

Devonian conodonts from the Oberbuchach II section

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Locality - Along the road connecting Gundersheim and Gundersheimer Alm, at coordinates N 46°37'37", E 13°06'15".

Lithostratigraphic unit - Alticola Fm., Rauchkofel Fm., La Valute Fm., Findenig Fm., Hoher Trieb Fm. and Pal Grande Fm.

Age - Pridoli (upper Silurian) to Givetian (Middle Devonian), and Famennian (Upper Devonian); Lower O.e. detortus Zone to Sm. hermanni Zone, and Pa. rhomboidea Zone.

What to see - A continuous rock sequence from Pridoli to Givetian deposited in pelagic environment.

How to get there

The Oberbuchach II section is located at an altitude of 1280 m, south of the village of Gundersheim in the Gail Valley. The section is exposed along a small Alpine road constructed in the mid-1970s running from the Gail Valley near Gundersheim to Gundersheim Alm (Fig. 1).



Figure 1. Location map of the Oberbuchach II section.

Historical outline

The Oberbuchach II section is a classical section for the pelagic Devonian deposits of the Carnic Alps. The section was first studied by Jaeger & Schönlaub (1980), who focused on the Lochkovian part. Research was extended to the upper part of the section in the following years, and Schönlaub (1985) and Alberti (1985) published detailed conodont and tentaculites data, respectively.

Lithology and fossil content

At Oberbuchach II section more of 120 m of limestones and shales are exposed, documenting a continuous pelagic sedimentation from the Pridoli to the Middle Devonian (upper Givetian). In the uppermost part of the section, after a fault, a few meters of Famennian limestones occur.

The section starts with a few meters of light gray well bedded limestones of the Alticola Fm., grading abruptly into dark platy limestones with interbedded black shales and marls of the Rauchkofel Fm. The formational boundary is more or less coincident with the Silurian/Devonian boundary (Fig. 3). At Oberbuchach II section the Rauchkofel Fm is about 11 m thick and is overlain by the light gray to pale brown limestones of the La Valute Fm. This unit is here 15 m thick and become more nodular and marly in the upper part before the gradual boundary

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with the Findenig Fm. The Lochkovian-Pragian boundary is traced in the uppermost part of La Valute Fm., in connection with the entry of the dacyoconarid species *Nowakia acuaria* (Fig. 4) The Findenig Fm. is more than 40 m thick and is mainly represented by poorly fossiliferous pink and gray flaser and nodular limestones.

The Findenig Fm. is succeeded by the Hoher Trieb Fm., which is represented by an alternation of limestones, shales, cherts, encrinites, and by two thick bodies of bio- and litho-clastic limestones and breccias with silicified corals and stromatoporoids. Both the Emsian/Eifelian and Eifelian/Givetian boundaries occur within this unit (Figs 5-6). The Hoher Trieb Fm. is 53 m thick, but the upper part of the unit is missing due to a fault that interrupts the section. Above the fault a few meters of limestones of the Pal Grande Fm. are exposed.

Beside conodonts, graptolites are relatively abundant in the shales of the Rauchkofel Fm. (Jaeger & Schönlaub, 1980; Schönlaub, 1985), and tentaculites have been documented from several levels of the La Valute, Findenig and Hoher Trieb Fm. (Alberti, 1985; Schönlaub, 1985). Loboliths of scyphocrinitid pelagic crinoids are rather abundant in the basal Devonian beds.



Figure 2. Views of the Oberbuchach II section. **A.** Panoramic view of the section with the limestones of the Findenig Fm. in the foreground. **B.** Detail of the Rauchkofel Fm.

Palaeoenvironment

The Oberbuchach II section was deposited in a pelagic environment.

Conodonts

The original conodont collection from Oberbuchach II section by H.P. Schönlaub is stored at the Austrian Geological Survey in Vienna. It includes more than 180 samples of late Silurian to Late Devonian age (Figs. 3-6), and has been restudied for this paper on the basis of recent taxonomic revisions.

The association includes 110 conodont taxa (species and subspecies) belonging to 25 genera. The state of preservation of conodonts is in general quite good, with an abundance varying from a few to more than 250 elements/Kg of rock. Both abundance and diversity are in general higher in the Middle Devonian than in the older parts of the section.

Biostratigraphy

Twenty-eight conodont zones are discriminated in the Oberbuchach II section. For details and complete conodont occurrence refer to Figs 3-6.

