LAUB, 1969a); Siltiti, arenarie e biocalcareniti (MANARA & VAI, 1970: p. 451); Himmelberger Sandstein (SCHÖNLAUB, 1971a: p. 99–100); Himmelburger Sandstein (DULLO, 1992).

Lithology: Massive to well-bedded greyish to greenish sandstones and arenaceous shales showing locally cross-bedding, ripples and conglomeratic intercalations. Upward these basal clastics grade into more calcareous rocks with lense-like reddish coarse-grained limestone intercalations consisting of crinozoan debris.

Fossils: GAERTNER (1931) reported the following fauna from the transition of the sandstones to the overlying Wolayer Limestone: *Orthis* cf. *duftonensis, Dalmanella notata, Dalmanella* cf. *hirnantensis, Strophomena aquila* and *Corylocrinus* sp. In addition he observed bryozoan remains.

Origin, facies: Marine siliciclastics (SCHÖNLAUB, 1971a).

Chronostratigraphic age: This unit is not well dated yet. Katian age is proposed based on the well defined age of the overlying Wolayer Limestone (FERRETTI & SCHÖNLAUB, 2001: Katian to Hirnantian).

Biostratigraphy: -

Thickness: Approx. 60 m.

Lithostratigraphically higher rank unit: Himmelberg Facies (informal).

Lithostratigraphic subdivision: -

Underlying unit(s): Dark grey shales at Himmelberg Alm of unknown age (conformable contact?).

Overlying unit(s): Wolayer Limestone (conformable contact).

Lateral unit(s): Fleons Greywacke, Uggwa Shale.

Geographic distribution: Central Carnic Alps, Plöcken Area.

Remarks: The old hut known as Upper Himmelberger Alm was destroyed after World War II but the area is still used during summer as grazing ground. It is accessible either from Spielbodenalm or along a forest road from the still existing Lower Himmelberger Alm.

Complementary references: HERITSCH (1943), FLÜGEL (1963), SCHÖNLAUB (1980b), HERZOG (1983), SCHÖNLAUB (1985a, 1991), SCHÖNLAUB & HISTON (1999, 2000), MADER & NEUBAUER (2004).

Uggwa-Schiefer / Uggwa Shale

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

Validity: Invalid; first mentioned by STACHE (1884) when he published fossils of the Uggwa creek (N-Italy) collected by Eduard Suess; first described by GAERTNER (1931); further observed by VAI (1971) and SCHÖNLAUB (1971a, 1979, 1985a).

Type area: ÖK50-UTM, map sheets 3109 Oberdrauburg, 3110 Kötschach-Mauthen, 3111 Spittal an der Drau, 3116 Sonnenalpe Naßfeld, 3117 Nötsch im Gailtal (ÖK50-BMN, map sheets 197 Kötschach, 198 Weißbriach, 199 Hermagor).

Type section: -

Reference section(s): Uggwa creek (VAI, 1971), N 46°36'32" / E 13°29'03"; Feistritzgraben, Nölblinggraben, (SCHÖNLAUB, 1979: p. 45, 1985a: p. 36).

Derivation of name: After Uggwa creek, 200 m NNE of Rifugio Fratelli Nordio close to the village of Ugovizza in Friuli-Venezia Giulia, Italy (VAI, 1971).

Synonyms: Strophomena-Horizont (STACHE, 1884: p. 324); Uggwaserie (GAERTNER, 1931); Schiefer des Caradoc (HABERFELNER & HERITSCH 1932b); Sandige Schiefer mit Bryozoen (SCHÖNLAUB, 1969a: Tab. 1); Siltstone and Sandstone Member of the Uqua Formation (VAI, 1971); Siltstones et grès de L'Uqua (VAI, 1971: p. 439); grünlichgraue Siltsteine der "Stillwasser-Fazies" (SCHÖNLAUB, 1971a: Fig. 2); Greygreen siltstones (SCHÖNLAUB, 1971a: p. 368); sandig-pelitische Uggwafazies (SCHÖNLAUB, 1979); Formazione di Uqua (VAI et al., 1984); Uggwa-Schiefer (SCHÖNLAUB, 1985a: p. 36, 37, 63).

