Synonyms: Partly: Orthocerenkalk (FLÜGEL, 1953a); Folge von Laufnitzdorf (H. FLÜGEL, 1960, 1975).

Lithology: Succession of various fine-grained volcaniclastic rocks, organodetritic limestones and silt- to sandstones.

Fossils: Conodonts; TSCHELAUT in GOLLNER et al. (1982) mentioned in the lower series (basal 30 m of the sequence) various fossils in thin sections (bryozoans, brachiopods, echinoderms, trilobites).

Origin, facies: Pelagic environment of some 10 to 100 m water depth (GOLLNER et al., 1982).

Chronostratigraphic age: Llandovery to Emsian.

Biostratigraphy: *amorphognathoides* Zone–lower *sagitta* Zone.

Thickness: About 350 m.

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

Lithostratigraphic subdivision: FLÜGEL (2000) discerned three members according to the suggestions of GOLLNER et al. (1982).
Oberferler Member: Predominantly argillaceous shales and silt/sandstones, subordinate occurrences of lydites and alkaline volcanoclastics; up to 200 m in thickness.
Rathlosgraben Member: Flaser to nodular limestones, argillaceous shales, Lydites and silt/sandstones; up to 90 m in thickness.
Rothleiten Member: Alkaline volcaniclastics with intercalations of limestones; about 70 m in thickness.

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

Overlying unit(s): Units of the Kogler Nappe (tectonic contact).

Lateral unit(s): -

Geographic distribution: Styria, highland in the surroundings of Graz; ÖK50-BMN, map sheets 133 Leoben, 134 Passail.

Remarks: -

Complementary references: FLÜGEL & NEUBAUER (1984), HUBMANN & WEBER (2010).

Kehr-Formation / Kehr Formation

BERNHARD HUBMANN

Validity: Valid; description and formalization by FLÜGEL (2000: p. 14; "Kehrer-Vulkanit-Formation"); change of name into Kehr-Formation by EBNER et al. (2000).

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

Type section: No type section defined, but FLÜGEL (2000) proposed a type region in the municipality area of Kehr, ÖK50-UTM, map sheet 4228 Voitsberg (ÖK50-BMN, map sheet 163 Voitsberg) (N 47°07'38" / E 15°14'34").

Reference section(s): -

Derivation of name: After Kehr (formerly Kher), a small village east of the monastery Rein, approx. 20 km northwest of Graz.

Synonyms: Partly: obere Schiefer (HERITSCH, 1917b); Falbenschiefer (WAAGEN, 1929); untere Schichten von Kher (FLÜGEL & SCHÖNLAUB, 1972b; FLÜGEL & NEUBAUER, 1984); Schichten von Kher (H. FLÜGEL, 1975); vulkanoklastische Schichtfolge des Haritzgrabens (NEUBAUER, 1989).

Lithology: Predominantly alkaline subordinately acidic metavolcanites (tuffs, lavas).

Fossils: Conodonts – one single finding of a graptolite fragment (HIDEN, 1995).

Origin, facies: Open marine environment.

Chronostratigraphic age: Llandovery–Ludlow.

Biostratigraphy: *leintwardinensis* graptolite zone.

Thickness: Probably more than 100 m.

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

Lithostratigraphic subdivision: -

Underlying unit(s): Unknown (crystalline basement of the Graz Paleozoic ?)

Overlying unit(s): Kötschberg Formation.

Lateral unit(s): -

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

Remarks: -

Complementary references: HUBMANN & MESSNER (2005).

Kötschberg-Formation / Kötschberg Formation

BERNHARD HUBMANN

Validity: Valid; description and formalization by FLÜGEL (2000: p. 14; "Kötschberger-Formation"); change of name into Kötschberg-Formation by EBNER et al. (2000).

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

Type section: No type section defined, but FLÜGEL (2000) proposed a type region in the area of the municipality Kötschberg; ÖK50-UTM, map sheet 4229 Graz (ÖK50-BMN, map sheet 164 Graz) (N 47°05'28" / E 15°20'56").

Reference section(s): -

Derivation of name: After Kötschberg near Thal, a small village 12 km west of Graz.

Synonyms: Partly: obere Schiefer (HERITSCH, 1917b); obere Schichten von Kher (FLÜGEL & SCHÖNLAUB, 1972b; FLÜGEL & NEUBAUER, 1984); Schichten von Kher (H. FLÜGEL, 1975); plattige Kalkschiefer (WEBER, 1990).

Lithology: Predominantly limestones, rare dolostones, argillaceous shales and silty shales.

Fossils: Conodonts, orthocon cephalopods, bivalves, corals.

Origin, facies: Pelagic environment.

