

**Derivation of name:** After Hubenhalt an area east of Tyrnau, approx. 40 km north of Graz.

**Synonyms:** Kalke und Kalkschiefer der Hubenhalt (PENECKE, 1890); Kalkschiefer der Hubenhalt (CLAR et al., 1929); Schichten der Hubenhalt (H. FLÜGEL, 1975).

**Lithology:** Various platy to slaty limestones and dolomites with sandstone intercalations.

**Fossils:** Conodonts and corals.

**Origin, facies:** Deeper marine environment with restricted water circulation (HUBAUER, 1986).

**Chronostratigraphic age:** Pragian–Emsian.

**Biostratigraphy:** -

**Thickness:** 130–250 m.

**Lithostratigraphically higher rank unit:** Peggau Group (FLÜGEL, 2000).

**Lithostratigraphic subdivision:** HUBAUER (1986) distinguished four formations within the “Kalkschieferformationen” between Tyrnauergraben and Schremsbach (Hochlantsch area, west of Passail basin); FLÜGEL (2000) adopted HUBAUER’s subdivisions but changed their hierarchy into members.

Gscheidberg Member: Brownish, limonitic limestones and subordinate alkaline metatuffs; up to 200 m in thickness.

Hausebner Member: Alternating crinoidal limestones, flaser limestones, marly siltstones and calcareous sandstones, subordinate dolostones and tuffitic shales; thickness up to 250 m.

Heuberg Member: Grey to brown flaser limestones, dolomitic marls and slaty sandstones; about 200 m in thickness.

Sulberg Member: Blue-grey (flaser)limestones, sandstone with frequent intercalations of dolostones and carbonatic sandstones; up to 130 m in thickness.

**Underlying unit(s):** Unknown due to tectonic cut.

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

**Lateral unit(s):** -

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

**Remarks:** -

**Complementary references:** FLÜGEL & HUBAUER (1984).

### Harrberger-Formation / Harrberger Formation

BERNHARD HUBMANN

**Validity:** Valid; first description and formalization by GOLLNER (1981: p. 62; Harrberger-Formation).

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

**Type section:** GOLLNER (1981) published five sections (A–D) at the northern slope of the Hochlantsch in the vicinity of the farmstead “Harrberger” south of Breitenau valley (N 47°22’15” / E 15°26’10”). Section A at altitude 1,015 and 1,230 m was chosen as type section by GOLLNER (1981).

**Reference section(s):** In the vicinity of the farmstead Harrberger GOLLNER (1981) described four reference sections of the formation, section B at 1120 to 1185 m altitude, section C at 1,100 and 1,240 m and section D at

1,135 and 1,200 m; section E is along a forest road at 1,150 m altitude.

**Remarks:** GOLLNER et al. (1982) distinguished three series within the formation which were re-named and considered as members by FLÜGEL (2000).

**Derivation of name:** After the abandoned farmstead Harrberger south of the Breitenau valley, approx. 55 km north of Graz.

**Synonyms:** Partly: Bänderkalk-Kalkschiefer-Zug (CLAR et al., 1929).

**Lithology:** Limestones with tentaculites, argillaceous shales, sandstones, lydites, radiolarites and tuffs.

**Fossils:** Conodonts, tentaculites, radiolarians.

**Origin, facies:** Calm pelagic environment of some 10 to 100 m water depth (GOLLNER, 1981).

**Chronostratigraphic age:** Emsian–Frasnian; not Eifelian as indicated in the ASC 2004.

**Biostratigraphy:** *gronbergi* to *triangularis* conodont zones.

**Thickness:** 70–90 m.

**Lithostratigraphically higher rank unit:** Laufnitzdorf Group (FLÜGEL, 2000).

**Lithostratigraphic subdivision:** -

**Underlying unit(s):** Formations of the Gschwend Nappes (tectonic contact).

**Overlying unit(s):** Formations of the Osser and Hochlantsch Nappe (tectonic contact).

**Lateral unit(s):** -

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

**Remarks:** -

**Complementary references:** GOLLNER & ZIER (1982), FLÜGEL & NEUBAUER (1984).

### Flösserkogel-Formation / Flösserkogel Formation

BERNHARD HUBMANN

**Validity:** Valid; first description by PENECKE (1894: “Quarzit-Dolomit-Stufe”); formalized by FLÜGEL (2000: p. 19; Flösserkogel-Formation).

