Freikofel Formation

Monica Pondrelli, Damien Pas, Claudia Spalletta, Hans-Peter Schönlaub, Enzo Farabegoli, Carlo Corradini, Thomas J. Suttner, Maria G. Corriga, Maria Cristina Perri, Anne-Christine Da Silva, Susanne M.L. Pohler, Luca Simonetto, Claudia Dojen, Angelo Mossoni, Erika Kido & Heiko Hüneke

Österreichische Karte 1:50.000
Blatt BMN 197 Kötschach

Blatt UTM 3109 Oberdrauburg
Blatt UTM 3110 Kötschach-Mauthen
Blatt UTM 3116 Sonnenalpe Naßfeld

Carta Topografica d'Italia 1:50.000
Foglio 018 Passo di Monte Croce Carnico
Foglio 031 Ampezzo
Foglio 032 Tolmezzo

Definition

Prevalent floatstone/rudstone interbedded with lithoclastic packstone/grainstone and pelagic mudstone/wackestone (Bandel, 1972; Spalletta et al., 1982; Spalletta & Vai, 1984; Schönlaub, 1985; Kreutzer, 1990, 1992a, b; Schönlaub et al., 2004; Schnellbächer, 2010; Pas et al., 2014).

Description

The Freikofel Formation consists of three well-bedded facies listed in order of decreasing abundance.

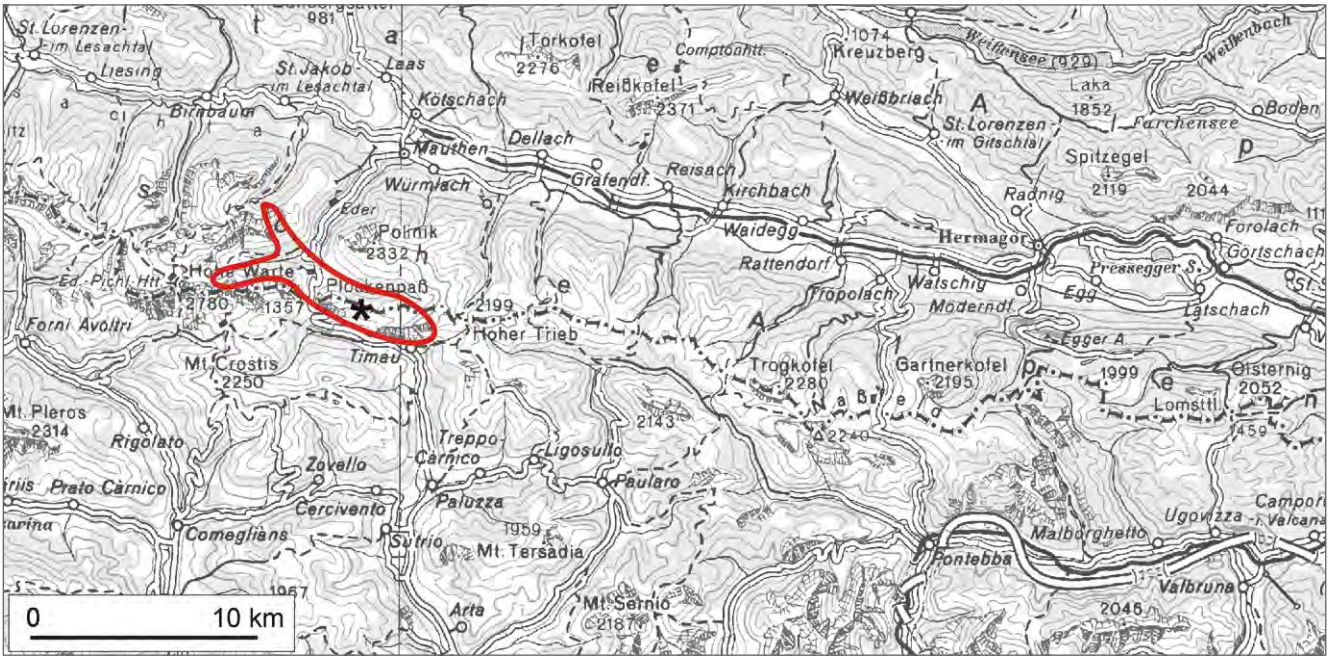
Facies A: medium dark gray, medium to thick bedded, moderately sorted lithoclastic rudstone (subordinately floatstone) sometimes showing fining upward grading; matrix consists of grainstone (subordinately wacke-/packstone);

Facies B: medium dark gray, thin to medium bedded grainstone and subordinate packstone locally showing fining upward grading; planar and subordinate cross lamination is present;

