

extension). The complexity of the Carnic mountain chain is known since long time and drafted in several schemes resembling the tectonic and bathymetric interrelationship of the different nappes (compare STUR, 1856; GAERTNER, 1931; KREUTZER, 1992b; SCHÖNLAUB et al., 2004). Facies types and/or nappes corresponding to different time slices (e.g., SCHÖNLAUB, 1985a) are discriminated as follows:

Ordovician units are developed in four facies types: Fleons Facies, Himmelberg Facies, Uggwa Facies and Bischofalm Facies.

Among the Silurian strata the Wolayer Facies (shallow marine limestone), Plöcken Facies (shallow to moderately deep marine limestone), Findenig Facies (slope deposits) and the Bischofalm Facies (basinal clastic sediments such as black shales or lydites) are distinguished.

The spectra of Devonian deposits include the southern shallow-water facies (intertidal, back reef, reef and reef debris limestone) of the Kellerwand Nappe, the transitional or slope facies of the Cellon Nappe, the pelagic limestone facies of the Rauchkofel Nappe, the distal pelagic siliciclastic facies of the Bischofalm Nappe and the northern shallow-water facies of the Feldkogel Nappe.

During the early Carboniferous pelagic limestones and lydites, as well as flysch sediments (with regional intercalations of neritic limestone) and volcanites were deposited.

Val Visdende-Formation / Val Visdende Formation

THOMAS J. SUTTNER, HANS P. SCHÖNLAUB,
ANNALISA FERRETTI

Validity: Invalid; the name “Val Visdende Gruppe” for units distinguished by SCHMIDT (1930) was introduced by SCHÖNLAUB (1979); a detailed description of a part of this unit, ascribed as “Val-Visdende-Schiefer”, is provided by HUBICH & LOESCHKE (1993: p. 355).

Type area: ÖK50-UTM, map sheets 3108 Sillian, 3109 Oberdrauburg (ÖK50-BMN, map sheet 196 Obertilliach).

Type section: Section between Col Quaterná and Tscharrspitze near Passo Silvella (HUBICH & LOESCHKE, 1993; Figs. 2, 3); N 46°40'16" / E 12°28'19".

Reference section(s): Area near Lake Obstanser (Großer Kinigat, Pfannspitze, Roßkopf, Maurerspitze, Tscharrspitze-Gatterspitze, Passo Silvella) (HUBICH & LOESCHKE, 1993).

Derivation of name: After the Visdende Valley in northern Italy (SCHÖNLAUB, 1979: p. 52; see also map compiled by HINDERER, 1992: Fig. 2).

Synonyms: Val Visdende Gruppe [partim] (SCHÖNLAUB, 1979); Comelico phyllite (HEINISCH, 1981); Val-Visdende-Schiefer (HUBICH & LOESCHKE, 1993); Val-Visdende-Schichten (HUBICH et al., 1993); Formazione della Val Visdende (DUCA, 2004).

Lithology: Phyllitic schists (of variable amount of quartz) alternating with quartzite beds; subordinate conglomerate horizons occur; quartzites are less well sorted, some are of volcano-clastic origin (HUBICH & LOESCHKE, 1993: p. 355; CARLONI, 1971: p. 16).

Fossils: -

Origin, facies: The quartzites of the Val Visdende Formation probably indicate a shallow marine environment (HUBICH & LOESCHKE, 1993: p. 355). Volcanic quartz grains,

plagioclase and tourmaline suggest a source area consisting of acidic volcanic and plutonic rocks.

Chronostratigraphic age: Middle Ordovician (?); the age assignment is supported by the stratigraphic relationship with the overlying Comelico Porphyry the age of which is certainly Ordovician. However, the stratigraphic position and age is still controversial, as this unit could also be of Carboniferous age (compare SPALLETTA & VENTURIN, 1989; HINDERER, 1991, 1992; LÄUFER et al., 1993; VENTURINI et al., 2003).

Biostratigraphy: -

Thickness: > 500 m.

Lithostratigraphically higher rank unit: -

Lithostratigraphic subdivision: -

Underlying unit(s): -

Overlying unit(s): Comelico Porphyry (conformable contact?); Fleons Greywacke (conformable contact?); Himmelberg Sandstone (conformable contact?); Uggwa Shale (conformable contact?); Bischofalm Quartzite (conformable contact?).