The lower part of the section can be attributed to the Lower *O.e. detortus* Zone by the occurrence of *D. obliquicostatus* in sample 9. The Silurian/Devonian boundary (= base of the *I. hesperius* Zone) is traced at level of sample 16, where both *I. hesperius* and *I. woschmidti* were collected. The base of the succeeding *I. postwoschmidti* Zone is tentatively aligned with the entry of *Pand. optima*, as already done in other sections of the Carnic Alps (Schönlaub et al., 2017). However, the alignment of the FAD of *Pand. optima* with the FAD of *I. postwoschmidti* has still to be demonstrated. The base of the succeeding *Ad. carlsi* Zone is discriminated by the entry of the marker in sample 47.

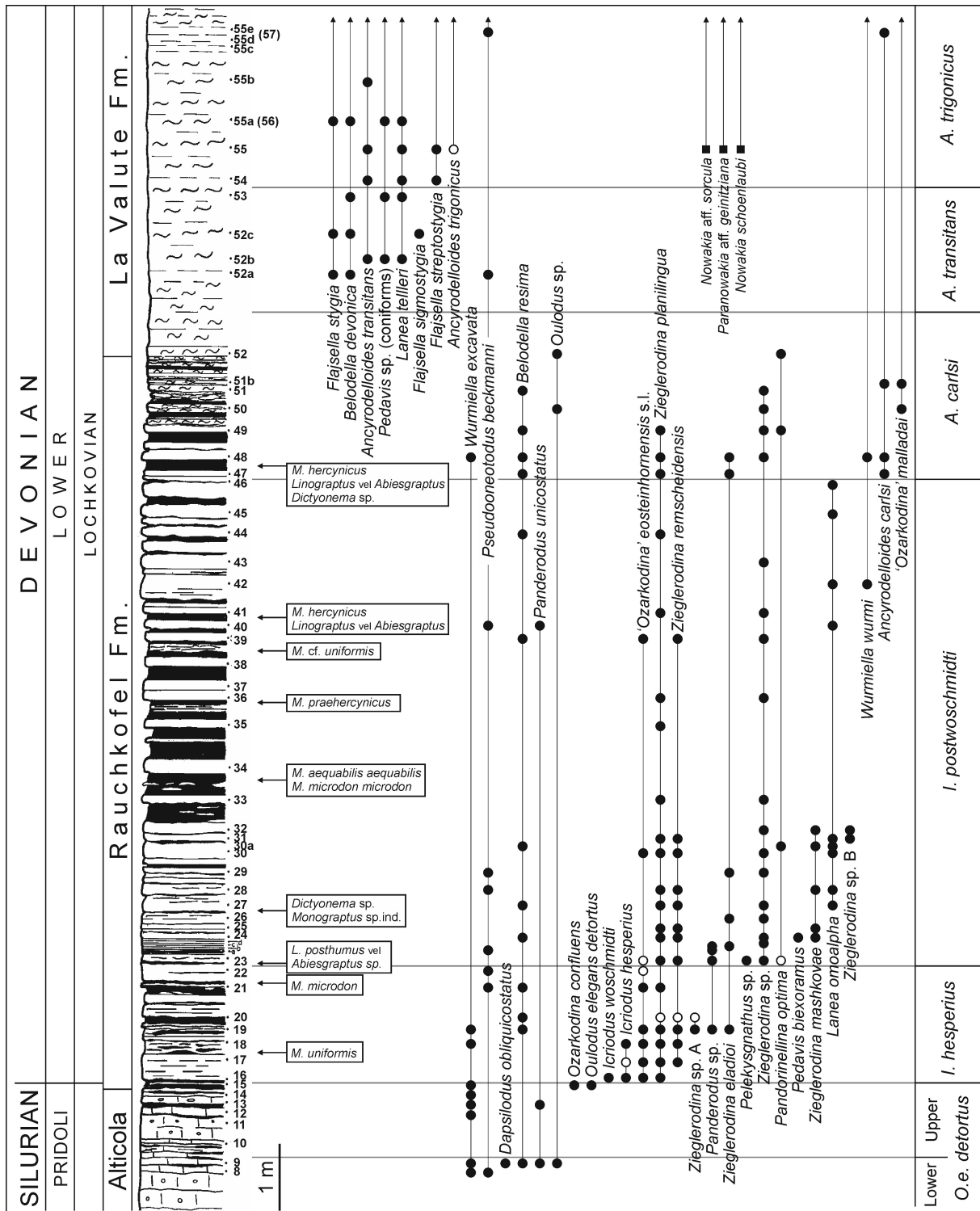


Figure 3. Stratigraphic column of the lower part of the Oberbuchach II section and occurrences of graptolites, conodonts and tentaculites. Log and tentaculite data after Schönlaub (1985); graptolite occurrences after Jaeger & Schönlaub (1980).