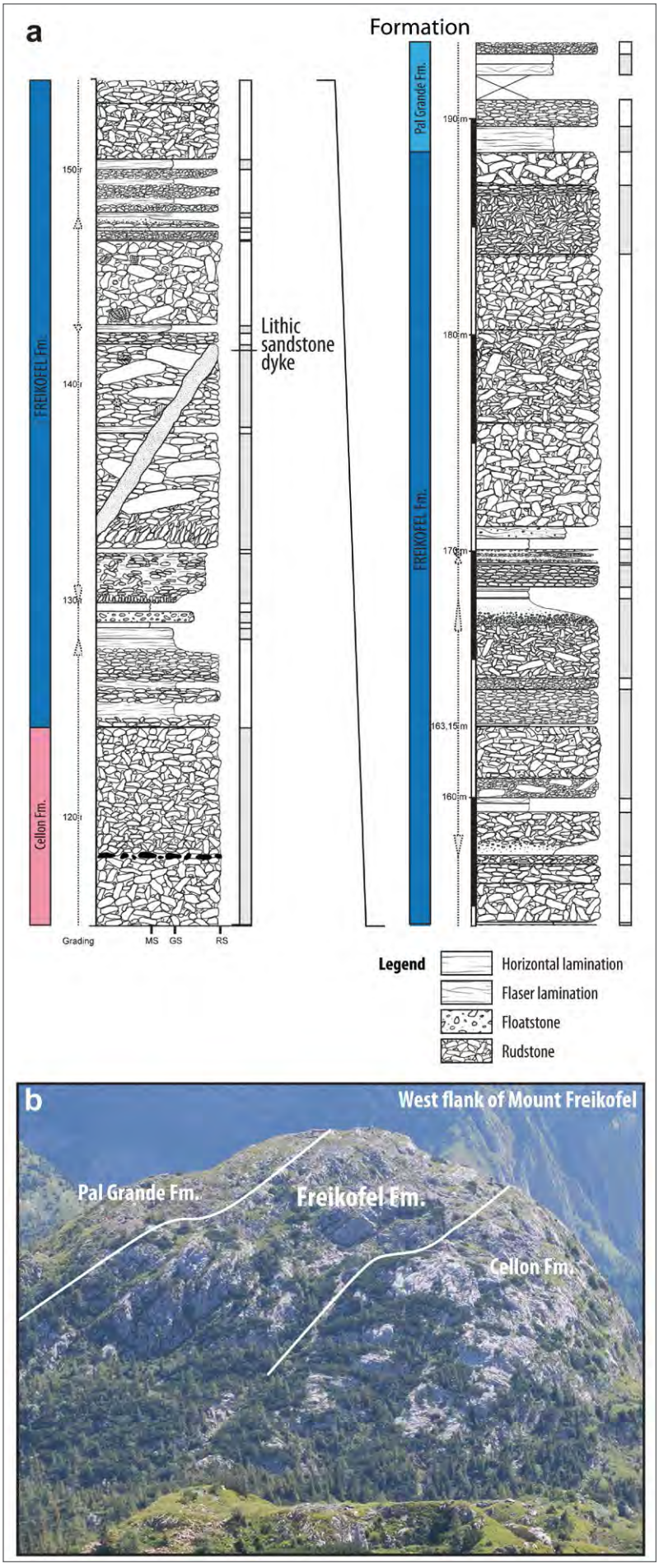
Facies C: very thin to thin bedded, moderate pink to gray mud-/wackestone.

Fossil content

Brachiopods, calcispheres, cephalopods, conodonts, crinoids, foraminifers, trilobites, ostracods, rugose corals, stromatoporoids and styliolinids have been documented (Kreutzer, 1992b; Pas et al., 2014).



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



The Freikofel Section. a) log of the Freikofel Formation (SCHNELLBÄCHER, 2010); b) view of the section taken from the west (photo M. PONDRELLI).

Depositional environment

The Freikofel Formation was formed at the slope of a carbonate apron (Schnellbächer, 2010; Pas et al., 2014). Deposits of hyperconcentrated and concentrated density flows (Facies A) and turbidity flows (Facies B) predominate. Thin interbeds of pelagic sediments (Facies C and D) are rarely preserved.

Stratotype

Freikofel Section, located on the western slope of Mt. Freikofel (Bandel, 1972; Schnellbächer, 2010; Pas et al., 2014), between coordinates N 46°36'05.1", E 12°58'33.9" (base of the section) and N 46°36'08.0", E 12°58'35.0" (top of the section).

Reference sections -

Type area

Central Carnic Alps.

