Findenig Formation

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Österreichische Karte 1:50.000
Blatt BMN 197 Kötschach
Blatt BMN 198 Weißbriach
Blatt BMN 199 Hermagor

Blatt UTM 3109 Oberdrauburg
Blatt UTM 3110 Kötschach-Mauthen
Blatt UTM 3116 Sonnenalpe Naßfeld
Blatt UTM 3117 Nötsch im Gailtal

Carta Topografica d'Italia 1:50.000
Foglio 018 Passo di Monte Croce Carnico
Foglio 031 Ampezzo
Foglio 032 Tolmezzo
Foglio 033 Tarvisio

Definition

Flaser-like pink nodular limestone (mudstone to wackestone) at places interlayered with light gray packstone to grainstone.

Description

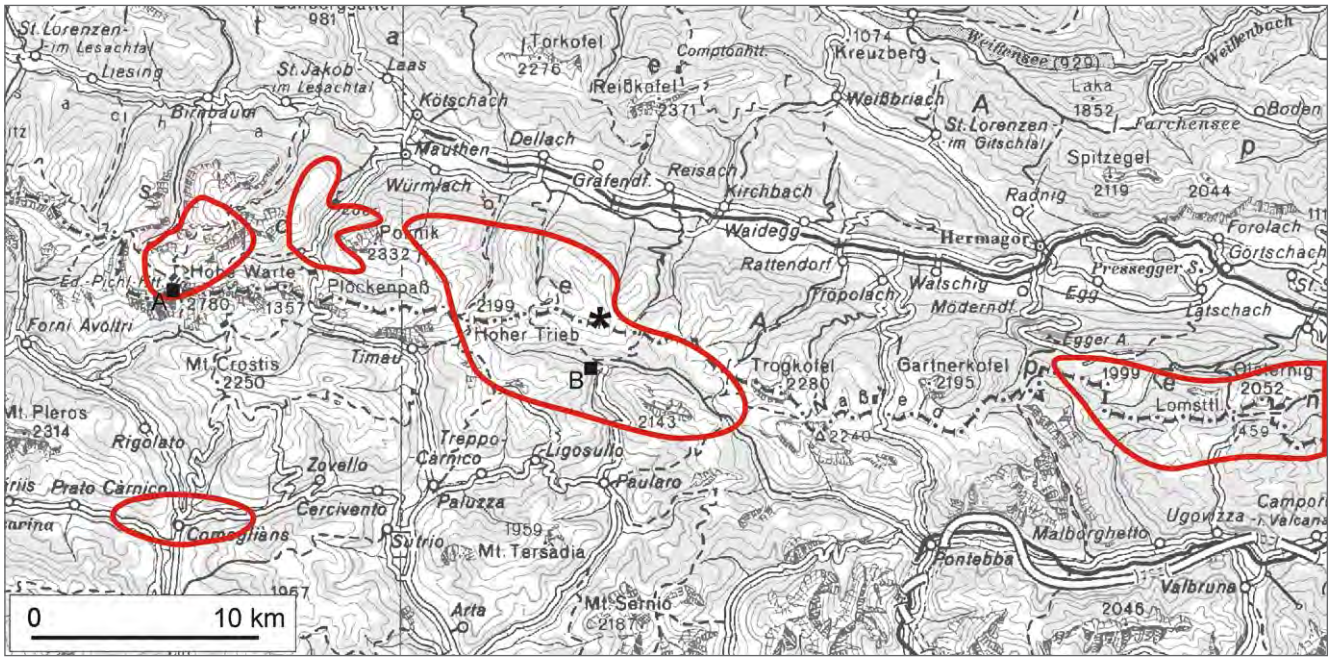
The Findenig Formation consists of red to pink nodular centimetric thick beds of mudstone/wackestone, with interlayered millimetric to centimetric red marls, and, at places, some centimetric to decimetric calcarenitic (grainstone) intervals (allodapic layers) and breccia (calcirudite) beds in the upper part of the unit.