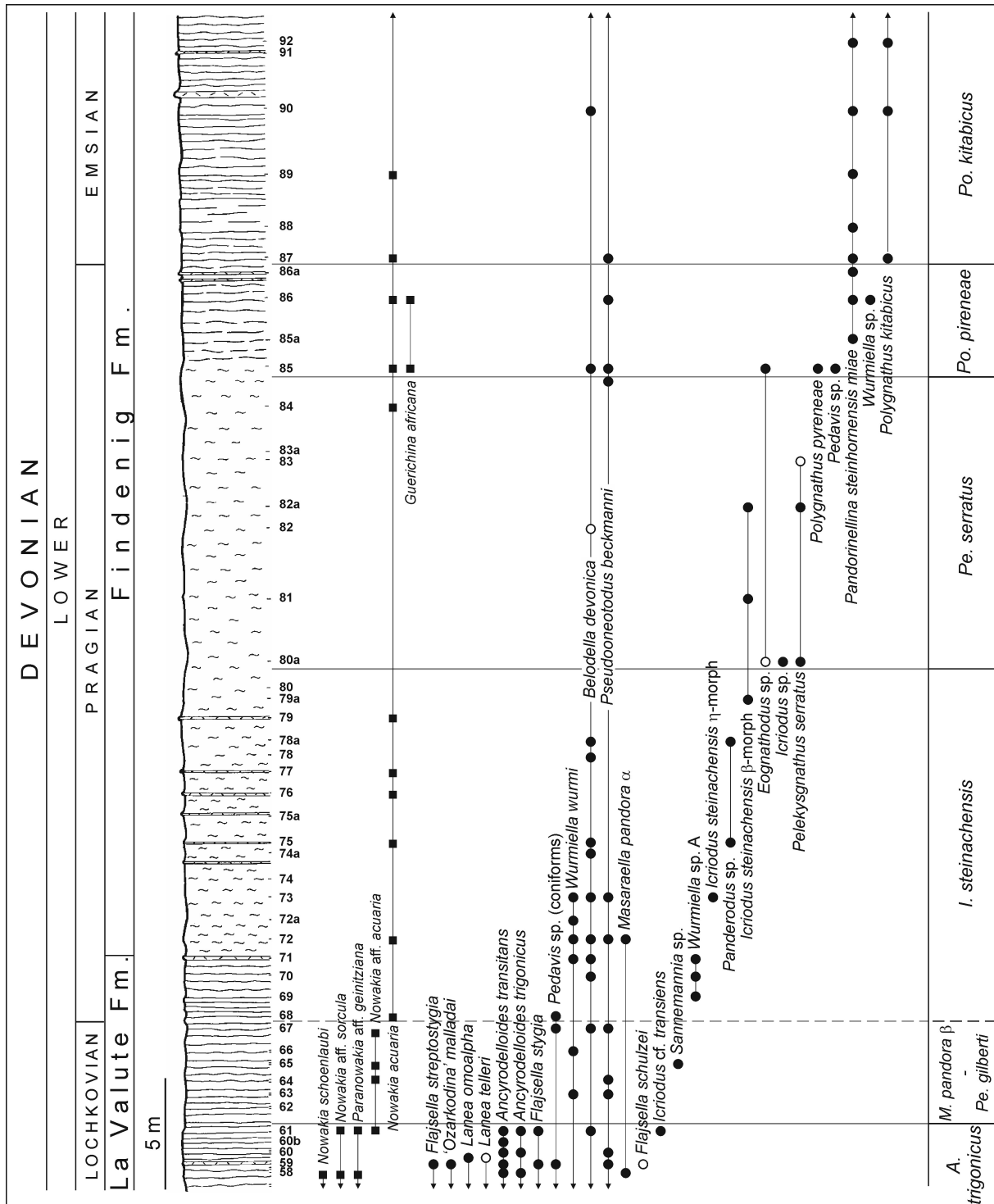


Figure 4. Stratigraphic column of the lower-central part of the Oberbuchach II section and occurrences of conodonts and tentaculites. Log and tentaculite data after Schönlaub (1985).

