

Section 1

Silurian/Devonian boundary section of Eggenfeld/Paeozoic of Graz (fig. 5, 6, 7)

by Fritz Ebner¹

Location

Approx. 13 km NNW of Graz at the eastern side of the Mur Valley N of the village Eggenfeld. The bad exposures are located at the edge of the forest area of Eggenfeld at an altitude of 440 m.

Geological and paleontological informations

EBNER 1976, 1983, PLODOWSKI 1976, FRITZ & NEUBAUER 1988, NEUBAUER 1989, FRITZ et. al. 1992.

Geodynamic/paleogeographic evolution

The Silurian/Lower Devonian basal units of the uppermost nappe (Rannach nappe, fig. 5) of the Graz Thrust Complex are differentiated in account of their paleogeographic/geodynamic evolution. The Silurian is dominated by alkaline mafic lavas and pyroclastics which are interpreted as initial rift sequences. These volcano- and siliciclastics are followed by progressive carbonate production during the Devonian.

In the Eggenfeld area the distribution of Upper Silurian/Lower Devonian sediments is controlled by the Silurian volcanism (fig. 6). It is suggested that the volcanic island of Eggenfeld was buried by Late Silurian/Lowermost Devonian fossiliferous carbonates. Within the Lower Devonian block rotation occurred due to extensional tectonics. This caused a weak angular unconformity between the Late Silurian/Lower Devonian carbonates ("Crinoid-Fm.") and the Lower Devonian Dolomite Sandstone-Fm. The latter is starting with a 5-10 m thick yellow rauchwacke member (FRITZ & NEUBAUER 1988, NEUBAUER 1989).

Lithostratigraphic sequence (fig. 7)

In spite of the bad outcrops the following lithostratigraphic sequence (from S-N = bottom - top) may be reconstructed (EBNER 1976).

Diabas Fm. of Eggenfeld (Silurian)

1) Massive green diabases interfingering with violett to greenish/grey tuffs. Syngenetic hematitic layers and crusts are concentrated at the tuffs and the upper contact of the diabases to dark dolomites.

