

Wolayer Formation

HANS-PETER SCHÖNLAUB & ANNALISA FERRETTI

Österreichische Karte 1:50.000
Blatt BMN 197 Kötschach
Blatt BMN 198 Weißbriach

Carta Topografica d'Italia 1:50.000
Foglio 018 Passo di Monte Croce Carnico

Blatt UTM 3109 Oberdrauburg
Blatt UTM 3110 Kötschach-Mauthen

Definition

White and locally pinkish massive, coarse-grained cystoid-bryozoan limestone (packstone-grainstone).

Description

10 to 17 m thick white to grayish and locally pinkish massive or indistinctly bedded coarse-grained pelmatozoan limestone. No macrofossil clearly recognizable at naked eyes. At higher magnification, the Wolayer Formation is rich in cystoid debris, bryozoans, crinoids, corals, algae, conodonts and rarely occurring ostracods and trilobites. According to DULLO (1992), the parautochthonous bioclasts were derived from bryozoan mounds, although such structures have never been found.

The upper boundary of the limestone is marked by a peculiar and easily recognizable discontinuity surface, strongly undulated, which defines the Ordovician/Silurian boundary. An ironstone horizon is well developed at the boundary in the Lake Wolayer area.

Fossil content

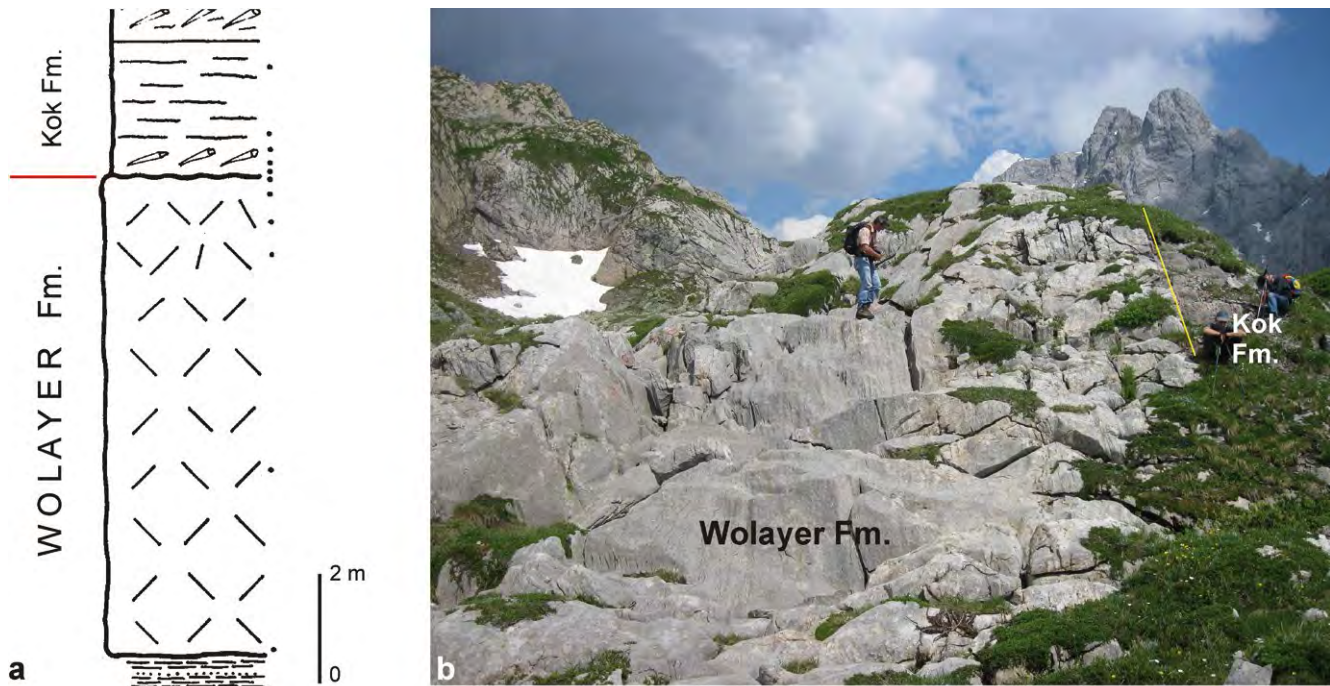
Algae, brachiopods, bryozoans, conodonts, corals, crinoids, cystoids, ostracods, trilobites.