**Type area:** ÖK50-UTM, map sheets 4223 Weiz, 4228 Voitsberg, 4229 Graz (ÖK50-BMN, map sheets 134 Passail, 162 Köflach, 163 Voitsberg, 164 Graz).

**Type section:** No type section defined; FENNINGER & HOLZER (1978) published several dislocated sections; FLÜGEL (2000) proposed a type region at Flösserkogel (elevation spot 696 m on ÖK50-BMN, map sheet 164 Graz) (N 47°06’15” / E 15°22’06”).

**Reference section(s):** Following sections studied by FENNINGER & HOLZER (1978) may be used for reference: Göstinggraben (N 47°06’01” / E 15°22’49”), Pfaffenkogel (N 47°09’54” / E 15°19’02”) (see also HUBMANN & MESSNER, 2005), Eichberg (N 47°06’54” / E 15°22’47”), and Trefenberg (Treffenkogel, 745 m) (N 47°09’07” / E 15°16’38”).

**Remarks:** This formation covers large areal parts in the Rannach Nappe but lacks good outcrops due to its high weathering capability; in the Hochlantsch Nappe the thickness is reduced due to tectonic amputation.

**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.

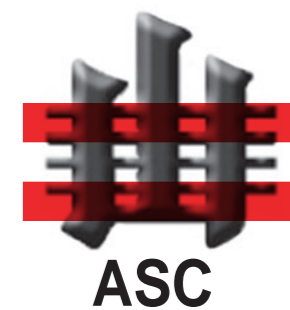
**Derivation of name:** After the hill Plabutsch (754 m) west of Graz (HUBMANN, 2003).

**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.

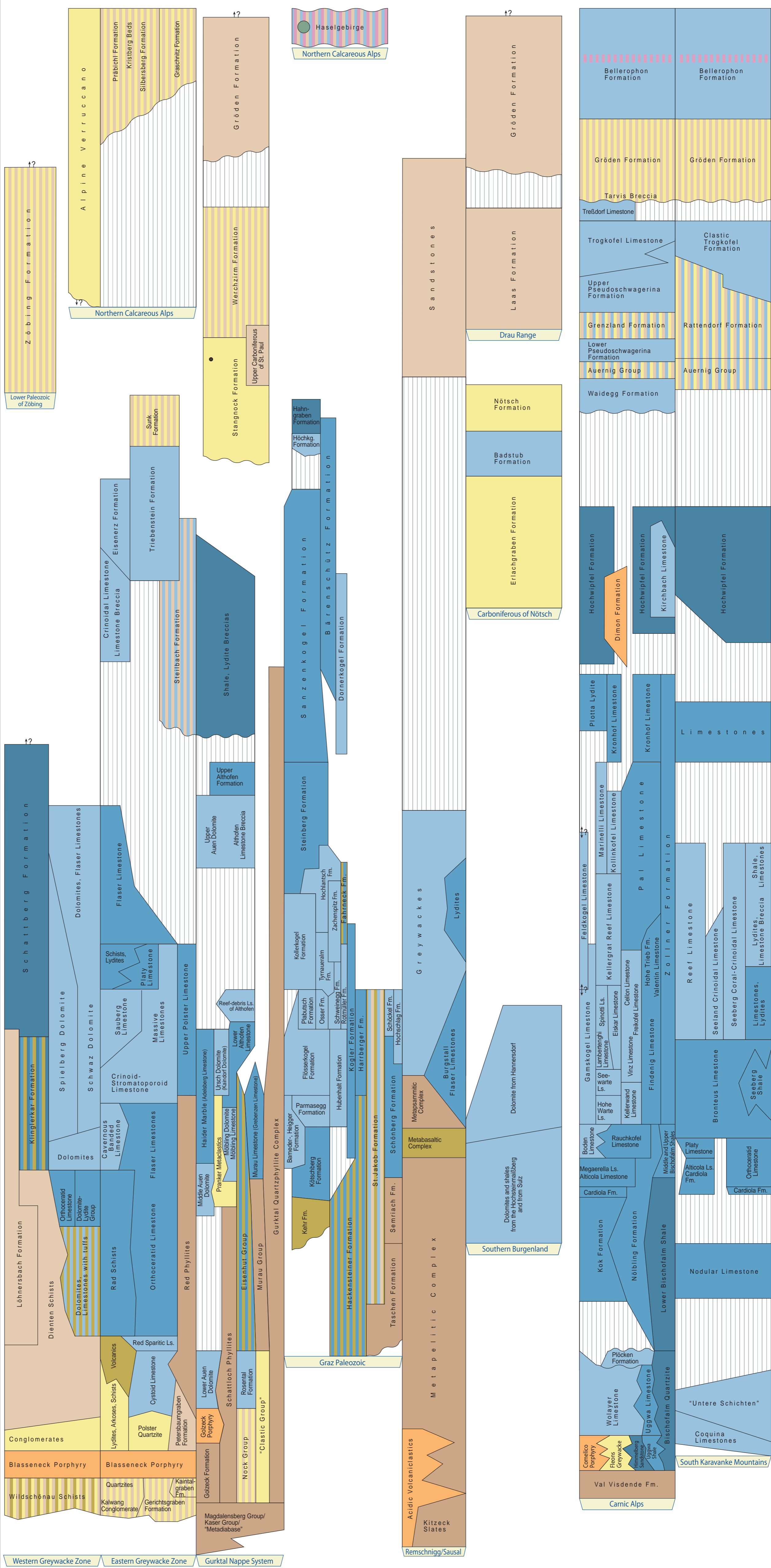
# Austrian Stratigraphic Chart 2004 - Paleozoic