Fossil content

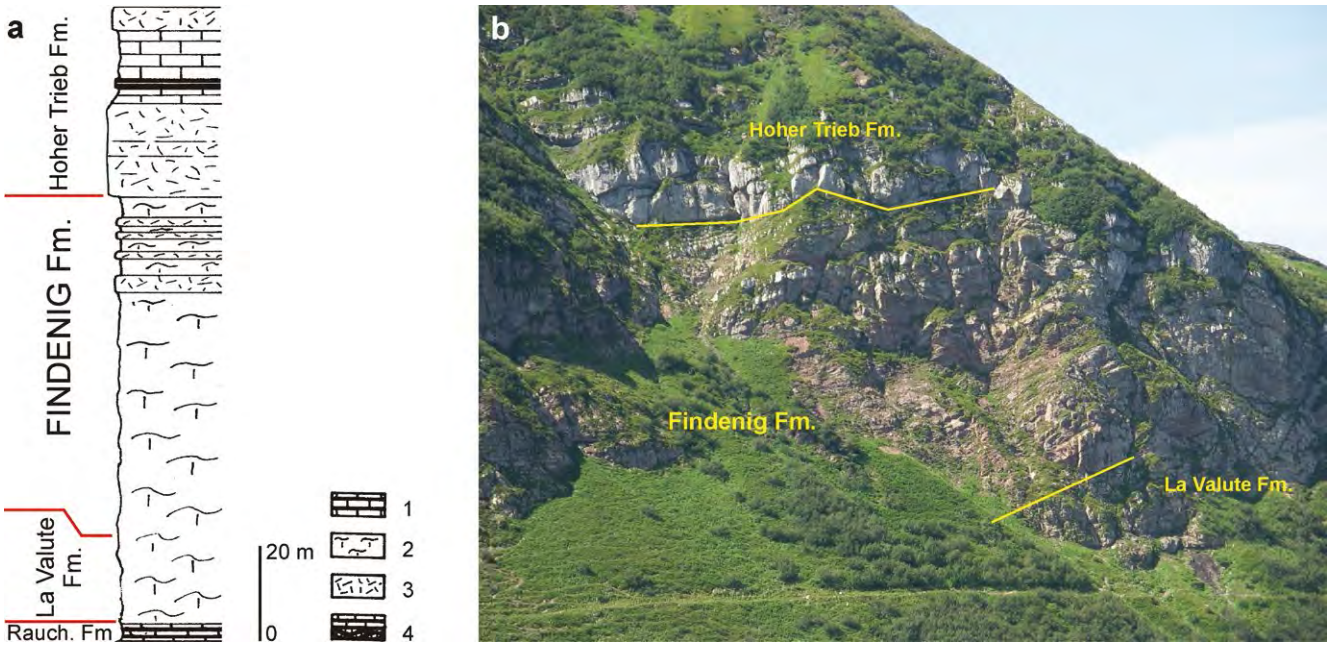
Brachiopods, conodonts, crinoids, dacryoconarids, foraminifers, goniatites, orthoceratids, ostracods.

Depositional environment

The Findenig Formation took place in a pelagic environment, from slope to open basin. The allodapic layers have been interpreted as tempestites (VAI, 1980).



Areas of outcrop of the Findenig Formation with indication of the stratotype (asterisk) and reference sections (squares). A: Costone Lambertenghi/Seekopf Sockel Section; B: Stua Ramaz Section.



The Findenig Section 4. a) log of the section, 1: well bedded, dark gray limestone with interbedded chert, 2: gray to pink nodular limestone, 3: massive light gray rudite, 4: well bedded gray limestone with interbedded black shales (modified after PÖLSLER, 1969); b) panoramic view (photo C. CORRADINI).

Stratotype

"Findenigkofel profil 4" (PÖLSLER, 1969), on the northern slope of Findenigkofel/Mt. Lodin, at coordinates N 46°35'51.4", E 13°06'04.0".

Reference sections

Costone Lambertenghi/Seekopf Sockel Section, west of Lake Wolayer at coordinates N 46°36'34.6", E 12°51'58.8" (at the base of the Findenig Formation), where the boundaries with the La Valute Formation and the Valentin Formation are well exposed and easy accessible.

Stua Ramaz Section, along the Chiarsò creek at coordinates N 46°34'32.6", E 13°06'37.3"), where the allodapic layers are well developed (VAI, 1980).

Type area

Carnic Alps.

Main outcrop areas

The Findenig Formation crops out along the whole Carnic Alps, mainly in Lake Wolayer-Rauchkofel, Cuestalta/Hoher Trieb, to Mt. Pizzul and Mt. Cocco areas.

Thickness

About 25 m (Lake Wolayer/Volaia) to about 60 m (Findenigkofel).

Boundaries

Underlying units – La Valute Formation (comformable gradual contact), Nölbling Formation in the distal part (conformable contact).

Overlying units – Hohe Trieb Formation (conformable gradual contact), Valentin Formation (conformable gradual contact).