Main outcrop areas

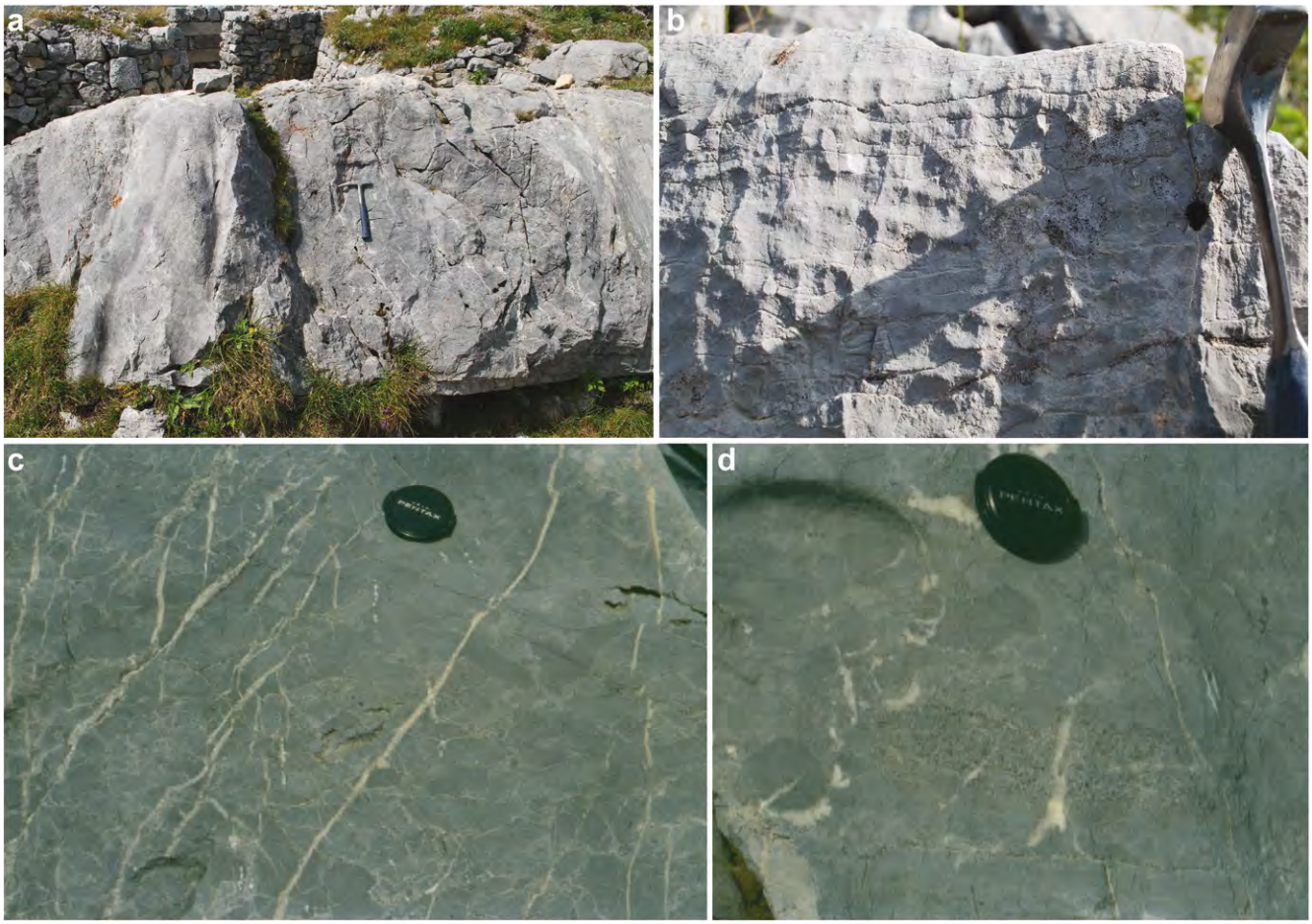
The Freikofel Formation crops out in the Rauchkofel area, in the south side of the Valentintal and between the Cellon/Creta di Collinetta and the Creta di Timau.

Thickness

About 65 m (Freikofel) to about 100 m (Kellerwand).

Boundaries

Underlying units – Cellon Formation (conformable sharp contact).



Views of the Freikofel Formation in the field. a) breccia bed: top of Mt. Freikofel (photo M. Pondrelli); b) part of a breccia bed showing a crude fining upward trend: Freikofel Section (photo M. Pondrelli); c) rudstone: PR327 section (photo C. Spalletta); d) particular of a rudstone bed: PR327 section (photo C. Spalletta).

Overlying units – Pal Grande Formation (conformable interfingering contact).

Lateral units – Kellergrat Formation, Creta di Collina Formation (proximal part); Hoher Trieb Formation, Pal Grande Formation (distal part).

Derivation of name

After Mount Freikofel.

