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 recrystallized 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-Raudenspitz (N 46°39'45"/ E 12°44'05") (HINDERER, 1992: Figs. 2, 4).

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

Derivation of name: After Mount Fleons [= Raudenspitz] (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-Grauwacken (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 Raudenspitz (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-

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: -

Austrian Stratigraphic Chart 2004 - Paleozoic

(sedimentary successions)

Austrian Stratigraphic Commission

ASC

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

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

The Austrian Stratigraphic Chart 2004 - Paleozoic is a supplement of:
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