Chronostratigraphic age: Ludlow–Lochkovian.

Biostratigraphy: *siluricus* to *woschmidti* conodont zones.

Thickness: About 30 m.

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

Lithostratigraphic subdivision: FLÜGEL (2000) distinguished 4 members:
Eggenfeld Member: Dolomites alternating with fine bedded tuffs; about 10 m in thickness.

Genovevakreuz Member: Brownish to grey flaser limestones and nodular limestones; about 10 m in thickness.
Lend Member: Red to violet sometimes brecciated dolomites and dolomitic phyllites and platy limestones; known only from temporarily exposed subsurface outcrops.
Thalwinkel Member: Red to violet cephalopod limestones; up to 30 m in thickness.

Underlying unit(s): Kehr Formation.

Overlying unit(s): Parmasegg Formation.

Lateral unit(s): -

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

Remarks: -

Complementary references: HUBMANN & MESSNER (2005, 2007), HUBMANN & SUTTNER (2007), HISTON et al. (2010), EBNER & HUBMANN (2012).

Bameder-Formation / Bameder Formation

BERNHARD HUBMANN

Validity: Valid; first description by EBNER (1989: "Bameder-Formation"); formalized by EBNER (1998: p. 129–130).

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

Type section: Not defined, but EBNER (1998) proposed a type region at Bamederkogel (1,160 m) (N 47°11'45" / E 15°12'20") west of village Groß-Stübing (ÖK50-BMN, map sheet 163 Voitsberg).

Reference section(s): -

Derivation of name: After the hill Bameder 30 km north of Graz.

Synonyms: Partly: Bythotrephis-Schiefer (STACHE, 1874); Neritenschiefer (PENECKE, 1894); Nereitenschiefer (HERITSCH, 1906); Scalarituba-Sandsteine (WEBER, 1990).

Lithology: Grey sand/siltstones and clay shales with intercalations of black platy nodular and flaser limestones.

Fossils: Rare solitary rugose corals.

Origin, facies: Intertidal to shallow subtidal environment.

Chronostratigraphic age: Lochkovian–Pragian.

Biostratigraphy: -

Thickness: 300–500 m.

Lithostratigraphically higher rank unit: Rannach Group.

Lithostratigraphic subdivision: EBNER (1998) distinguished 2 members, both outcropping on Bameder hill west of Groß-Stübing.
Krahfuß Member: Predominantly grey sandstones with *Scalarituba* and intercalations of dark coloured platy (crinoidal) limestones; about 150–200 m in thickness.
Spandl Member: Succession overlying the Krahfuß Member; alternating silty and clayey shales and sand/siltstones with darkgrey platy limestones; about 200–300 m in thickness.

Underlying unit(s): Unknown.

Overlying unit(s): Unknown.

Lateral unit(s): -

Geographic distribution: Styria, western parts of highland in the surroundings of Graz; ÖK50-UTM, map sheet 4228 Voitsberg (ÖK50-BMN, map sheet 163 Voitsberg).

Remarks: -

Complementary references: EBNER (2001), FLÜGEL (2000).

Heigger-Formation / Heigger Formation

BERNHARD HUBMANN

Validity: Valid; first abridged description by FLÜGEL (1984) (herein: "Haiggerfolge"); formalized by FLÜGEL (2000: p. 23; Heigger-Formation).

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

Type section: No type section defined; FLÜGEL (1984, 2000) proposed an area between the western slopes of Pleschkogel (1,061 m) and Mühlbacherkogel (1,050 m) as type region (Heiggerkogel: N 47°09'34" / E 15°14'20").

Reference section(s): -

Derivation of name: After the hill Heiggerkogel (1,098 m) northwest of Rein.

Synonyms: Partly: Kalkschieferstufe i.w.S. (HERITSCH, 1917b, c).

Lithology: Light grey to brownish thin bedded limestones locally intercalated by marly clay/siltstones.

Fossils: Spicules, styliolids, conodonts (BUCHROITHNER, 1978).

Origin, facies: Shallow subtidal deposits.

Chronostratigraphic age: Lochkovian–Emsian.

Biostratigraphy: -

Thickness: Local strong variation in thickness; more than 100 m.

Lithostratigraphically higher rank unit: Rannach Group.

Lithostratigraphic subdivision: -

Underlying unit(s): Parmasegg Formation.

Overlying unit(s): Flösserkogel Formation.

Lateral unit(s): Flösserkogel Formation.

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

Remarks: Transitions from dolomitic and sandy/silty deposits of the Flösserkogel Formation into successions dominated by thin bedded limestones northwest of Pleschkogel-Heiggerkogel-Mühlbacherkogel were interpreted as transitional zone between tidal flat environments and basinal settings (FENNINGER & HOLZER, 1978) of the "Rannachfacies" (H. FLÜGEL, 1975).

