of Graz (ÖK50-BMN, map sheet 163 Voitsberg) (N 47°04'07" / E 15°19'18"); the type section is now within the abandoned quarry “Trolp” (NÖSSING, 1975).

Reference section(s): Eichkogel at Rein (NÖSSING et al., 1977) (N 47°07'17" / E 15°16'22") and section “Hartbauer” (N 47°07'22" / E 15°21'58") southeast of Gratkorn (EBNER et al., 1980b).

Derivation of name: After the hill Sanzenkogel 15 km west of Graz.

Synonyms: Partly: Clymenienkalk (PETERS, 1867; VACEK, 1907); Kramenzelkalk (HERITSCH, 1917b); Manticoceraskalk (HERITSCH, 1927c); Kalkschiefer der Rannachwiese (CLAR, 1933); Oberdevonische Flaserkalke (KUNTSCHNIG, 1937); Bunte Flaserkalke (SCHÄFER, 1937); oberer Clymenienkalk (WAAGEN, 1937); *Gnathodus*-Kalk (FLÜGEL & ZIEGLER, 1957); Steinberg-Kalk (H. FLÜGEL, 1975).

Lithology: Monotonous, well-bedded flaser limestones of variable colors, mostly greyish; lydites.

Fossils: Conodonts.

Origin, facies: Depositions of a deeper shelf margin.

Chronostratigraphic age: Tournaisian–Serpukhovian.

Biostratigraphy: *sulcata* to *bilineatus bollandensis* conodont zones.

Thickness: Up to 35 m.

Lithostratigraphically higher rank unit: Forstkogel Group.

Lithostratigraphic subdivision: Within the Sanzenkogel Formation FLÜGEL (2000) distinguished two beds, Hart Bed and Trolp Bed.

Hart Bed: Well-bedded grey-yellowish lydites; variable in thickness (half a meter to 2 meters).

Trolp Bed: Dark grey marly limestones with phosphoritic nodules (diameters up to 5 cm); about 20 cm in thickness.

Underlying unit(s): Steinberg Formation.

Overlying unit(s): Höchkogel Formation.

Lateral unit(s): -

Geographic distribution: Styria, highland in the surroundings of Graz; ÖK50-BMN, map sheets 163 Voitsberg, 164 Graz.

Remarks: Distinguishing lithological features between rocks of the Sanzenkogel Formation and the underlying Steinberg Formation are rather meagre. Furthermore, the subdivision of a “lower Sanzenkogel Formation” with its type section at Sanzenkogel (abandoned quarry “Trolp”; see NÖSSING, 1975) and the “upper Sanzenkogel Formation” (FLÜGEL, 2000) with its type section at the roadcut “Hartbauer” (see EBNER, 1978a) is only a biostratigraphic not a lithostratigraphic one.

Complementary references: BOŠIČ (1998), EBNER & HUBMANN (2012).

Dornerkogel-Formation / Dornerkogel Formation

BERNHARD HUBMANN

Validity: Valid; first description by SY (1957: “Sandsteine des Dorner-Kogels”); formalization by FLÜGEL (2000: p. 13; Dornerkogel-Formation).

Type area: ÖK50-UTM, map sheet 4223 Weiz (ÖK50-BMN, map sheet 134 Passail).

Type section: No type section defined, but FLÜGEL (2000) proposed a type region at Dornerkogel, a mountain near St. Erhard (Breitenau), ÖK50-BMN, map sheet 134 Passail (N 47°21'11" / E 15°22'58").

Reference section(s): -

Derivation of name: After the mountain Dornerkogel (1,336 m) north St. Erhard (Breitenau), approx. 60 km north of Graz.

Synonyms: Sandsteine des Dorner-Kogels (SY, 1957); Dornerkogel-Folge (H. FLÜGEL, 1975); Dornerkogelfolge (FLÜGEL & NEUBAUER, 1984); partly: Karbon der Breitenau (FLÜGEL, 1953a).

Lithology: Greenish-grey arkoses, greywackes and sandstones.

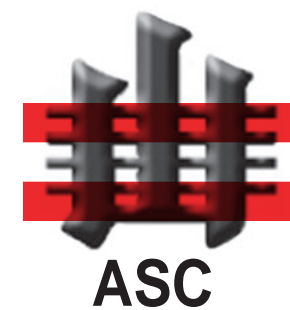
Fossils: Undeterminable fragmental plant remains.