(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				
		WUCHIAPINGIAN / Dufuflian	255						
		CAPITANIAN	260						
		WORDIAN	265						
		ROADIAN	270						
		PERMIAN	LOWER PERMIAN / CISURALIAN			KUNGURIAN	275		
						ARTINSKIAN	280		
						SAKMARIAN	285		
						ASSELIAN	290		
		PERMIAN	UPPER PERMIAN / CARBONIFEROUS			GZHELIAN	295	PERMIAN	LOWER PERMIAN / CISURALIAN
KASIMOVIAN	300								
MOSKOVIAN	305								
BASHKIRIAN	310								
PERMIAN	UPPER PERMIAN / CARBONIFEROUS			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			EMSIA	400		
						405			
		PRAGIAN	410						
		LOCHKOVIAN	415						
		PERMIAN	LOWER DEVONIAN			LUDFORDIAN	420	PERMIAN	LOWER DEVONIAN
						GORSTIAN	425		
HOMERIAN	430								
SHEINWOOD	435								
TELYCHIAN	440								
AERONIAN	443.7								
RHUDDANIAN	445								
HIRNANTIAN	447								
PERMIAN	UPPER ORDOVICIAN			450	PERMIAN	UPPER ORDOVICIAN			
				455					
		460							
		465							
		470							
		475							
		480							
		485							
		488.3							
		490							
PERMIAN	MIDDLE ORDOVICIAN	495	PERMIAN	MIDDLE ORDOVICIAN					
		500							
		505							
		510							
		515							
		520							
		525							
		530							
		535							
		540							
PERMIAN	LOWER ORDOVICIAN	542	PERMIAN	LOWER ORDOVICIAN					
		545							
		550							
		555							
		560							
		565							
		570							
		575							
		580							
		585							
PERMIAN	UPPER CAMBRIAN	590	PERMIAN	UPPER CAMBRIAN					
		595							
		600							
		605							
		610							
		615							
		620							
		625							
		630							
		635							
PERMIAN	MIDDLE CAMBRIAN	640	PERMIAN	MIDDLE CAMBRIAN					
		645							
		650							
		655							
		660							
		665							
		670							
		675							
		680							
		685							
PERMIAN	LOWER CAMBRIAN	690	PERMIAN	LOWER CAMBRIAN					
		695							
		700							
		705							
		710							
		715							
		720							
		725							
		730							
		735							



- 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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