Lithology: Greyish to greenish pelitic to arenaceous siltstones composed of quartz, feldspar, mica and other minerals. Some horizons show indistinct bedding and are more compact resembling fine-grained sandstones. Others display lamination and a lense-like texture in thin sections. Fossils are more or less decalcified.

Fossils: Acritarchs, brachiopods, bryozoans, cystoids, hyolithids, tentaculites, trilobites.

Origin, facies: Low energetic marine deposits (SCHÖNLAUB, 1971a: p. 99).

Chronostratigraphic age: According to the macrofossil assemblage obtained from this unit a Katian age is suggested (e.g., VAI & SPALETTA, 1980: p. 48).

Biostratigraphy: -

Thickness: 15 m to more than 50 m.

Lithostratigraphically higher rank unit: Uggwa Facies (informal).

Lithostratigraphic subdivision: -

Underlying unit(s): Fleons Greywacke (conformable contact?) (SCHÖNLAUB & FLAJS, 1993).

Overlying unit(s): Uggwa Limestone (conformable contact).

Lateral unit(s): Himmelberg Sandstone, Bischofalm Quartzite.

Geographic distribution: Central Carnic Alps; Uggwa Valley (Italy).

Remarks: -

Complementary references: SCHÖNLAUB (1980b), HAVLICEK et al. (1987), PRIEWALDER (1987, 1997, 2000), SCHÖNLAUB (1991, 2000b), VAI (1998), SCHÖNLAUB & HISTON (1999, 2000), HUBMANN et al. (2003), VENTURINI (2006), BRIME et al. (2008).

Bischofalm-Quarzit / Bischofalm Quartzite

THOMAS J. SUTTNER

Validity: Invalid; first described as "basal quartzite" at the base of the section Oberbuchach 1 by JAEGER & SCHÖNLAUB (1980); mapped as "Bischofalm-Quarzit" around lake Zollner by SCHÖNLAUB (1981); petrographic analysis are provided by MADER & NEUBAUER (2004).

Type area: ÖK50-UTM, map sheets 3108 Sillian, 3109 Oberdrauburg, 3110 Kötschach-Mauthen, 3116 Sonnenalpe Naßfeld (ÖK50-BMN, map sheets 196 Obertilliach, 198 Weissbriach).

Type section: -

Reference section(s): Section Oberbuchach 1 along the Gundersheimer Almroad, Bischofalmgraben, Collendiaul (SCHÖNLAUB, 1981, 1985a: p. 40, 72).

Derivation of name: After the locality Bischofalm in the Carnic Alps (Austria).

Synonyms: Basal quartzite (JAEGER & SCHÖNLAUB, 1980: p. 404); Quarzite (JAEGER & SCHÖNLAUB, 1980: Fig. 1); dünne quarzitische Lagen (SCHÖNLAUB, 1985a: p. 40).

Lithology: Dark grey to grey, thin quartzite beds, dolomitic sandstone (JAEGER & SCHÖNLAUB, 1980: p. 411; SCHÖNLAUB, 1981).

Fossils: -

Origin, facies: Marine siliciclastics, pelagic unit.

Chronostratigraphic age: Based on the above deposited graptolite-yielding shales (Lower Bischofalm Shale) which are early Silurian in age (see SCHÖNLAUB, 1979: Fig. 17 and updated version in SCHÖNLAUB, 1985a: Fig. 13), a late Ordovician to early Silurian age is proposed for this unit by JAEGER & SCHÖNLAUB (1980) and SCHÖNLAUB (1981).

Biostratigraphy: -

Thickness: Approx. 80 m.

Lithostratigraphically higher rank unit: Bischofalm Nappe (informal).

Lithostratigraphic subdivision: -

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

Overlying unit(s): Lower Bischofalm Shale (conformable contact).

Lateral unit(s): Uggwa Shale, Uggwa Limestone, Plöcken Formation.

Geographic distribution: Carnic Alps.

Remarks: -

Complementary references: SCHÖNLAUB (1985a, 1991), SCHÖNLAUB & HEINISCH (1994), SCHÖNLAUB & HISTON (2000), HUBMANN et al. (2003).

Wolayer-Kalk / Wolayer Limestone

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

Validity: Invalid; first observed by STACHE (1884: p. 337); better described by GAERTNER (1931), who already used the name Wolayer Kalk for this unit; later included within the summary of the Variscan carbonate sequences in the Carnic Alps (KREUTZER, 1992b).

