

Remarks: FLÜGEL (2000) introduced the Kollerkogel Formation substitutional for the two former lithostratigraphic units “Kanzelkalk” (e.g., VACEK, 1907; H. FLÜGEL, 1975; EBNER et al., 1980a) and the “Mitteldevon-Dolomit” (EBNER et al., 1980a). In this conception both units have the rank of a member only.

Complementary references: HUBMANN (1993, 2003), HUBMANN & FRITZ (2004), HUBMANN & MESSNER (2007), HUBMANN & WEBER (2010), EBNER & HUBMANN (2012).

Tyrnaueralm-Formation / Tyrnaueralm Formation

BERNHARD HUBMANN

Validity: Valid; first description by GOLLNER & ZIER (1982: “Tyrnauer Alm-Formation”); formalized by GOLLNER & ZIER (1985: p. 48–49; Tyrnauer Alm-Formation); change of name into Tyrnaueralm-Formation by FLÜGEL (2000: p. 32).

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

Type section: At forest road to Tyrnauer Alm east of the Rote Wand (see GOLLNER & ZIER, 1982, 1985) (N 47°21'46" / E 15°25'28").

Reference section(s): Tiefenbachgraben north of Teichalm (see GOLLNER & ZIER, 1985) (N 47°22'18" / E 15°27'54").

Derivation of name: After an alp in the Hochlantsch region, approximately 40 km north of Graz.

Synonyms: Calceola-Schichten (PENECKE, 1890; H. FLÜGEL, 1975), Kalk des Mooskofel (CLAR et al., 1929).

Lithology: Dark grey to black often fossiliferous limestones. Lower parts of the succession consist of light grey late diagenetic dolostones. At Tyrnaueralm and Hochlantsch a less than a half meter thick horizon of dark green porphyritic volcanites is characteristic.

Fossils: At Zechnerhube (Teichalm area) rugose and tabulate corals and stromatoporoids are common. For faunal list see FLÜGEL (1971).

Origin, facies: Parts of the successions were deposited on a tidal flat (indicated by biolaminations and fenestrate fabrics) and shallow subtidal environments (indicated by various cnidarians).

Chronostratigraphic age: Upper Eifelian–Givetian; not Frasnian as illustrated in the ASC 2004.

Biostratigraphy: *ensensis* to *varcus* conodont zones.

Thickness: 150 m (up to 500 m?).

Lithostratigraphically higher rank unit: Lantsch Group.

Lithostratigraphic subdivision: GOLLNER & ZIER (1985) distinguished two different facial types which were considered as informal members. FLÜGEL (2000) erected the following three members:

Rote-Wand Member: Sequence of various volcanitic rocks and dolostones; 50 to 150 m in thickness.

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

Tiefenbach Member: Predominantly grey-blue micritic limestones, locally rich in fossils (stromatoporoids, corals); about 50 m in thickness.

Underlying unit(s): Plabutsch Formation (conformable contact).

Overlying unit(s): Zachenspitz and Hochlantsch Formations.

Lateral unit(s): Plabutsch Formation.

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

Remarks: This formation has substantial similarities in lithology and fossil content with the Kollerkogel Formation of the Rannach Group.

Complementary references: HUBMANN (1993, 2003), HUBMANN & MESSNER (2007).

Zachenspitz-Formation / Zachenspitz Formation

BERNHARD HUBMANN

Validity: Valid; first description by GOLLNER & ZIER (1985: “Zachenspitzformation”); change of name into Zachenspitz-Formation by FLÜGEL (2000: p. 34).

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

Type section: At the Zachenspitz, a mountain east of the Hochlantsch (see GOLLNER & ZIER, 1982, 1985) (N 47°22'05" / E 15°27'06").

Reference section(s): Tiefenbachgraben north of Teichalm (see GOLLNER & ZIER, 1985) (N 47°22'18" / E 15°27'54").

Derivation of name: After a mountain top next to Hochlantsch, approximately 40 km north of Graz.

Synonyms: Quadrigemminum-Kalk (PENECKE, 1890); partly: Stringocephalenschichten (HERITSCH, 1906); auffallendes Kalkband des Wallhüttenprofils (HERITSCH, 1917c).

Lithology: Massive and bedded grey-blue often fossiliferous limestones.

Fossils: Rugose and tabulate corals, stromatoporoids, conodonts, tentaculitids.

Origin, facies: Differentiated depositional environment composed of restricted lagoonal areas, reefal systems and open marine shallow subtidal settings.

Chronostratigraphic age: Upper Givetian–(?)Frasnian

Biostratigraphy: *varcus* conodont zone.

Thickness: Variable; 80 m up to 300 m.

Lithostratigraphically higher rank unit: Lantsch Group.

Lithostratigraphic subdivision: GOLLNER & ZIER (1985) distinguished two different facial types which were considered as informal members. FLÜGEL (2000) erected the following two members:

Ranerwand Member: Sequence of grey flaserlimestones; subordinate argillaceous shales and volcanoclastic rocks; up to 80 m in thickness.

Teichalm Member: Grey-blue to dark-grey sometimes densely fossiliferous limestones; subordinate tuff horizons; strong variation in thickness (up to 300 m?).

Underlying unit(s): Tyrnaueralm Formation (conformable contact).

Overlying unit(s): Hochlantsch Formation and Steinberg Formation.

Lateral unit(s): Hochlantsch Formation.

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

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).

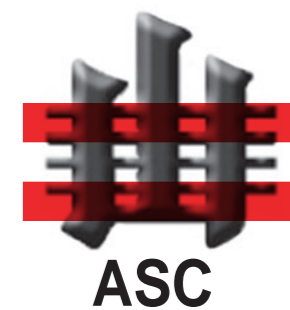
Derivation of name: After the village Steinberg, 15 km west of Graz.