Depositional environment

Shallow marine limestone, neritic unit consisting of parautochthonous bioclasts derived from crinozoan mounds.



Areas of outcrop of the Wolayer Formation with indication of the stratotype (asterisk).



The Rauchkofel Boden Section. a) log of the lower part of the section (modified after SCHÖNLAUB, 1980); b) view of the Wolayer Formation (photo H.P. SCHÖNLAUB).

Stratotype

Rauchkofel-Boden Section (GAERTNER, 1931) on the southern slope of Mt. Rauchkofel at coordinates N 46°36'54", E 12°52'30".

Reference sections -

Type area

Central Carnic Alps.

Main outcrop areas

Base of Mt. Seekopf, Valentin Törl, Rauchkofel Boden.

Thickness

10 to 17 m.

Boundaries

Underlying units – Himmelberg Formation (conformable contact?).

Overlying units – Kok Formation (disconformable contact).

Lateral units – Uqua Formation.

Derivation of name

After the Wolayer region in the central Carnic Alps.

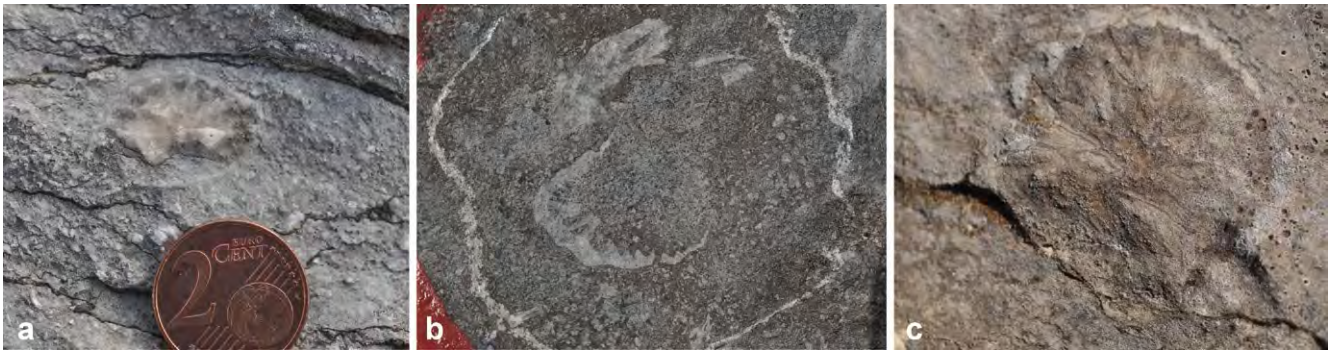
Synonymy

Stufe der weissen und grauen Kalke: STACHE (1884).

Graue, massige, versteinungsleere Kalke auf der Höhe des Thörl: FRECH (1887).

Graue massige Kalke: FRECH (1894).

Massige Bank von grauem aber hell anwitterndem Kalk: GEYER (1903).



Details of the Wolayer Formation at the Rauchkofel Boden Section. a) cross-section of a spherical theca of a cystoid (photo H.P. SCHÖNLAUB); b) a broken rugose coral (photo H.P. SCHÖNLAUB); c) cross-section of the algae *Coelosphaeridium* (photo H.P. SCHÖNLAUB).

Helle massige Bank: SPITZ (1909).

Roter und weißer hell verwitternder Krinoidenkalk: GAERTNER (1931).

Biocalciliti mandorlate («Tonflaserkalk»): MANARA & VAI (1970).

Grey massive crinoid limestone: SCHÖNLAUB (1971).

Ashgill-Crinoiden-Calcarenit: SCHÖNLAUB (1971).

Calcare a crinoidi, bioruditic lst. («Cystoideenkalk»): SPALLETTA et al. (1982).

Cystoideenkalk: DULLO (1992).

Cystoidean Limestone: DULLO (1992).

Wolayer-Kalk/Limestone: SUTTNER et al. (2014).

Chronostratigraphic age

Ordovician: Late Katian (Ka3-Ka4 Stage slices *sensu* BERGSTRÖM et al., 2009) to (?) basal Hirnantian.

Biostratigraphy

Conodonts. – *Amorphognathus ordovicicus* Zone (FERRETTI & SCHÖNLAUB, 2001 and references therein).

