

**Derivation of name:** After the hill Flösserkogel northwest of Graz (FLÜGEL, 2000).

**Synonyms:** Quarzit-Dolomit-Stufe (PENECKE, 1894); Dolomit-Sandstein-Folge (Stufe) (HERITSCH, 1917b, c); Dolomitsandstein-Folge (H. FLÜGEL, 1953a, 1961, 1975; FENNINGER & HOLZER, 1978; EBNER et al., 1980a, b).

**Lithology:** Major parts of the succession consist of monotonous light grey late diagenetic dolostones. In some sections in the vicinity of Graz and west of the Pleschkogel various lithotypes in different stratigraphic levels occur: reddish-purple to green volcanoclastics, pure quartz sandstones, marly dolomites, biolaminated and bioclastic dolomites of variable colors.

**Fossils:** Fossils are rare; bad preserved rugose and tabulate corals and stromatoporoids are restricted to few localities. At Admonterkogel and Rannach hill amphiporid mounds (*Amphipora ramosa desquamata*) occur (HUBMANN & SUTTNER, 2007). For faunal list see H. FLÜGEL (1975).

**Origin, facies:** Parts of the successions with biolaminations, fenestrate fabrics and gypsum pseudomorphs are interpreted as tidal flat deposits.

**Chronostratigraphic age:** Pragian to Emsian; locally Eifelian (to Givetian?).

**Biostratigraphy:** -

**Thickness:** 500–1,000 m, local strong variation in thickness.

**Lithostratigraphically higher rank unit:** Rannach Group.

**Lithostratigraphic subdivision:** FENNINGER & HOLZER (1978) distinguished four facial types which were considered as members by FLÜGEL (2000), i.e., Göstinggraben Member, Pfaffenkogel Member, Treffenberg Member and Eichberg Member. Following the conception of FLÜGEL (2000) four further members are to be added: Admonterkogel Member (FLÜGEL, 2000), Pleschkogel Member (EBNER, 1998), Schwarzkogel Member (FLÜGEL, 2000), and Sattler Member (FLÜGEL, 2000). HUBMANN (2003) supplemented the Kehlberg Member.

Admonterkogel Member: Reddish-purple to green volcanoclastics within grey to bluish dolostones; about 50 m (up to 200 m) in thickness.

Eichberg Member: Interbeddings of black dolomitic *Amphipora* float/packstones and platy, sometimes laminated darkgrey dolomites; strong variation in thickness (less than 100 m).

Göstinggraben Member: White to yellow sandy dolomites intercalated with quartzitic silt/sandstones and platy dolomites; probably some 100 m in thickness.

Kehlberg Member: Brown cellular dolomites and shales; probably some 10 m in thickness.

Pfaffenkogel Member: White biolaminated dolomites with birdseye-structures, thick bedded dolomites; up to 200 m in thickness.

Pleschkogel Member: Well bedded dolomites in intercalation with darkblue biotrititic limestones; strong variation in thickness (several tens of meters).

Sattler Member: Darkblue, local biotrititic dolostones with subordinate dolomitic shales and sandstone intercalations; about 500 m in thickness.

Schwarzkogel Member: Massive to platy sand/siltstones with yellow weathering color; probably some 100 m in thickness.

Treffenberg Member: Grey to lightbrown marly dolomites and flaserdolomites; probably up to 100 m in thickness.

**Underlying unit(s):** Parmasegg Formation.

**Overlying unit(s):** Plabutsch Formation.

**Lateral unit(s):** Parmasegg Formation, Plabutsch Formation.

**Geographic distribution:** Styria, highland in the surroundings of Graz.

**Remarks:** -

**Complementary references:** HUBMANN (1993), HUBMANN & MESSNER (2007), EBNER & HUBMANN (2012).

### Plabutsch-Formation / Plabutsch Formation

BERNHARD HUBMANN

**Validity:** Valid; first description by PENECKE (1890: "Horizont des *Heliolites Barrandei*"); formalized by HUBMANN (1993: Barrandeikalk-Formation), FLÜGEL (2000: Barrandeikalk-Formation) and HUBMANN (2003: Plabutsch-Formation).

**Type area:** ÖK50-UTM, map sheet 4229 Graz (ÖK50-BMN, map sheet 164 Graz).

**Type section:** The type section along the forest road (N 47°05'20" / E 15°22'12") at the southern slope of the Frauenkogel (near Thalwinkel) was described by HUBMANN (1992, 1993).

