Chronostratigraphic age: Eifelian, Givetian?

Biostratigraphy: -

Thickness: Less than 100 m.

Lithostratigraphically higher rank unit: Lantsch Group.

Lithostratigraphic subdivision: -

Underlying unit(s): Flösserkogel Formation (with tectonic contact).

Overlying unit(s): Tyrnaueralm Formation.

Lateral unit(s): Zachenspitz Formation.

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

Remarks: Parts of this formation which contain corals and stromatoporoids resemble the Plabutsch Formation resp. the Tyrnaueralm Formation of the Rannach Group. ZIER (1982) distinguished two parts within the sequence, a lower up to 60 m thick part of the succession which contains considerable amounts of stromatoporoids and corals and an upper part with white fossil-free beds of limestones. FLÜGEL (2000) assigned ZIER's lower part of the formation ("unterer Schweineggkalk") to the Draxler Formation which was synonymised with the Plabutsch Formation by HUBMANN (2003).

Complementary references: GOLLNER & ZIER (1985).

Rotmüller-Formation / Rotmüller Formation

BERNHARD HUBMANN

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

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

Type section: No type section published because of bad outcrops; according to EBNER (1998) on both sides of the Arzbach valley from "Reicherhöhe" (998 m; N 47°12'24" / E 15°14'23") in the southwest to "Rathlosgraben" in the northeast and in the vicinity of the farmstead "Rotmüller" (N 47°14'54" / E 15°14'52") on ÖK50-BMN, map sheet 163 Voitsberg typical outcrops of the formation may be seen.

Reference section(s): See above; forest road west of Reicherhöhe at altitude 880 m (EBNER, 1998)
Remarks: The Formation may be a lateral equivalent of the Tyrnaueralm Formation (EBNER, 1998: p. 128).

Derivation of name: After the farmstead "Rotmüller" 40 km northwest of Graz.

Synonyms: -

Lithology: Massive light to dark grey dolostones.

Fossils: Stromatoporoids (especially amphiporids), rugose and tabulate corals, crinoids, brachiopods.

Origin, facies: Subtidal depositional environment.

Chronostratigraphic age: ?Eifelian – Givetian.

Biostratigraphy: -

Thickness: About 300 m.

Lithostratigraphically higher rank unit: Lantsch Group.

Lithostratigraphic subdivision: -

Underlying unit(s): Flösserkogel Formation (tectonic contact).

Overlying unit(s): Fahrneck Formation.

Lateral unit(s): Zachenspitz Formation?

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

Remarks: -

Complementary references: FLÜGEL (2000).

Kollerkogel-Formation / Kollerkogel Formation

BERNHARD HUBMANN

Validity: Valid; first entry by SUESS (1868: "ungeschichteter, … lichtgrauer Kalkstein, welcher … an den Westhängen des Kollerberges … entblößt ist"); formalized by FLÜGEL (2000: p. 25–26; Kollerkogel-Formation).

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

Type section: No type section defined, but FLÜGEL (2000) selected a type region at Kollerkogel (Kollerberg, 633 m) (N 47°03'46" / E 15°22'35"), a hill belonging to the Plabutsch-Buchkogel-Range west of Graz.

Reference section(s): -

Derivation of name: After the hill Kollerberg (633 m) west of Graz.

Synonyms: Helle Kalke (KUNTSCHNIG, 1937); Helle Kalke des Mitteldevon (SCHÄFER, 1937); partly: Korallenkalk (CLAR, 1874) and Mitteldevon-Gruppe (VACEK, 1891).

Lithology: Grey dolomites with biolaminations, light bluish limestones (mostly mudstones), locally bioclastic limestones with chert nodules.

Fossils: Rugose and tabulate corals, stromatoporoids, conodonts.

Origin, facies: Major parts of the sequence developed in an open platform setting; basal parts are shallow restricted lagoonal deposits due to biolaminations, emersion horizons and pseudomorphs after gypsum.

Chronostratigraphic age: Givetian–Frasnian.

Biostratigraphy: *varcus* Zone; *asymmetricus* to *triangularis* conodont zones.

Thickness: Strong variation in thickness; about 150 m.

Lithostratigraphically higher rank unit: Rannach Group.

Lithostratigraphic subdivision: FLÜGEL (2000) included four members in the Kollerkogel Formation.
Gaisbergsattel Member: dark grey biolaminated dolostones; about 20 m (up to 100 m) in thickness.
Kanzel Member: light grey to bluish limestones; mostly mudstones; up to 100 m in thickness.
Platzl Member: sequence of grey limestones intercalated with carbonatic argillaceous shales; about 50 m in thickness.
Platzlkogel Member: grey limestones (in some places biohermal structures); about 75 m in thickness.