Complementary references -

Remarks -

References

BERGSTRÖM, S.M., CHEN, X., GUTIÉRREZ-MARCO, J.-C. & DRONOV, A. (2009): The new chronostratigraphic classification of the Ordovician System and its relations to regional series and stages and to $\delta^{13}\text{C}$ chemostratigraphy. – *Lethaia*, **42**, 97–107, Oslo.

DULLO, W.C. (1992): Mikrofazies und Diagenese der oberordovizischen Cystoideen-Kalke (Wolayerkalk) und ihrer Schuttfazies (Uggwakalk) in den Karnischen Alpen. – *Jahrbuch der Geologischen Bundesanstalt*, **135/1**, 317–333, Wien.

FERRETTI, A. & SCHÖNLAUB, H.P. (2001): New conodont faunas from the Late Ordovician of the Central Carnic Alps, Austria. – *Bollettino della Società Paleontologica Italiana*, **40/1**, 3–15, Modena.

FRECH, F. (1887): Über das Devon der Ostalpen, nebst Bemerkungen über das Silur und einen palaeontologischen Anhang. – *Zeitschrift der Deutschen geologischen Gesellschaft*, **39**, 659–738, Berlin.

FRECH, F. (1894): Die Karnischen Alpen. Ein Beitrag zur vergleichenden Gebirgs-Tektonik. – *Abhandlungen der Naturforschenden Gesellschaft zu Halle*, **18**, 1–514, Halle.

GAERTNER, H.R. von (1931): *Geologie der Zentralkarnischen Alpen*. – *Denkschrift der Österreichischen Akademie der Wissenschaften, mathematisch-naturwissenschaftliche Klasse, Abteilung 1*, **102**, 113–199, Wien.

GEYER, G. (1903): *Exkursion in die Karnischen Alpen*. – *Führer IX. Internationaler Geologischer Kongress in Wien*, **11**, 1–51, Wien.

MANARA, C. & VAI, G.B. (1970): La sezione e i conodonti del Costone Sud del M. Rauchkofel (Paleozoico, Alpi Carniche). – *Estratto dal Giornale di Geologia, Annali del museo Geologico di Bologna, Serie 2a*, **XXXVI**, 1968, 441–514, Bologna.

SCHÖNLAUB, H.P. (1971): *Paleoenvironmental Studies at the Boundary Ordovician/Silurian in the Carnic Alps*. – *Mémoires du Bureau de Recherches géologiques et Minières*, **73**, 367–376, Paris.

SCHÖNLAUB, H.P. (1980): *Carnic Alps. Field Trip A. with contributions from JAEGER, H., HOUSE, M.R., PRICE, J.D., GÖDDERTZ, B., PRIEWALDER, H., WALLISER, O.H., KRÍŽ, J., HAAS, W. & VAI, G.B.* – In: SCHÖNLAUB, H.P. (ed.): *Second European Conodont Symposium, ECOS II, Guidebook, Abstracts*. – *Abhandlungen der Geologischen Bundesanstalt*, **35**, 5–57, Wien.

SPALLETTA, C., VAI, G.B. & VENTURINI, C. (1982): La Catena Paleocarnica. – In: CASTELLARIN, A. & VAI, G.B. (eds.): Guida alla geologia del Sudalpino centro-orientale. – Guide Geologiche Regionali, Società Geologica Italiana, 281–292, Bologna.

SPITZ, A. (1909): Geologische Studien in den Zentralkarnischen Alpen. – Mitteilungen der Geologischen Gesellschaft Wien, **2**, 278–334, Wien.

STACHE, G. (1884): Über die Silurbildungen der Ostalpen nebst Bemerkungen über die Devon-, Carbon- und Permschichten dieses Gebietes. – Zeitschrift der Deutschen geologischen Gesellschaft, **36**, 277–378, Berlin.

SUTTNER, T.J., SCHÖNLAUB, H.P. & FERRETTI, A. (2014): Wolayer-Kalk/Wolayer Limestone. – In: PILLER, W.E. (ed.): The lithostratigraphic units of the Austrian Stratigraphic Chart 2004 (sedimentary successions), Vol. I - The Paleozoic Era(them). – Abhandlungen der Geologischen Bundesanstalt, **66**, 65, Wien.