**Reference section(s):** Reference sections within the Rannach Nappe, the Hochlantsch Nappe and the "transitional zone" are named by HUBMANN (1993): the abandoned quarry at Kollerkogel (N 47°03'31" / E 15°22'29") from the Plabutsch-Buchkogel-Range, the section along the road south of St. Pankrazen (N 47°07'56" / E 15°11'04"), and in the Hochlantsch area the section along the forest road to Tyrnaueralm (N 47°20'10" / E 15°25'02") and the abandoned quarry in the vicinity of the hotel "Pierer" at Teichalm.

Remarks: Type area and eponym is the Plabutsch, a hill which supplied in several quarries huge amounts of building material for the city of Graz during the 19<sup>th</sup> century. Today, the ancient quarries are covered by vegetation and no persistent sections are known from that area. The formation occurs in the Rannach Nappe as well as in the Hochlantsch Nappe.

**Derivation of name:** After the hill Plabutsch (754 m) west of Graz (HUBMANN, 2003).

**Synonyms:** During history of investigation the succession has been called "Barrandeikalk" (PENECKE, 1890; derived from a heliolitid coral's species name) for more than 110 years. Attempts to subdivide the formation into a coral-dominated lower part and a brachiopod-rich upper part resulted in a subdivision of "Korallenkalk" and "Pentameruskalk" (HERITSCH, 1935). Both terms and definitions are only applicable in some distinct regions and were therefore dismissed. Other older synonyms: Korallenbank des Plabutsch (PETERS, 1867); Kalk des Gaisberges (Suess, 1868); Corallenkalk (CLAR, 1874); Horizont des *Heliolites Barrandei* (PENECKE, 1890); Barrandeikalk (H.

FLÜGEL, 1961, 1975); Barrandeikalk-Formation (HUBMANN, 1993; FLÜGEL et al., 2011). During evaluation of the conceptual content of the formation and re-definition (HUBMANN, 2003: p. 285–287) the Draxler-Formation (sensu FLÜGEL, 2000: p. 25; equivalent to “unterer Schweineggkalk” of ZIER, 1982) was synonymised with the Plabutsch Formation.

**Lithology:** The succession represents a highly fossiliferous sequence dominated by dark marly bioclastic limestones. In the lower parts, especially at the boundary to the underlying Flösserkogel Formation yellow to brownish shales occasionally blotched with moulds of chonetid brachiopods are characteristic. In the upper parts of the formation intercalations of red marls and marly limestones are common.

**Fossils:** Coral and sponge taxa dominate the diverse fauna. Among tabulate corals most common are thamnoporids (*Thamnopora reticulata*, *Th. vermicularis*, “*Striatopora suessi*”), favositids (*Favosites styriacus*, *F. alpinus*), and heliolitids (*Pachycanalicula barrandei*). The rugose coral fauna is dominated by mostly fractured dendroid (phaceloid) taxa. A frequent and distinctive phillipsastroid taxon is *Thamnophyllum* (*Th. stachei*, *Th. murchisoni*). Stromatoporoids are mostly recrystallized and thus precluding precise determinations (common genera are *Actinostroma* and *Clathrocoilona*). Among brachiopods the thick valved *Zdimir* cf. *hercynicus* may occur in coquina horizons. For faunal list see H. FLÜGEL (1975: p. 44–46).

**Origin, facies:** A deposition on a differentiated and gently inclined carbonate platform of some few (tens) meters is assumed (HUBMANN, 1993). Conspicuous is the rarity of in situ organisms, the intermittently high supply of clayey sediments (marl-limestone intercalations) and high supply of lime mud, temporary influx of high amounts of continental phytoclasts and storm impacts (tempestites) (HUBMANN, 1995).

**Chronostratigraphic age:** Eifelian; locally the sequence may range from Upper Emsian to Lower Givetian (HUBMANN, 1993).

**Biostratigraphy:** -

**Thickness:** 80–100 m, strong variation.

**Lithostratigraphically higher rank unit:** Rannach Group.

**Lithostratigraphic subdivision:** In some sections at the base of the unit less than 5 m thick brownish to yellow marly slates with moulds of chonetid brachiopods are named Gaisberg Bed (FLÜGEL, 2000; HUBMANN & FRITZ, 2004; HUBMANN & MESSNER, 2007).