Origin, facies: Shallow marine environment.

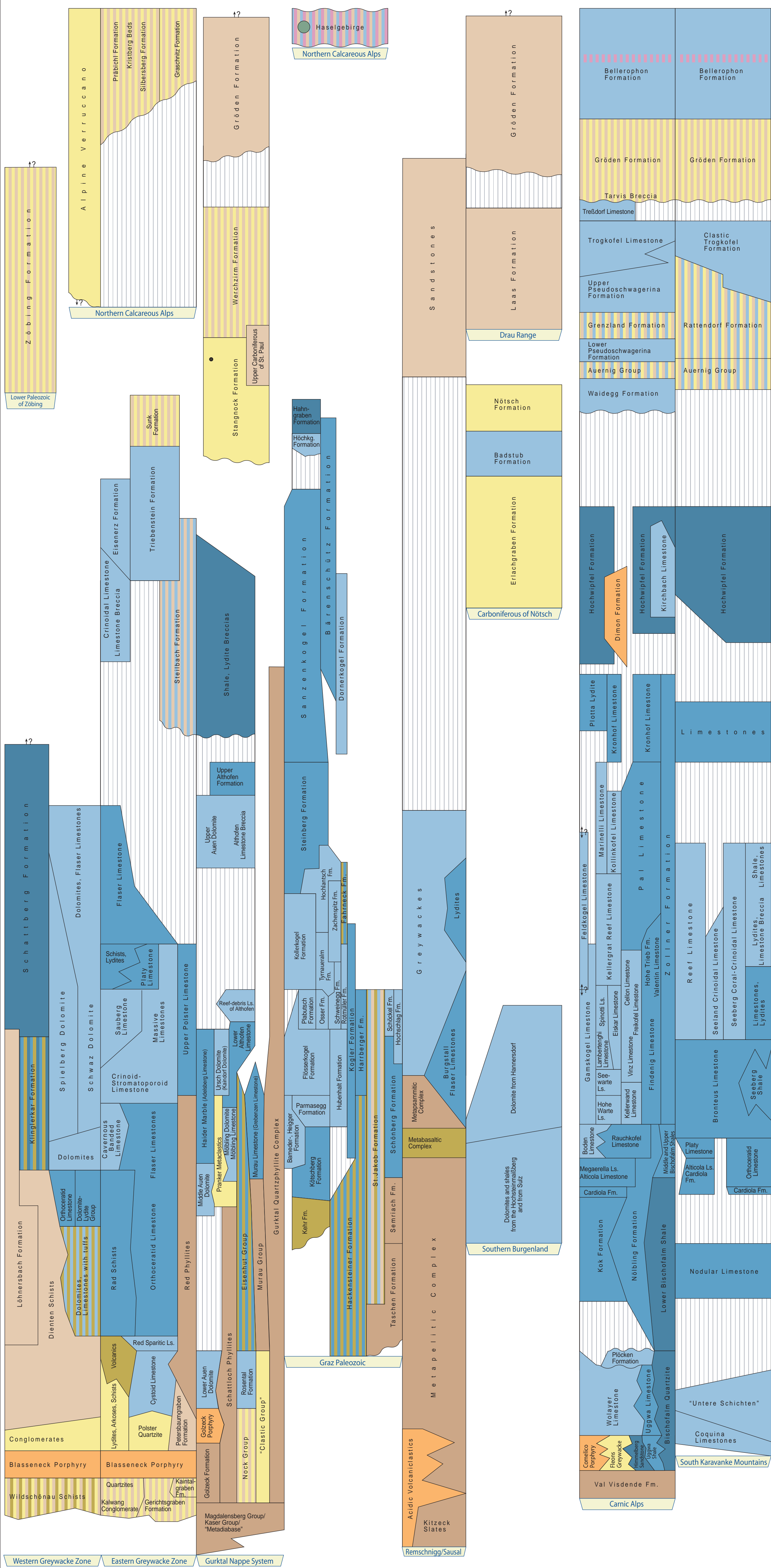
Austrian Stratigraphic Chart 2004 - Paleozoic

(sedimentary successions)