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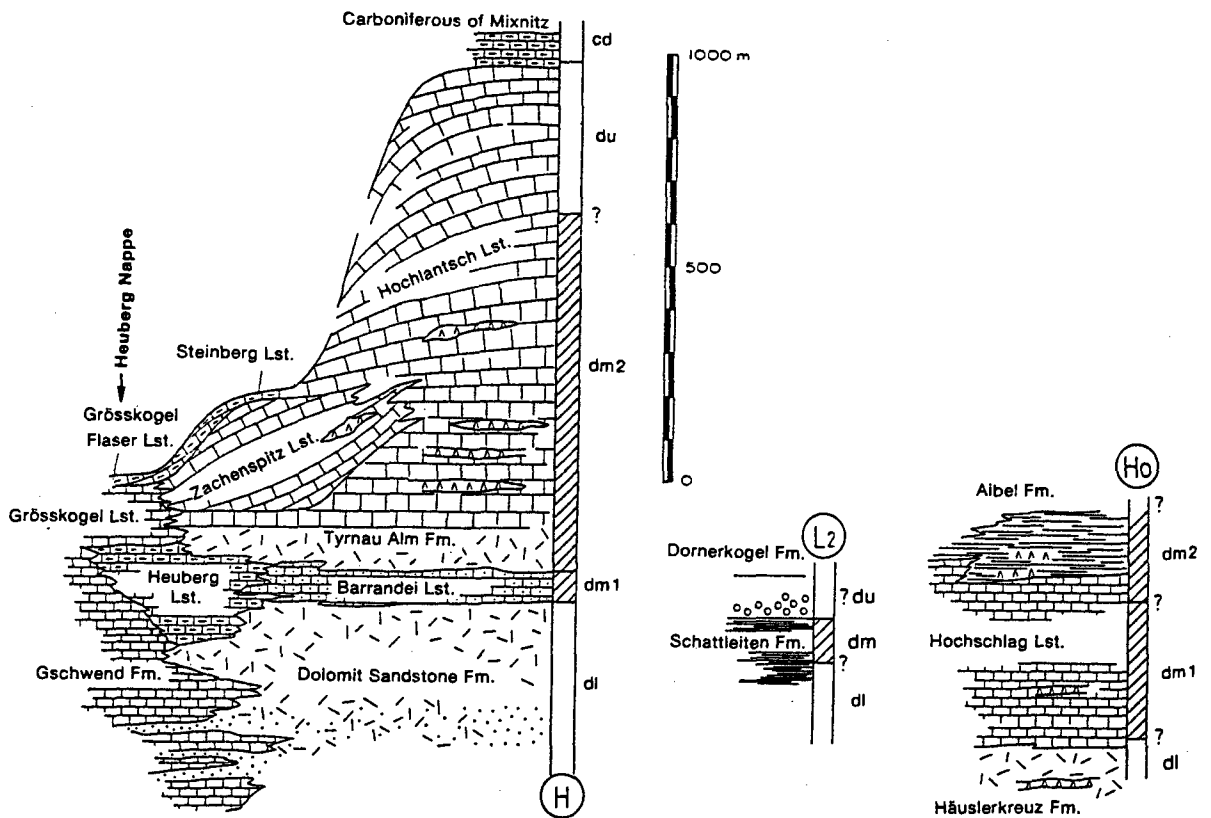
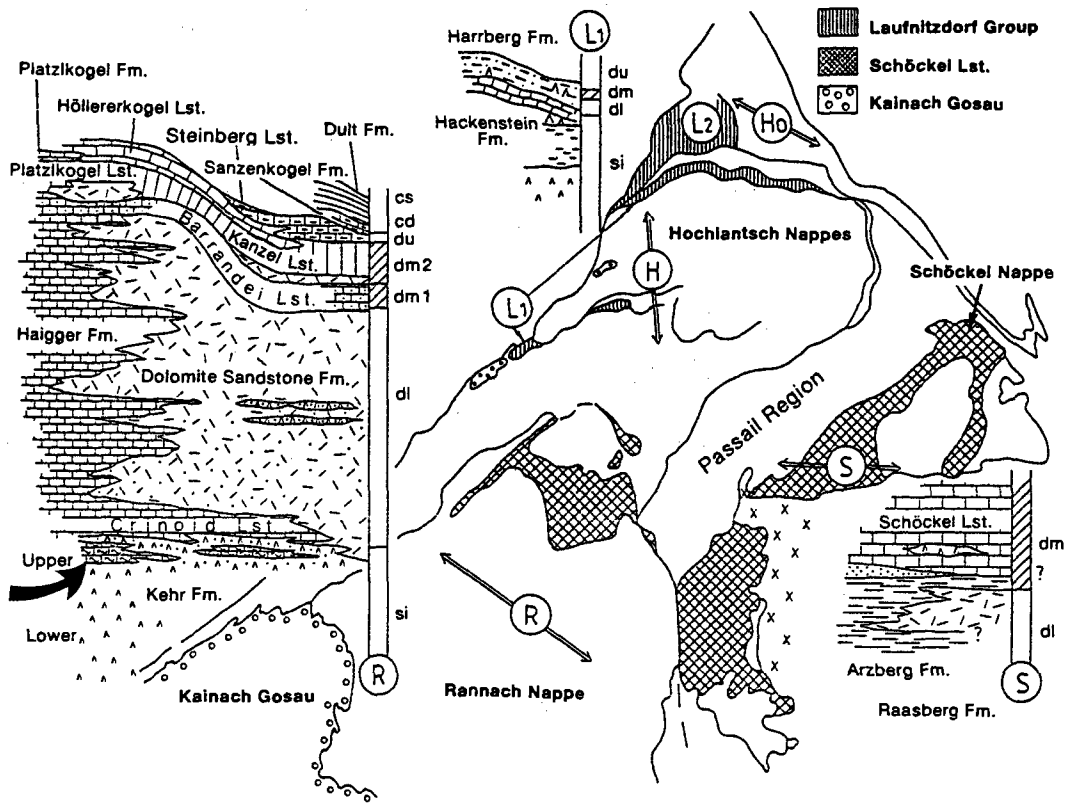


Fig. 5: Stratigraphy of the thrust system of the Paleozoic of Graz. Letters of the stratigraphic columns indicate: *R* Rannach Group; *L*₁, *L*₂ Laufnitzdorf Group; *Ho* Hochschlag Group; *S* Schöckel Group. (FLÜGEL & NEUBAUER 1984).