Complementary references: EBNER (1998, 2001).

Parmasegg-Formation / Parmasegg Formation

BERNHARD HUBMANN

Validity: Valid; first description by FLÜGEL (1960: "Crinoiden-Schichten"); formalized by FRITZ (1991: p. 230–233; Parmasegg Formation).

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

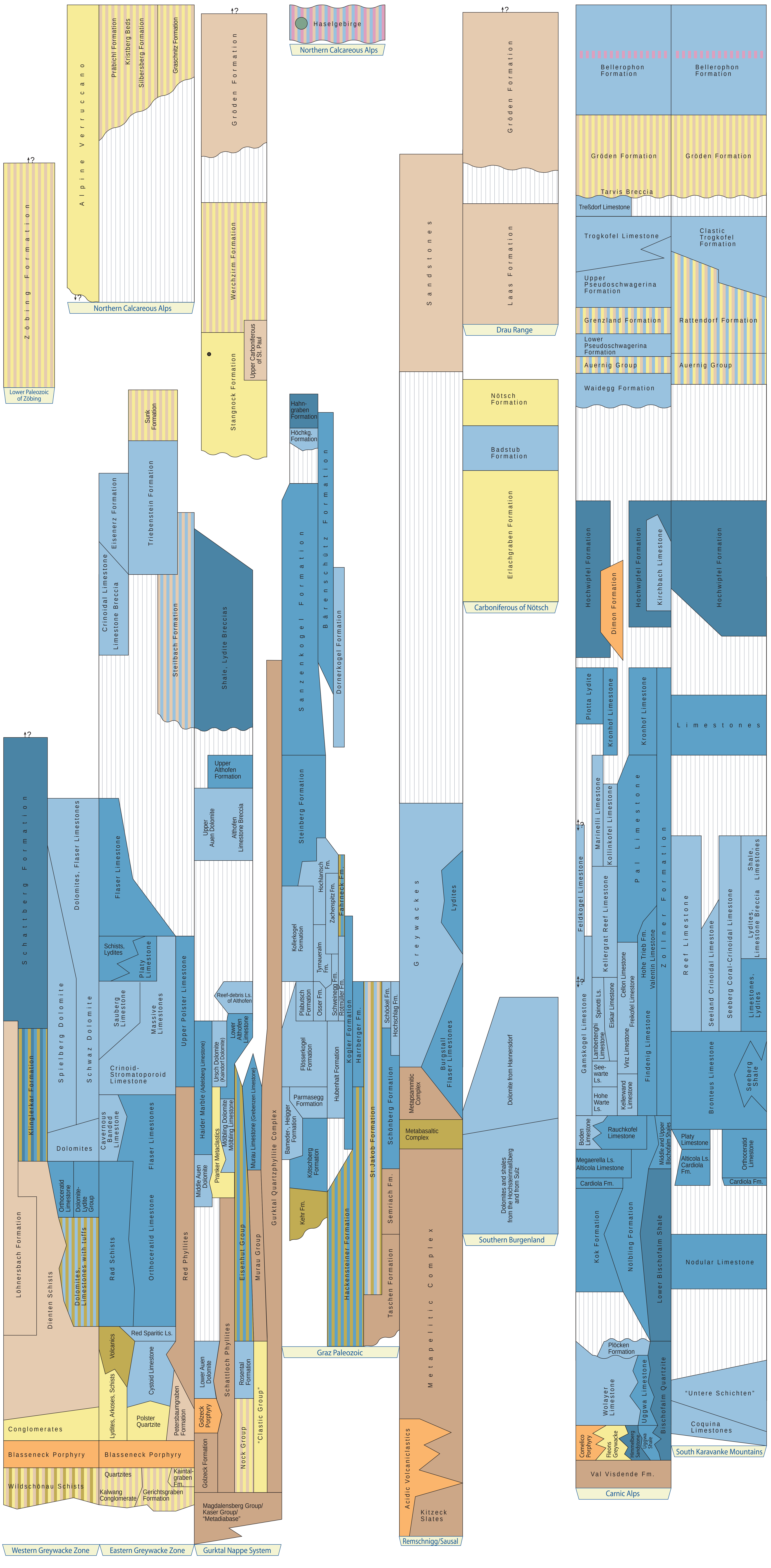
Type section: FRITZ (1991) proposed a type section at Parmaseggkogel (N 47°13'29" / E 15°28'50").

Austrian Stratigraphic Chart 2004 - Paleozoic

(sedimentary successions)

Austrian Stratigraphic Commission

ASC



Legend

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

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

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