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

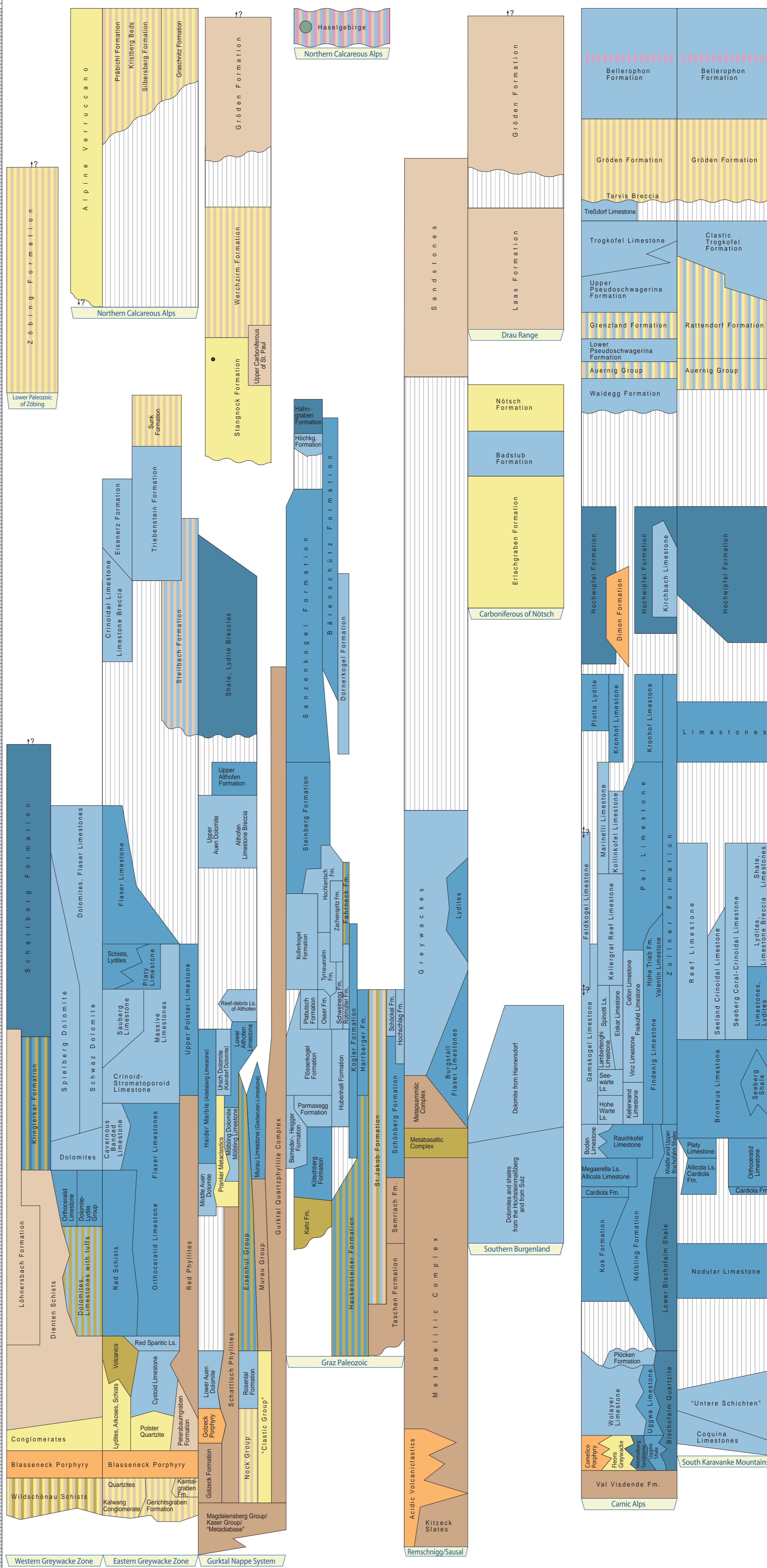
Austrian Stratigraphic Chart 2004 - Paleozoic

(sedimentary successions)

Austrian Stratigraphic Commission



| ERA | SYSTEM / PERIOD / SERIES / EPOCH | STAGE / AGE | DURATION Ma | Global Classification | | | | | |
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| 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 | | |
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| | | PERMIAN | UPPER PERMIAN / CARBONIFEROUS / PENNSYLVANIAN | | | GZHELIAN | 295 | PERMIAN | LOWER PERMIAN / CISURALIAN |
| KASIMOVIAN | 300 | | | | | | | | |
| MOSKOVIAN | 305 | | | | | | | | |
| BASHKIRIAN | 310 | | | | | | | | |
| PERMIAN | UPPER PERMIAN / CARBONIFEROUS / PENNSYLVANIAN | | | SERPUKHOVIAN | 315 | | | | |
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| | | FRASNIAN | 385 | | | | | | |
| | | GIVETIAN | 390 | | | | | | |
| | | EIFELIAN | 395 | | | | | | |
| | | DEVONIAN | LOWER DEVONIAN | | | EMSIAN | 400 | | |
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| | | PRAGIAN | 410 | | | | | | |
| | | LOCHKOVIAN | 415 | | | | | | |
| | | PERMIAN | LOWER DEVONIAN | | | LUDFORDIAN / GORSTIAN | 420 | PERMIAN | LOWER DEVONIAN |
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| TELYCHIAN | 430 | | | | | | | | |
| AERONIAN | 435 | | | | | | | | |
| RHUDDANIAN | 440 | | | | | | | | |
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- 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

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