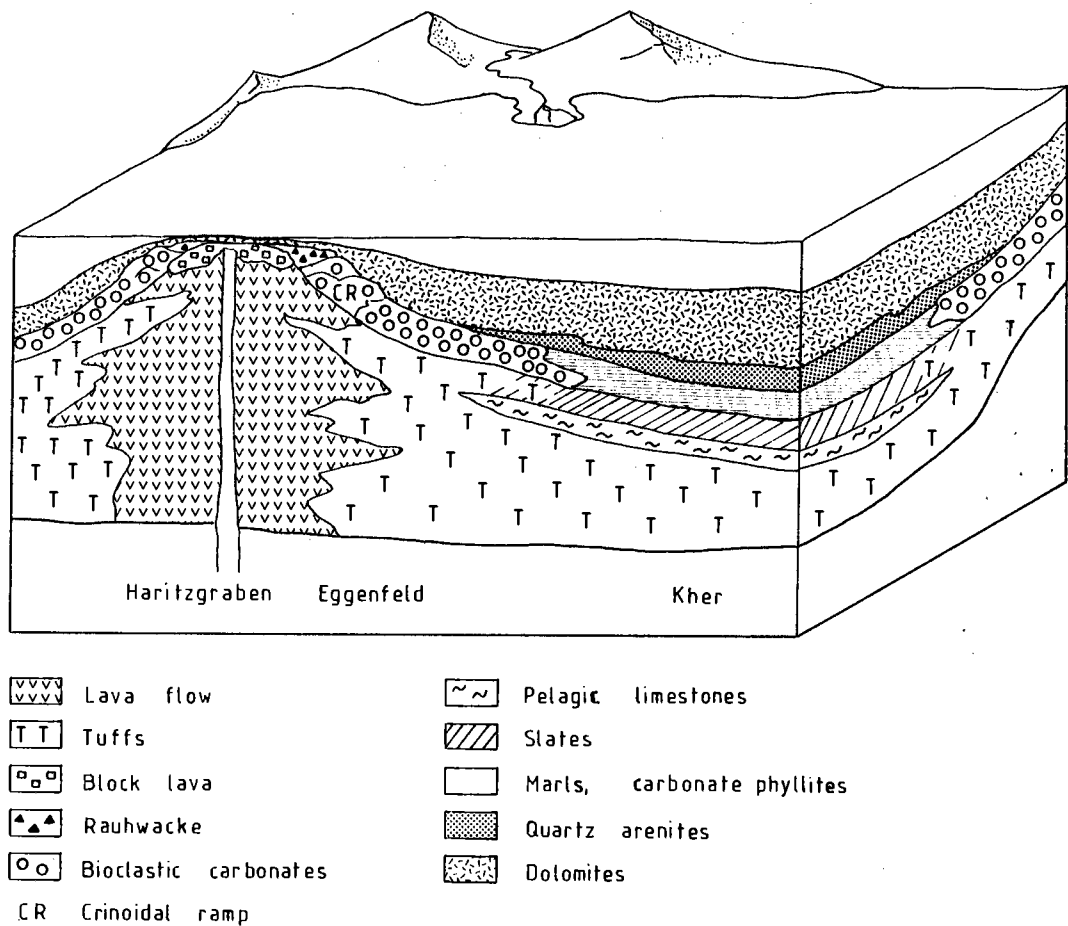


Fig. 6: Diagram showing the Middle Silurian Volcanic centers (after FRITZ & NEUBAUER 1988)

"Crinoid"-Fm. (Late Silurian - Lochkov)

- 2) 200 cm dark, bedded dolomites (D/1)
- 3) 700 cm tuffs and tuffitic shales
- 4) 200 cm dark, bedded dolomites (D/2) with lenses of bioclastic (crinoids, brachiopods) dolomitic limestones (L/1)
- 5) 350 cm tuffs and tuffitic shales including some layers of dark dolomites (D/3) with lenses and layers of bioclastic (crinoids, brachiopods) limestones (L/2).