Lateral unit(s): Comelico Porphyry (sensu HUBICH & LOESCHKE, 1993).

Geographic distribution: Western Carnic Alps.

Remarks: -

Complementary references: SCHÖNLAUB (1985a, 2000b), VAI & COCCOZZA (1986), FISCHER et al. (1996), SCHÖNLAUB & HISTON (1999, 2000), CARULLI (2006).

Comelico-Porphyröid / Comelico Porphyry

THOMAS J. SUTTNER, HANS P. SCHÖNLAUB,
ANNALISA FERRETTI

Validity: Invalid; this unit was named “Pfannspitzstreifen” by SCHMIDT (1930); a detailed description is provided in HUBICH & LOESCHKE (1993).

Type area: ÖK50-UTM, map sheets 3108 Sillian, 3109 Oberdrauburg (ÖK50-BMN, map sheet 196 Obertilliach).

Type section: Pfannspitze (HUBICH & LOESCHKE, 1993: p. 355), N 46°40'52" / E 12°30'05".

Reference section(s): Area near Lake Obstanser (Kleiner Kinigat, Großer Kinigat, Eisenreichgipfel, Tscharrspitze-Gatterspitze, Passo Silvella).

Derivation of name: After the region Comelico in the Province of Belluno in northern Italy.

Synonyms: Porphyroide des Pfannspitzsattel (SCHMIDT, 1930: p. 3); Pfannspitzstreifen (SCHMIDT, 1930: p. 4); Pre-Hercynian porphyritic plateau [partim] (SASSI & ZIRPOLI, 1968); Volcano-Sedimentary Complex (VSC) [partim] (SASSI & ZIRPOLI, 1989); Comelico “porphyroids” (SASSI & SPIESS, 1993: p. 601).

Lithology: Porphyry with common thin interbeds of phyllitic schists. According to HEINISCH (1981) and HUBICH & LOESCHKE (1993) the Comelico Porphyry comprises pyroclastic flow deposits (ignimbrites) with a rhyodacitic to dacitic composition. It represents volcanics of the calc-alkaline types. The porphyry contains phenocrysts of quartz, alkali feldspar and plagioclase in a matrix of chlorite, serizite, quartz and albite. Accessory minerals are apatite, zircon, tourmaline, biotite and garnet. In addition, in thin-

sections aggregates of quartz, chlorite and muscovite can be seen which are interpreted as former lapilli or relics of collapsed pumice. However, as pointed out by HEINISCH (1981) the crystal-rich Comelico Porphyry is strongly re-crystallized and thus difficult to link to a particular type.

Fossils: -

Origin, facies: The geotectonic position is difficult to assess because ignimbrites of similar composition occur in different geotectonic settings. A back-arc basin position or a position in a post-collisional extensional field of a continental crust is possible. Its origin within the latter is documented by S-type zircons (HUBICH & LOESCHKE, 1993: p. 370).

Chronostratigraphic age: Based on zircon crystals a late Ordovician age is suggested by HUBICH & LOESCHKE (1993: p. 366).

Biostratigraphy: -

Thickness: 670 m

Lithostratigraphically higher rank unit: -

Lithostratigraphic subdivision: -

Underlying unit(s): Val Visdende Formation (conformable contact?).

Overlying unit(s): Following HUBICH & LOESCHKE (1993: Fig. 3, p. 355) the Comelico Porphyry is succeeded by quartzites (reworked material from the Comelico Porphyry), shale, flaser limestone and lydites of Silurian age; the Wolayer Limestone does not directly follow above the Comelico Porphyry as shown in the ASC 2004.

Lateral unit(s): Fleons Greywacke; Val Visdende Formation (sensu HUBICH & LOESCHKE, 1993).

Geographic distribution: Western Carnic Alps.

Remarks: -

Complementary references: SASSI et al. (1979), HUBICH et al. (1993), SCHÖNLAUB & HISTON (1999, 2000).

Fleons-Grauwacke / Fleons Greywacke

THOMAS J. SUTTNER, HANS P. SCHÖNLAUB,
ANNALISA FERRETTI

Validity: Invalid; first observed by FRECH (1894b), followed by descriptions of GEYER (1899: p. 100), PELLIZZER & TOMADIN (1962), CARLONI (1971: p. 17–18), SCHÖNLAUB (1985a: p. 36–38) and by a detailed study of HINDERER (1992).