Lateral units – Rauchkofel Formation, Kellerwand Formation and Vinz Formation in the proximal part; Zollner Formation in the distal one.

Derivation of name

After Mount Findenigkofel.

Synonymy

Grauer und rother Kramenzelkalk: Frech (1894).
Calcari a tentaculiti [partim]: Vai (1963); Venturini (2006).
Calcari nodulari a tentaculiti [partim]: Vai in Braga et al. (1971).
Findenigkalk [partim]: Pölsler (1969).
'Roter Flaser- und Knollenkalk': Bandel (1974).
Reddish nodular limestone: Schönlaub (1980).
Calcari pelagici a tentaculiti [partim]: Spalletta et al. (1982).
Findenig-kalk: Schönlaub (1985a).
Findenig Limestone: Schönlaub (1985b).
Tentaculite pelagic limestone [partim]: Spalletta & Venturini (1990).
Cuestalta Limestone [partim]: Brime et al. (2008).
Calcari di Cuestalta [partim]: Spalletta & Pondrelli (2009).
Findenig-Formation/Findenig Formation: Suttner & Kido (2014).

Chronostratigraphic age

Devonian: From the uppermost Lochkovian to Eifelian.

Biostratigraphy

Conodonts. – From the *pandora* β Zone (Corriga et al., 2011) to the *costatus* Zone (pers. comm. C. Spalletta, 2014).

Dacryoconarids. – From the *Homoctenowakia bohemica* to the *Nowakia (N.) holynenis* Zone (Alberti, 1985).

Complementary references -

Remarks -

Views of the Findenig Formation in the field. a) view of the outcrop along the Rio Chiarsò (photo C. Spalletta); b) allodapic layers (gray) at the Stua Ramaz Section (photo G.B. Vai); c) the typical nodular limestone of the Findenig Formation on a bed surface in the Costone Lambertenghi/Seekopf Sockel Section (photo C. Corradini).

References

Alberti, G.K.B. (1985): Zur Tentaculitenfuehrung im Unter- und Mittel-Devon der zentralen Karnischen Alpen (Österreich). – Courier Forschungsinstitut Senckenberg, **75**, 375–387, Frankfurt am Main.

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.

Braga, G.P., Carloni, G.C., Colantoni, P., Corsi, M., Cremonini, P., Frascari, F., Locatelli, D., Monesi, A., Pisa, G., Sassi, F.P., Selli, R., Vai, G.B. & Zirpoli, G. (1971): Note illustrative della Carta geologica d'Italia. Foglio 4c-13 M. Cavallino-Ampezzo. – Ministero dell'Industria, del Commercio e dell'Artigianato, Direzione Generale delle Miniere, Servizio Geologico d'Italia, 108 p., Roma.

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.

Corriga, M.G. Suttner, T.J., Kido, E., Corradini, C., Pondrelli, M. & Simonetto, L. (2011): The age of the La Valute limestone-Findenig limestone transition in the La Valute Section (Lower Devonian, Carnic Alps, Italy). – Gortania Geologia, Paleontologia, Paletnologia, **32**, 5–12, Udine.

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

Pölsler, P. (1969): Stratigraphie und Tektonik im Nordabfall des Findenigkofels (Silur bis Karbon; Karnische Alpen, Österreich). – Jahrbuch der Geologischen Bundesanstalt, **112**, 355–398, Wien.

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., Kříž, 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.

Schönlaub, H.P. (1985a): 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. (1985b): Devonian conodonts from section Oberbuchach II in the Carnic Alps (Austria). – Courier Forschungsinstitut Senckenberg, **75**, 353–374, Frankfurt am Main.

Spalletta, C. & Pondrelli, M. (2009): Calcari di Cuestalta. – 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), 41–42, Stampa A.T.I. – S.EL.CA. srl. – L.A.C. srl. – System Cart srl., Firenze.

Spalletta, C. & Venturini, C. (1990): Stratigraphic correlation form of the Palaeozoic sequence in the Carnic Alps. – Rendiconti della Società Geologica Italiana, **12**, 417–421, Roma.

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.

Suttner, T.J. & Kido, E. (2014): Findenig-Formation/Findenig Formation. – 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**, 73, Wien.

Vai, G.B. (1963): Ricerche geologiche nel gruppo del M. Coglians e nella zona di Volaia (Alpi Carniche). – Giornale di Geologia, **30**, 137–198, Bologna.

Vai, G.B. (1980): Sedimentary environment of Devonian pelagic limestones in the Southern Alps. – Lethaia, **13**, 79–91, Oslo.

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