The microfacies of the dolomites (D/1-3) is characterized by a fine grained sparitic fabric and a content of biogens (filaments, brachiopods, crinoids, trilobites, orthoceratids) up to 15 %. The bioclastic limestone lenses (L 1/2) are dolomitized biosparitic limestones rich in crinoids and brachiopods (often with geopetal internal sediments).

Dolomite Sandstone-Fm. (Late Lower Devonian)

6) light dolomites

The yellow rauchwacke member at the base of the Dolomite Sandstone-Fm. is badly exposed at the path from the parking place to the Silurian/Devonian boundary section.

Fossil record and biostratigraphy

Macro- and microfossils (conodonts) are restricted to the carbonatic levels D/1-3 and bioclastic lenses (L1/2).

D 1: common: crinoids; rare: small indet. brachiopods, orthoceratids, *Favosites* s p.

D 2: common: crinoids, rare: orthoceratids, corals (*Syringaxon* sp.)

D 3: common: crinoids

L1/L2: common *Septatrypa subsecrata* PLODOWSKI, 1976.

The brachiopods deriving from L1/L2 were described by PLODOWSKI 1976 as the new dimorphic species *Septatrypa subsecrata* (with formae "typica" and "trapezoidalis"). Due to accompanying conodonts the brachiopod levels are dated as *eosteinhornensis*- and *woschmidti* Zone of Latest Silurian and Earliest Devonian age.

A few brachiopods (Uncinulidae and cf. *Dubaria hircinaeformis*) were found as loose materials but can not be related to a distinct carbonatic level.

Conodonts are relatively frequent in all carbonatic levels. Due to the dolomitization they are relatively well preserved and show CAI 5. Beside conodonts agglutinated foramaminifera (*Hyperammina*, *Lagenammina*, *Tolypammina*, *Psammosphaera cava*, *Sorosphaera tricella*, indet. ostracods) and some microproblematics were found.

All carbonatic levels were dated by conodonts (quoted only stratigraphic important taxa):

D/1: Ludlow (*P. siluricus* Zone): *Kockelella variabilis*, *Polygnathoides emarginatus*, *Polygnathoides siluricus*.

D/2: Basal parts of D/2 indicate the *O. snajdri* horizon of the *P. siluricus* Zone by *Ozarkodina snajdri* and *Poygnathoides emarginatus*. The first occurrence of *Ozarkodina remscheidensis eosteinhornensis* was also recorded inside this level.

The bioclastic lenses approximately 65 cm above the base of D/2 with *Ozarkodina remscheidensis eosteinhornensis* are related to the *O. eosteinhornensis* Zone. In between these levels index condonts of *P. latialata*- and *O. crispa* Zone were not recorded.

D/3: The base of the Devonian (*I. woschmidti* Zone) was proved by *Icriodus woschmidti* from the lowermost carbonatic level of the upper band of tuffitic shales followed by *Ozarkodina remscheidensis remscheidensis* in the nextfollowing carbonatic level.