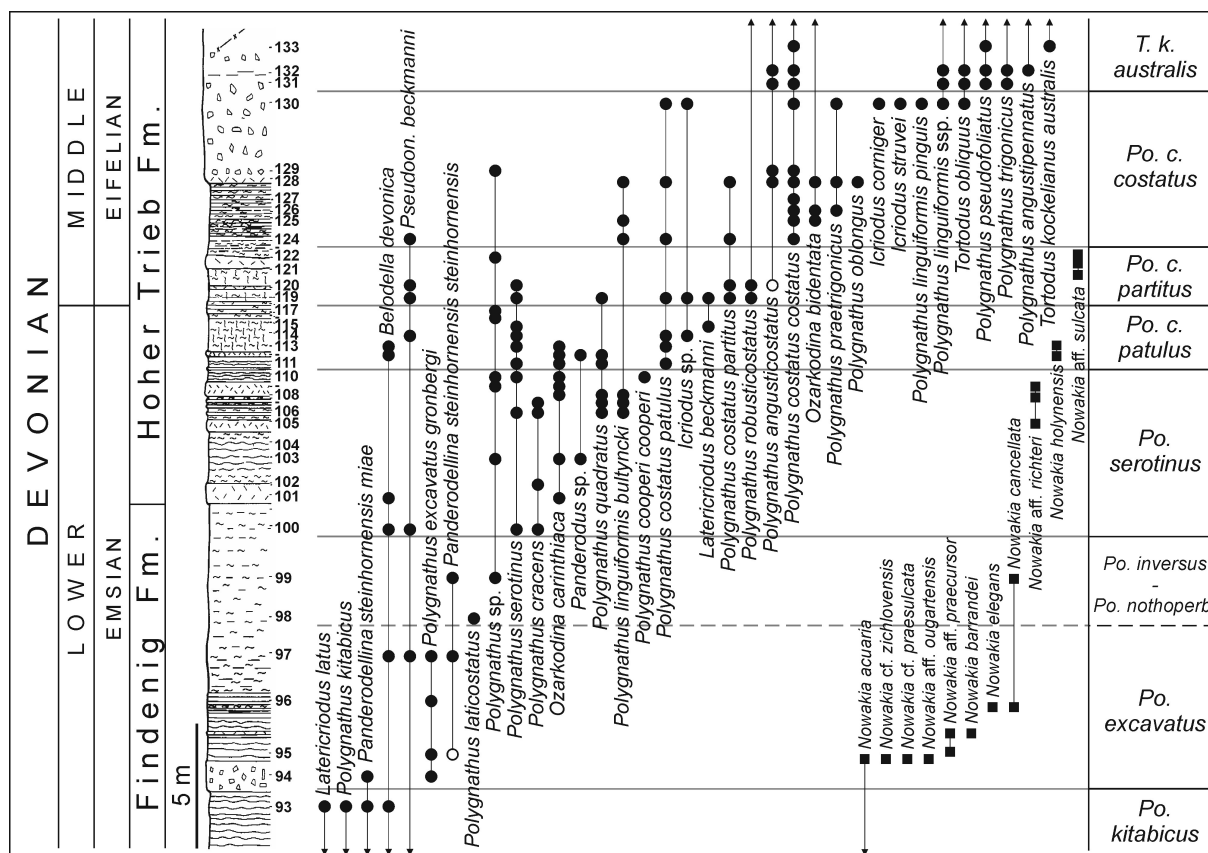


Figure 5. Stratigraphic column of the upper-central part of the Oberbuchach II section and occurrences of conodonts and tentaculites. Log and tentaculite data after Schönlaub (1985).

The base of the *A. transitans* Zone occurs below sample 52a, where *Fl. stygia*, which has his FAD in the central part of the Zone, occur. The succeeding *Ad. trigonicus* Zone starts at level of samples 54 by the presence of *Flajsella streptostygia* which is exclusive of this Zone. The top of the zone is discriminated by the last occurrence of *Ad. trigonicus*, whereas the scarce conodont associations in the upper part of the La Valute and Findenig formations prevents to define a precise zonation of the upper Lochkovian and Pragian interval. The Lochkovian/Pragian boundary is traced by the FAD of the dacroconarid *Nowakia acuaria*, since *I. steinachensis* occur a few meters higher.

The Pragian/Emsian boundary is traced at level of sample 87, where *Po. kitabicus* first occurs. The other Emsian conodont biozones within the Findenig Fm. are discriminated by the entry of *Po. excavatus gronbergi*, *Po. laticostatus*, and *Po. serotinus*.

Conodont are abundant in the Hoher Trieb Fm., allowing to obtain a precise biostratigraphy of the upper part of the section (Figs. 5-6). The Emsian/Eifelian boundary is traced at the entry of the index taxon *Po. c. partitus* at level of sample 118, and the Eifelian/Givetian one at sample 149, where *Po. hemiansatus* first occurs.