**Underlying unit(s):** Flösserkogel Formation (conformable contact, transgressive).

**Overlying unit(s):** Kollerkogel Formation (conformable contact).

**Lateral unit(s):** Flösserkogel Formation, Kollerkogel Formation, Tyrnaueralm Formation, Osser Formation.

**Geographic distribution:** Styria, highland in the surroundings of Graz; ÖK50-BMN, map sheets 134 Passail, 162 Köflach, 163 Voitsberg, 164 Graz.

**Remarks:** -

**Complementary references:** EBNER & HUBMANN (2012).

## Osser-Formation / Osser Formation

BERNHARD HUBMANN

**Validity:** Valid; first entry by VACEK (1891: “Osserkalk”); formalized by FLÜGEL (2000: p. 25; Osser-Formation).

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

**Type section:** Not defined, but FLÜGEL (2000) defined the hill Osser (N 47°20'40" / E 15°30'03") north of Passail as type region.

**Reference section(s):** -

**Derivation of name:** After the hill Osser (1,548 m) north of Graz (FLÜGEL, 2000).

**Synonyms:** Partly: Kalkschiefer [Folge] (CLAR, 1874; HERITSCH, 1917c); Flaserkalk (Osserkalk) (CLAR et al., 1929); Kalkschiefer-Stufe im Allgemeinen (WAAGEN, 1937); Kalkschiefer-Folge (H. FLÜGEL, 1961, 1975).

**Lithology:** Bluish platy tectonically stressed flaser limestones and grey dolostones with local intercalations of marly clay/siltstones and sandstones.

**Fossils:** Bad preserved rugose and tabulate corals.

**Origin, facies:** Shallow subtidal environment.

**Chronostratigraphic age:** ?Eifelian.

**Biostratigraphy:** -

**Thickness:** 50–100 m.

**Lithostratigraphically higher rank unit:** Rannach Group (FLÜGEL, 2000, p. 25).

**Lithostratigraphic subdivision:** -

**Underlying unit(s):** Flösserkogel Formation.

**Overlying unit(s):** Tyrnaueralm Formation?

**Lateral unit(s):** Plabutsch Formation?

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

**Remarks:** -

**Complementary references:** STATTEGGER (1984).

## Schweinegg-Formation / Schweinegg Formation

BERNHARD HUBMANN

**Validity:** Valid; first description by ZIER (1982: “oberer Schweineggkalk”); formalized by FLÜGEL (2000: p. 35–36; Schweinegg-Formation).

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

**Type section:** No type section defined, but FLÜGEL (2000) appointed the Schweinegg (= Schweineck, 1,457 m), a hill southwest of Teichalmhütte in the Hochlantsch area as type region (N 47°20'52" / E 15°26'40").

**Reference section(s):** -

**Derivation of name:** After a hill called Schweinegg in the Hochlantsch region, approximately 55 km north of Graz.

**Synonyms:** Oberer Schweineggkalk (ZIER, 1982).

**Lithology:** Dark grey to brown fossiliferous limestones.

**Fossils:** Stromatoporoids, rugose and tabulate corals, crinoids (see ZIER, 1982).

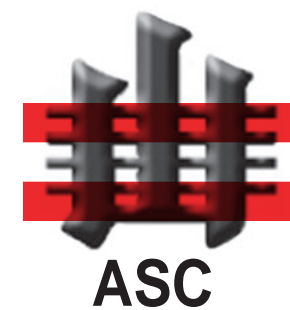
**Origin, facies:** Subtidal depositional environment with minor terrigenous influx.