Type area: ÖK50-UTM, map sheets 3108 Sillian, 3109 Oberdrauburg, 3110 Kötschach-Mauthen, 3116 Sonnenalpe Naßfeld (ÖK50-BMN, map sheets 196 Obertilliach, 197 Kötschach).

Type section: Monte Fleons-Raudenspitze (N 46°39'45" / E 12°44'05") (HINDERER, 1992: Figs. 2, 4).

Reference section(s): Letterspitz and near the Roßkark (HINDERER, 1992: p. 338), Tscharrspitze (HUBICH et al., 1993: Fig. 3).

Derivation of name: After Mount Fleons [= Raudenspitze] (HINDERER, 1992: p. 338) near the village Fleons di sopra (N 46°38'16" / E 12°44'58").

Synonyms: Mauthener Schichten (FRECH, 1894b); Grüne Eruptivgesteine (Diabastuffe) und bunte Schiefer (GEYER, 1899: p. 100); Diabastuffe (GEYER, 1902); Fleonsgrauwacken (PELLIZZER & TOMADIN, 1962); Formazione del Monte Fleons (CARLONI, 1971: p. 17–18); Fleons-Grauacken

(SCHÖNLAUB, 1985a: p. 36–38); Fleonsformation (HINDERER, 1988); Roßkarkonglomerat and Tscharrknollenfazies (HINDERER, 1992); Greywacke Series (HINDERER, 1992); Fleons-Formation (HINDERER, 1992); Formazione di Fleons (DUCA, 2004).

Lithology: Volcaniclastic sediments (quartzites, quartzitic schists, greywacke and conglomerates).

Fossils: Brachiopods (?), bryozoans (SCHÖNLAUB, 1985a; SCHÖNLAUB & FLAJS, 1993).

Origin, facies: Wave-dominated coastal environment with locally developed fan deposits (HINDERER, 1992).

Chronostratigraphic age: Late Ordovician age (Katian) is supported by fossil bearing intercalations of Uggwa Shale at Mount Raudenspitze (SCHÖNLAUB & FLAJS, 1993: p. 236).

Biostratigraphy: -

Thickness: > 500 m.

Lithostratigraphically higher rank unit: Fleons Facies (informal).

Lithostratigraphic subdivision: "Grauwackenserie" and "Quarzitische Serie" (HINDERER, 1992).

Underlying unit(s): Val Visdende Formation (conformable contact?).

Overlying unit(s): Following SCHÖNLAUB & FLAJS (1993: p. 236, 240–241) grey-green silty shales are interbedded between the Fleons Greywacke at the base of the overlying Uggwa Limestone (conformable contact?); the Wolayer Limestone does not directly follow above the Fleons Greywacke as shown in the ASC 2004.

Lateral unit(s): Val Visdende Formation and Himmelberg Sandstone, respectively (SCHÖNLAUB, 1985a: p. 36; HINDERER 1992: p. 364–365).

Geographic distribution: Western Carnic Alps.

Remarks: -

Complementary references: SELLI (1946, 1963), SCHÖNLAUB & HISTON (1999, 2000), SCHÖNLAUB (2000b), CARULLI (2006).

Himmelberg-Sandstein / Himmelberg Sandstone

THOMAS J. SUTTNER, HANS P. SCHÖNLAUB,
ANNALISA FERRETTI

Validity: Invalid; first mentioned by GAERTNER (1931: p. 125); described in detail by SCHÖNLAUB (1969a: Tab. 1, p. 273, 1971a: p. 99–102).

Type area: ÖK50-UTM, map sheets 3108 Sillian, 3109 Oberdrauburg, 3110 Kötschach-Mauthen, 3111 Spittal an der Drau, 3116 Sonnenalpe Naßfeld, 3117 Nötsch im Gailtal (ÖK50-BMN, map sheets 196 Obertilliach, 197 Kötschach, 199 Hermagor).

Type section: -

Reference section(s): Upper Himmelberg Alm (see remarks) west of Mount Polinik northeast of Plöckenhaus (N 46°37'40" / E 12°57'50"), Rauchkofel (N 46°36'55" / E 12°52'31") (SCHÖNLAUB, 1971a: Fig. 2).