Synonymy

'Lithoklastkalk' [partim]: BANDEL (1974).
Freikofel Kalk: SCHÖNLAUB (1985).
Freikofel limestone: KREUTZER (1992b).
Calcareniti di transizione prossimali [partim]: VENTURINI (2006).
Freikofel Rudstone [partim]: BRIME et al. (2008).
Calciruditi del Freikofel [partim]: SPALLETTA & PONDRELLI (2009).

Chronostratigraphic age

Devonian: Givetian to Frasnian (KREUTZER, 1990, 1992a, b; SCHNELLBÄCHER, 2010; PAS et al., 2014).

Biostratigraphy

Conodonts. – The Freikofel Formation spans to Frasnian Zone 13b (*linguiformis* Zone) (Freikofel T section)-Frasnian Zone 13a (middle-upper part of the Upper *rhenana* Zone) (Pramosio A section).

Complementary references -

Remarks -

References

BANDEL, K. (1972): Palökologie und Paläogeographie im Devon und Unterkarbon der zentralen Karnischen Alpen. – Palaeontographica Abteilung A, **141**/1–4, 1–117, Stuttgart.

BANDEL, K. (1974): Deep-water limestones from the Devonian-Carboniferous of the Carnic Alps, Austria. – Special Publications of the International Association of Sedimentologists, **1974**/1, 93–115, Oxford.

BRIME, C., PERRI, M.C., PONDRELLI, M., SPALLETTA, C. & VENTURINI, C. (2008): Polyphase metamorphism in the eastern Carnic Alps (N Italy-S Austria): Clay minerals and conodont Colour Alteration Index evidence. – International Journal of Earth Sciences, **97**/6, 1213–1229, Berlin-Heidelberg.

KREUTZER, L.H. (1990): Mikrofazies, Stratigraphie und Paläogeographie des Zentralkarnischen Hauptkammes zwischen Seewarte und Cellon. – Jahrbuch der Geologischen Bundesanstalt, **133**/2, 275–343, Wien.

KREUTZER, L.H. (1992a): Palinspastische Entzerrung und Neugliederung des Devons in den Zentralkarnischen Alpen aufgrund von neuen Untersuchungen. – Jahrbuch der Geologischen Bundesanstalt, **135**/1, 261–272, Wien.

KREUTZER, L.H. (1992b): Photoatlas zu den variszischen Karbonat-Gesteinen der Karnischen Alpen (Österreich/Italien). – Abhandlungen der Geologischen Bundesanstalt, **47**, 1–129, Wien.

PAS, D., DA SILVA, A.-C., SUTTNER, T., KIDO, E., BULTYNCK, P., PONDRELLI, M., CORRADINI, C., DE VLEESCHOUWER, D., DOIEN, C. & BOULVAIN, F. (2014): Insight into the development of a carbonate platform through a multi-disciplinary approach: a case study from the Upper Devonian slope deposits of Mount Freikofel (Carnic Alps, Austria/Italy). – International Journal of Earth Sciences, **103**, 519–538, Berlin-Heidelberg.

SCHNELLBÄCHER, P. (2010): Stratigraphy, transport mechanisms and provenience of Devonian carbonate slope deposits (Freikofel, Carnic Alps). – Unpublished master thesis, Universität Greifswald. – 124 p., Greifswald.

SCHÖNLAUB, H.P. (1985): Das Paläozoikum der Karnischen Alpen. – In: SCHÖNLAUB, H.P. (ed.): Arbeitstagung der Geologischen Bundesanstalt 1985 Kötschach-Mauthen, Gailtal – Geologische Bundesanstalt, 34–52, Wien.

SCHÖNLAUB, H.P., HISTON, K. & POHLER, S. (2004): The Palaeozoic of the Carnic Alps. – In: SCHÖNLAUB, H.P. (ed.): Field Trip Carnic Alps Guidebook. June 23-24, 2004, Carinthia, Austria. – Geologische Bundesanstalt, 2–32, Wien.

SPALLETTA, C. & PONDRELLI, M. (2009): Calciruditi del Freikofel. – In: VENTURINI, C. (ed.): Note Illustrative del Foglio 031 Ampezzo. – Carta Geologica d'Italia alla scala 1:50000, Istituto Superiore per la Protezione e la Ricerca Ambientale (ex-Agenzia per la Protezione dell'Ambiente e per i Servizi Tecnici, Servizio Geologico d'Italia), 43, Stampa A.T.I. – S.EL.CA. srl. – L.A.C. srl. – System Cart srl., Firenze.

SPALLETTA, C. & VAI, G.B. (1984): Upper Devonian intraclast parabreccias interpreted as seismites. – Marine Geology, **55**/1-2, 133–144, Amsterdam.

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.

VENTURINI, C. (2006): Evoluzione geologica delle Alpi Carniche. – Edizioni del Museo Friulano di Storia Naturale, **48**, 208 p., Udine.