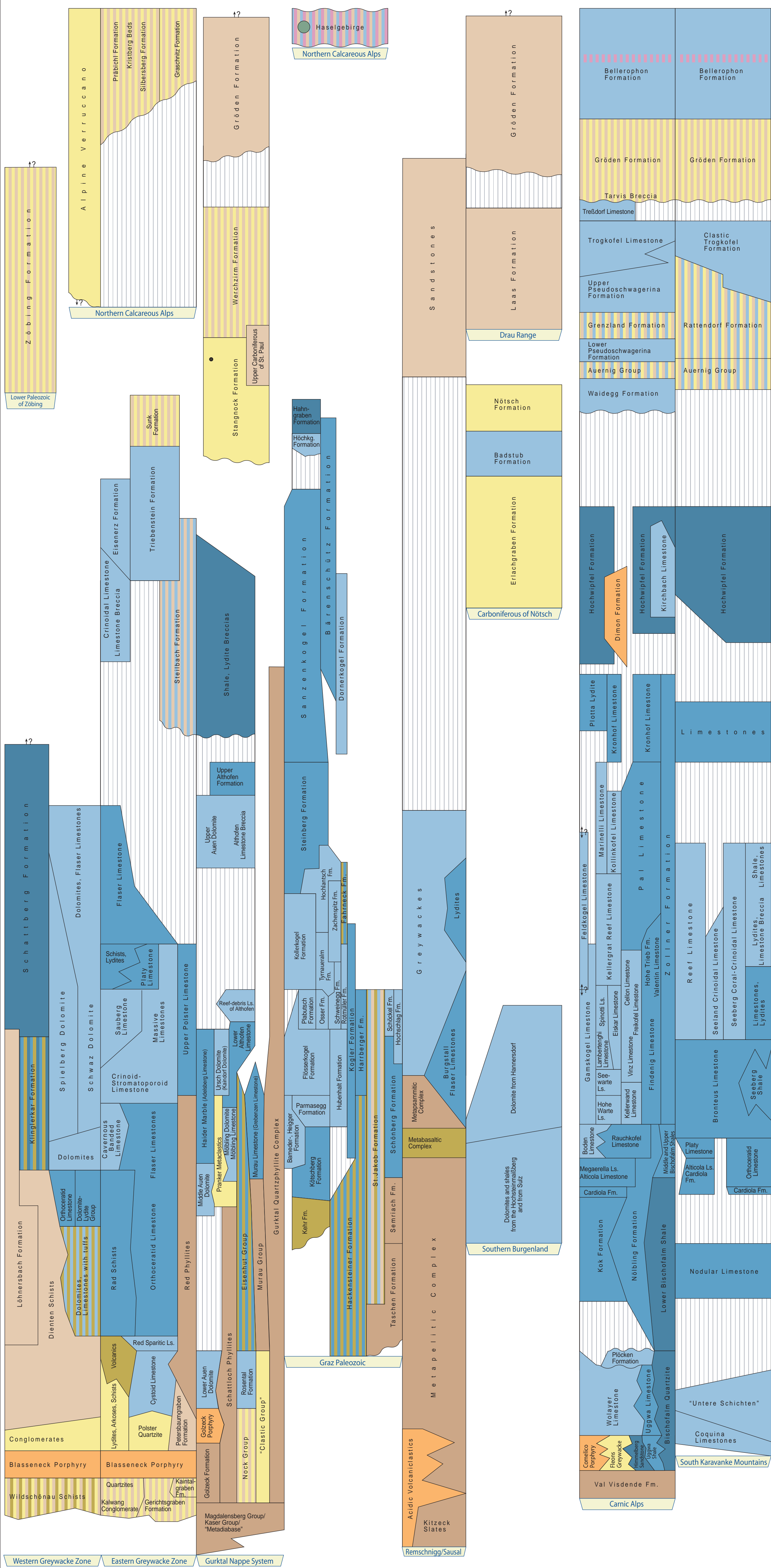
# Austrian Stratigraphic Chart 2004 - Paleozoic

(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 / Dabuffian	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	MIDDLE DEVONIAN			Dalejian	400		
						EMSIAN	405		
		DEVONIAN	LOWER DEVONIAN			Zlichovian	410		
						PRAGIAN	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							
		499							
		500							
PERMIAN	MIDDLE ORDOVICIAN	DARRIWILIAN	505	PERMIAN	MIDDLE ORDOVICIAN				
		510							
		515							
		520							
		525							
		530							
		535							
		540							
		542							
		PERMIAN	LOWER ORDOVICIAN			TREMA-DOCIAN	545	PERMIAN	LOWER ORDOVICIAN
550									
555									
560									
565									
570									
575									
580									
585									
590									
PERMIAN	UPPER CAMBRIAN	PAIBIAN	595	PERMIAN	UPPER CAMBRIAN				
		600							
		605							
		610							
		615							
		620							
		625							
		630							
		635							
		640							
PERMIAN	MIDDLE CAMBRIAN	505	PERMIAN	MIDDLE CAMBRIAN					
		510							
		515							
		520							
		525							
		530							
		535							
		540							
		545							
		550							
PERMIAN	LOWER CAMBRIAN	555	PERMIAN	LOWER CAMBRIAN					
		560							
		565							
		570							
		575							
		580							
		585							
		590							
		595							
		600							



- 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

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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), 2<sup>nd</sup> 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