Austrian Stratigraphic Commission



ERA	SYSTEM / PERIOD / SERIES / EPOCH	STAGE / AGE	DURATION Ma	Global Classification					
				ERATHM / ERA	SYSTEM / PERIOD / SERIES / EPOCH				
PALEOZOIC	PERMIAN	CHANGHSINGIAN / Dorashanian	251	PERMIAN	MID PERMIAN / GUADALUPIAN / LOPINGIAN				
		WUCHIAPINGIAN / Dzhulfian	255						
		CAPITANIAN	260						
		WORDIAN	265						
		ROADIAN	270						
		PERMIAN	LOWER PERMIAN / CISURALIAN			KUNGURIAN	275		
						ARTINSKIAN	280		
						SAKMARIAN	285		
						ASSELIAN	290		
		PERMIAN	UPPER PERMIAN / CARBONIFEROUS / PENNSYLVANIAN			GZHELIAN	295	PERMIAN	LOWER PERMIAN / CISURALIAN
KASIMOVIAN	300								
MOSKOVIAN	305								
BASHKIRIAN	310								
PERMIAN	UPPER PERMIAN / CARBONIFEROUS / PENNSYLVANIAN			SERPUKHOVIAN	315				
				VISEAN	320				
					325				
PERMIAN	LOWER PERMIAN / MISSISSIPPIAN			TOURNAISIAN	330	PERMIAN	LOWER PERMIAN / MISSISSIPPIAN		
				335					
				340					
		345							
		350							
		355							
		359.2							
		365							
		370							
		375							
PERMIAN	UPPER DEVONIAN	FAMENNIAN	380	PERMIAN	UPPER DEVONIAN				
		FRASNIAN	385						
		GIVETIAN	390						
		EIFELIAN	395						
		DEVONIAN	LOWER DEVONIAN			EMSIAN	400		
						405			
		DEVONIAN	LOWER DEVONIAN			PRAGIAN	410		
						415			
		PERMIAN	LOWER DEVONIAN			LOCHKOVIAN	420	PERMIAN	LOWER DEVONIAN
						425			
430									
435									
440									
443.7									
445									
450									
455									
460									
PERMIAN	UPPER ORDOVICIAN	LUDFORDIAN / GORSTIAN	465	PERMIAN	UPPER ORDOVICIAN				
		HOMERIAN / SHEINWOOD	470						
		TELYCHIAN	475						
		AERONIAN	480						
		RHUDDANIAN	485						
		HIRNANTIAN	490						
		495							
		498.3							
		500							
		505							
PERMIAN	MIDDLE ORDOVICIAN	DARRIWILIAN	510	PERMIAN	MIDDLE ORDOVICIAN				
		490							
		495							
		500							
		505							
		510							
		515							
		520							
		525							
		530							
PERMIAN	LOWER ORDOVICIAN	TREMA-DOCIAN	535	PERMIAN	LOWER ORDOVICIAN				
		540							
		545							
		550							
		555							
		560							
		565							
		570							
		575							
		580							
PERMIAN	UPPER CAMBRIAN	PAIBIAN	585	PERMIAN	UPPER CAMBRIAN				
		590							
		595							
		600							
		605							
		610							
		615							
		620							
		625							
		630							
PERMIAN	MIDDLE CAMBRIAN	PAIBIAN	530	PERMIAN	MIDDLE CAMBRIAN				
			535						
			540						
			545						
			550						
			555						
			560						
			565						
			570						
			575						
PERMIAN	LOWER CAMBRIAN	PAIBIAN	580	PERMIAN	LOWER CAMBRIAN				
			585						
			590						
			595						
			600						
			605						
			610						
			615						
			620						
			625						



- 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

© Commission for the Paleontological and Stratigraphical Research of Austria (CPSA) of the Austrian Academy of Sciences and Austrian Stratigraphic Commission

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

The Austrian Stratigraphic Chart 2004 - Paleozoic is a supplement of:
 Hubmann, B., Ebner, F., Ferretti, A., Kido, E., Krainer, K., Neubauer, F., Schönlaub, H.-P. & Suttner, T.J. (2014): The Paleozoic Era (them), 2nd edition. - In: Pillner, W.E. (Ed.): The lithostratigraphic units of the Austrian Stratigraphic Chart 2004 (sedimentary successions) - Vol. 1 - Abhandlungen der Geologischen Bundesanstalt, 66, 9-133, Wien.

Printing: Grasl Druck & Neue Medien GmbH, Bad Vöslau 2014