Derivation of name: After Himmelberger Alm (GAERTNER, 1931: p. 125).

Synonyms: Himmelberger Quarzit (GAERTNER, 1931); Dolomitische Sandsteine (SCHÖNLAUB, 1969a); Wechsellagerung Echinodermatenkalke-Karbonatsandsteine (SCHÖN-

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 / Dufuian	255						
		CAPITANIAN	260						
		WORDIAN	265						
		ROADIAN	270						
		PERMIAN	LOWER PERMIAN / CISURALIAN			KUNGURIAN	275		
						ARTINSKIAN	280		
						SAKMARIAN	285		
						ASSELIAN	290		
		PERMIAN	TRIAS			GZHELIAN	295	TRIAS	U. CARBONIFEROUS / PENNSYLVANIAN
KASIMOVIAN	300								
MOSKOVIAN	305								
BASHKIRIAN	310								
TRIAS	LOWER CARBONIFEROUS / MISSISSIPPIAN			SERPUKHOVIAN	315				
				VISEAN	320				
				TOURNAISIAN	325				
PERMIAN	DEVONIAN			FAMENNIAN	350	DEVONIAN	UPPER DEVONIAN		
				FRASNIAN	355				
				GIVETIAN	360				
		EIFELIAN	365						
		DEVONIAN	LOWER DEVONIAN	EMSIAN	370				
				LOCHKOVIAN	375				
		PERMIAN	DEVONIAN	LUDFORDIAN / GORSTIAN	380			DEVONIAN	MIDDLE DEVONIAN
				HOMERIAN / SHEINWOOD	385				
				TELYCHIAN	390				
				AERONIAN	395				
RHUDDANIAN	400								
DEVONIAN	LOWER DEVONIAN			PRAGIAN	405				
				LOCHKOVIAN	410				
PERMIAN	DEVONIAN			WEN-LOCK / LOW	415	DEVONIAN	LOWER DEVONIAN		
				HIRNANTIAN	420				
				LLANDOVERY	425				
		AERONIAN	430						
		RHUDDANIAN	435						
		DEVONIAN	LOWER DEVONIAN	PRAGIAN	440				
				LOCHKOVIAN	445				
		PERMIAN	DEVONIAN	WEN-LOCK / LOW	450			DEVONIAN	UPPER ORDOVICIAN
				LLANDOVERY	455				
				AERONIAN	460				
RHUDDANIAN	465								
DEVONIAN	LOWER DEVONIAN			PRAGIAN	470				
				LOCHKOVIAN	475				
PERMIAN	DEVONIAN			WEN-LOCK / LOW	480	DEVONIAN	MIDDLE ORDOVICIAN		
				LLANDOVERY	485				
				AERONIAN	490				
				RHUDDANIAN	495				
		DEVONIAN	LOWER DEVONIAN	PRAGIAN	500				
				LOCHKOVIAN	505				
		PERMIAN	DEVONIAN	WEN-LOCK / LOW	510			DEVONIAN	LOWER ORDOVICIAN
				LLANDOVERY	515				
				AERONIAN	520				
				RHUDDANIAN	525				
DEVONIAN	LOWER DEVONIAN			PRAGIAN	530				
				LOCHKOVIAN	535				
PERMIAN	DEVONIAN			WEN-LOCK / LOW	540	DEVONIAN	UPPER CAMBRIAN		
				LLANDOVERY	545				
				AERONIAN	550				
				RHUDDANIAN	555				
		DEVONIAN	LOWER DEVONIAN	PRAGIAN	560				
				LOCHKOVIAN	565				
		PERMIAN	DEVONIAN	WEN-LOCK / LOW	570			DEVONIAN	MIDDLE CAMBRIAN
				LLANDOVERY	575				
				AERONIAN	580				
				RHUDDANIAN	585				
DEVONIAN	LOWER DEVONIAN			PRAGIAN	590				
				LOCHKOVIAN	595				
PERMIAN	DEVONIAN			WEN-LOCK / LOW	600	DEVONIAN	LOWER CAMBRIAN		
				LLANDOVERY	605				
				AERONIAN	610				
				RHUDDANIAN	615				
		DEVONIAN	LOWER DEVONIAN	PRAGIAN	620				
				LOCHKOVIAN	625				



- 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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