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

Overlying unit(s): Steinberg Formation (conformable contact).

Lateral unit(s): ?Plabutsch Formation.

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

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 volcaniclastic 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.

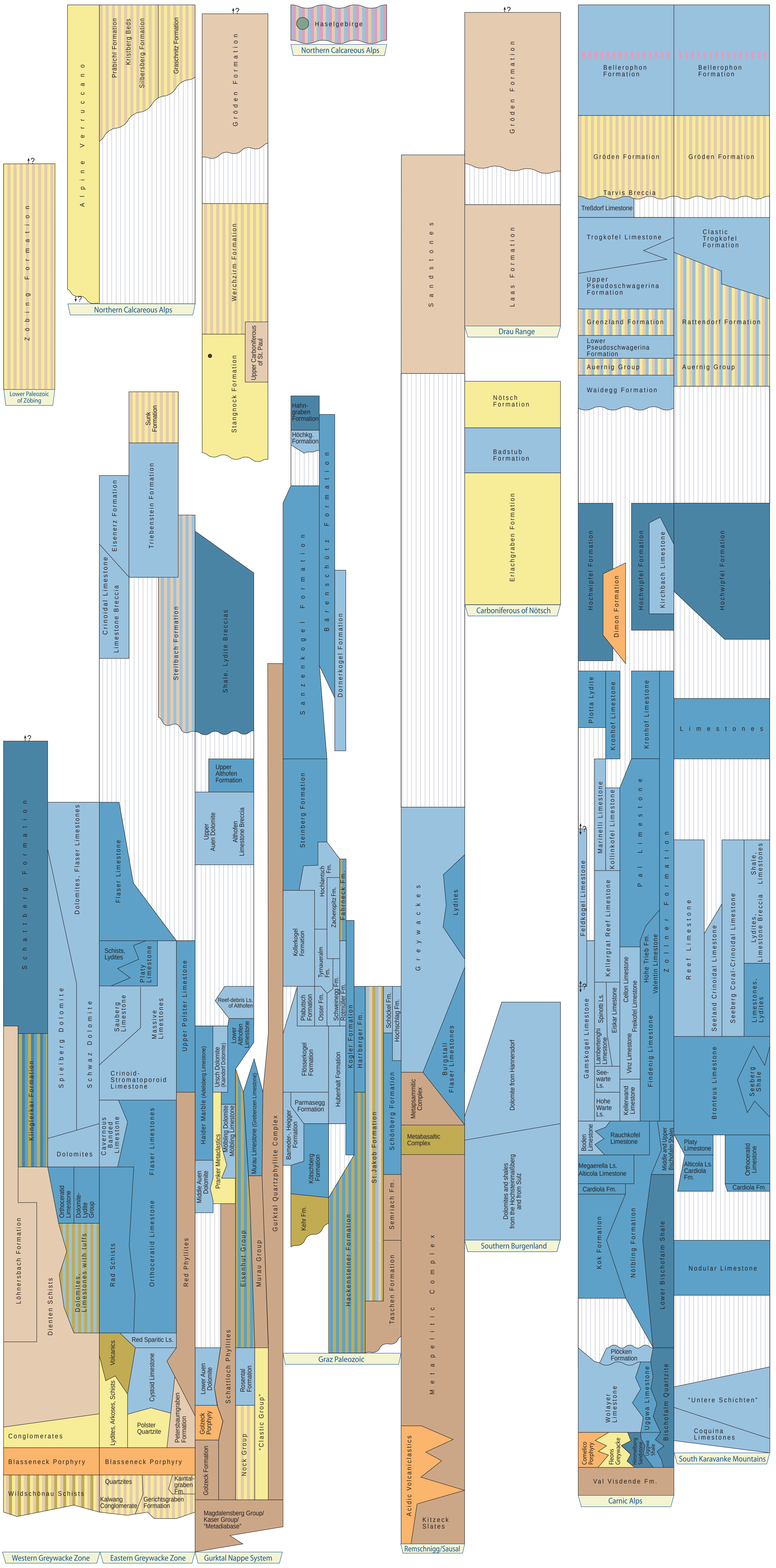
Geographic distribution: Styria, highland in the surroundings of Graz; ÖK50-BMN, map sheet 134 Passail.

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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