Type area: ÖK50-UTM, map sheets 3109 Oberdrauburg, 3110 Kötschach-Mauthen, 3116 Sonnenalpe Naßfeld (ÖK50-BMN, map sheets 197 Kötschach, 198 Weißbriach).

Type section: Rauchkofelboden (GAERTNER, 1931: p. 136–137); N 46°36'54" / E 12°52'30"; altitude 2,153 m.

Reference section(s): Seekopfsockel (N 46°36'33" / E 12°51'58"), Valentintörl (SCHÖNLAUB, 1980b).

Derivation of name: After the Wolayer region in the central Carnic Alps (Austria).

Synonyms: Stufe der weissen und grauen Kalke (STACHE, 1884); Graue, massige, versteinerungsleere Kalke auf der Höhe des Thörl (FRECH, 1887: p. 685); Graue massige Kalke (FRECH, 1894b: Fig. 82); massige Bank von grauem oder rötlichem, aber hell anwitterndem Kalk [partim] (GEYER, 1903); Helle, massige Bank (SPITZ, 1909); roter und weißer, hell verwitternder Krinoidenkalk [partim] (GAERTNER, 1931); Krinoidenkalk ("helle Bank") [partim] (HABERFELNER & HERITSCH, 1932b); Biocalcilutiti mandorlate ("Tonflaserkalk") (MANARA & VAI, 1970); Grey massive crinoid limestone (SCHÖNLAUB, 1971a: p. 369); Ashgill-Crinoiden-Calcarenit der "Bewegtwasser-Fazies" (SCHÖNLAUB, 1971a: Fig. 2); Calcare a crinoidi, bioruditic lst. ("Cystoideenkalk") (SPALLETTA et al., 1982: p. 282–283); Cystoideen-Kalk (DULLO, 1992); Cystoidean Limestone (DULLO, 1992).

Lithology: White massive, sparry crinoidal debris limestone (KREUTZER, 1992b).

Fossils: Bryozoans, crinoids, conodonts, cystoids, ostracods (rare), trilobites.

Origin, facies: Marine limestone, neritic unit consisting of parautochthonous bioclasts derived from crinozoan mounds (DULLO, 1992).

Chronostratigraphic age: Upper Ordovician (Katian–Hirnantian).

Biostratigraphy: *ordovicicus* conodont zone (FERRETTI & SCHÖNLAUB, 2001).

Thickness: 10–17 m.

Lithostratigraphically higher rank unit: Himmelberg Facies (informal).

Lithostratigraphic subdivision: -

Underlying unit(s): Himmelberg Sandstone (conformable contact). Following HUBICH & LOESCHKE (1993: Fig. 3; p. 355) and SCHÖNLAUB & FLAJS (1993: p. 236 and 240–241), the Comelico Porphyry or the Fleons Greywacke, respectively, are not directly overlain by the Wolayer Limestone as shown in the ASC 2004.

Overlying unit(s): Plöcken Formation (unconformable contact); Kok Formation (unconformable contact).

Lateral unit(s): Uggwa Limestone.

Geographic distribution: Carnic Alps.

Remarks: -

Complementary references: HABERFELNER & HERITSCH (1932b), HERITSCH (1932), SCHÖNLAUB (1979, 1991, 1992, 2000b), SCHÖNLAUB et al. (1997, 2004), VAI (1998), SCHÖNLAUB & HISTON (2000).

Uggwa-Kalk / Uggwa Limestone

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

Validity: Invalid; already mentioned by STACHE (1884) as Knollenkalk; first described by GAERTNER (1931); further observed by VAI (1971) and SCHÖNLAUB (1971a, 1979, 1985a); later included within the summary of the Variscan carbonate sequences in the Carnic Alps (KREUTZER, 1992b).

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

Type section: Cellon avalanche gully (see remarks), Beds 1–4+ after WALLISER (1964); N 46°36'32" / E 13°29'03"; altitude 1,500 m.

Reference section(s): Uggwa creek (VAI, 1971), N 46°33'05" / E 13°29'13"; Valentintörl, Feistritzgraben, Nölblinggraben (SCHÖNLAUB, 1985a: p. 36; DULLO, 1992).

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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