In the upper part of the section a clear fault separates the Hoher Trieb Fm. from the Pal Grande Fm., and the equivalents of the upper Givetian, Frasnian and lower Famennian are missing. The first limestone bed above the fault yielded conodonts of the middle Famennian *Pa. rhomboidea* Zone.

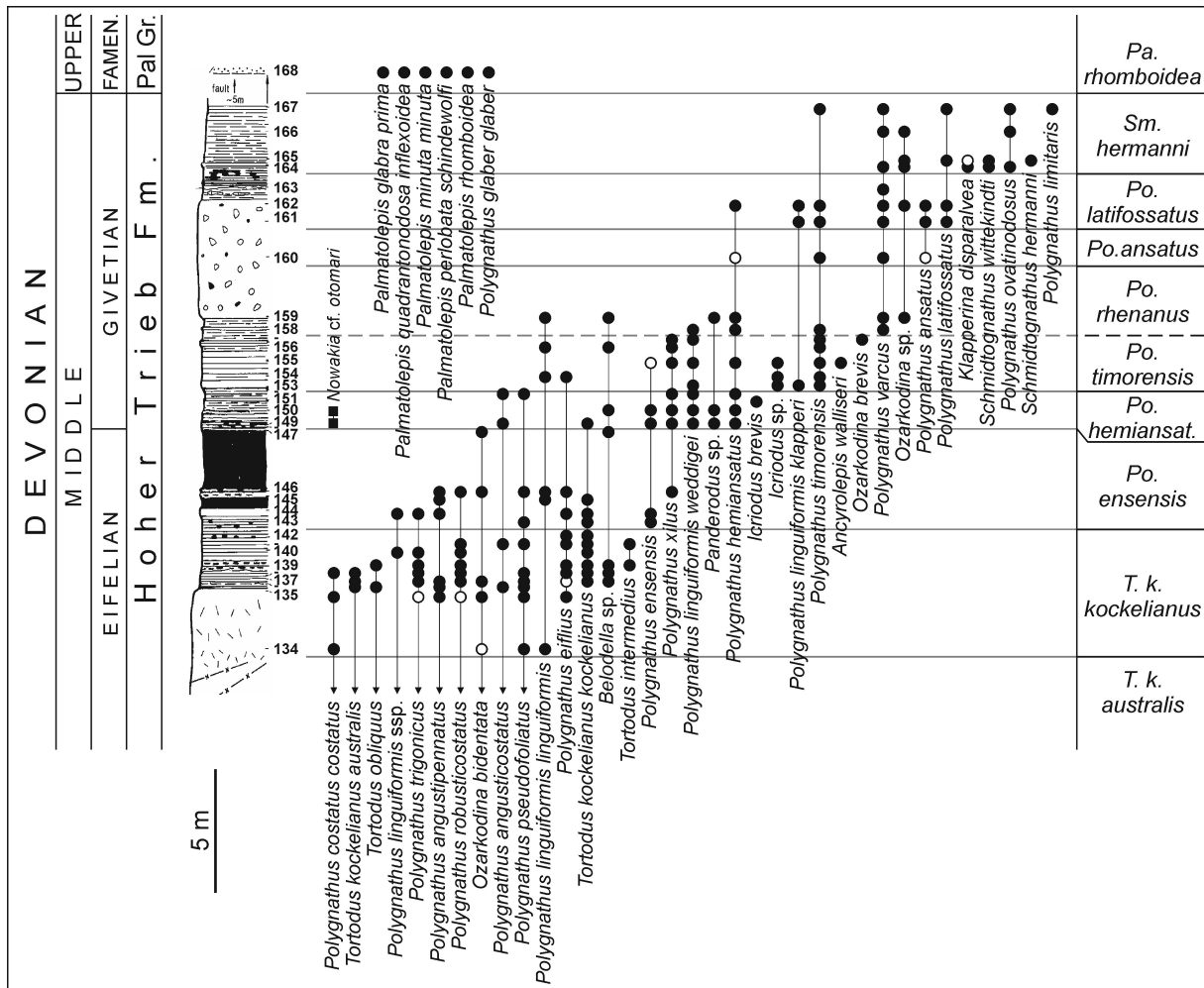


Figure 6. Stratigraphic column of the upper part of the Oberbuchach II section and occurrences of conodonts and tentaculites. Log and tentaculite data after Schönlaub (1985).

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