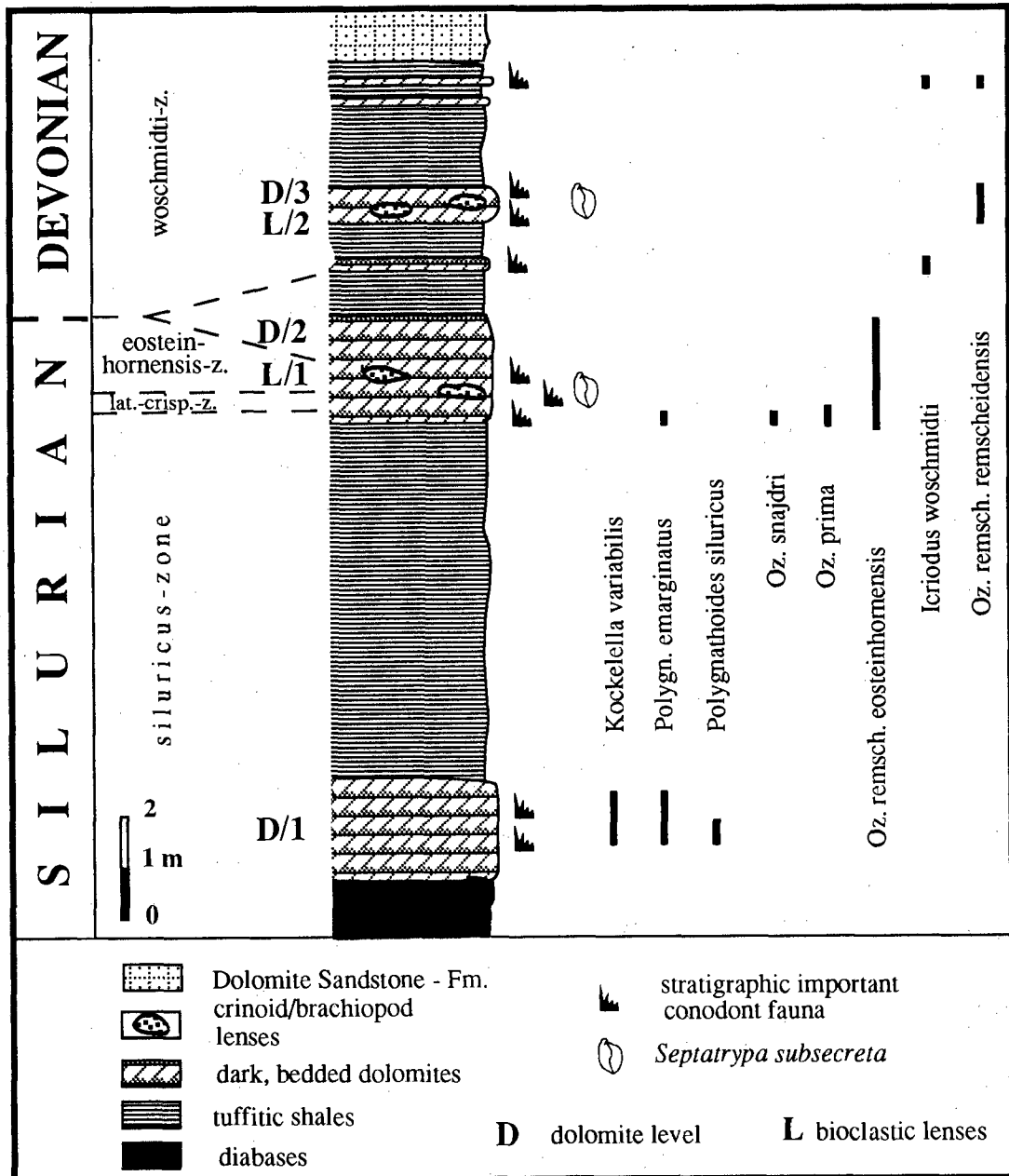


Fig. 7: Bio- and Lithostratigraphy of the Eggenfeld Section

Importance of Eggenfeld section

- * Proof of Silurian volcanism which is typical for the Eastern Alps.
- * Continuation of the volcanic activities to the Lower Devonian.
- * Geodynamic implications (block rotation) deduced from biostratigraphy and field mapping.
- * One of the best biostratigraphic records of Upper Silurian and Lowermost Devonian in the Eastern Alps. All paleontological materials are stored in Graz at the Landesmuseum Joanneum, Dept. of Geology and Paleontology.
- * Position of the Silurian/Devonian boundary between the conodont bearing levels of D/2 and D/3 within a vertical sequence of approx. 2 m.
- * Locus typicus of *Septatrypa subsecrata* PLODOWSKI, 1976.

What to see in the field ?

- * Silurian diabases behind the house at the path from the parking place to the Silurian/Devonian section. o Along the path to the forest bad exposures and debris of tuffitic shales and yellow rauckwacke.
- * In the forest righthand the path the outcrop in which the "Crinoid"-Fm. is overlain by the rauckwacke member of Dolomite Sandstone-Fm. by a weak unconformity (according to FRITZ & NEUBAUER 1988, NEUBAUER 1989).
- * The lithostratigraphic section above the diabases and the Silurian/Devonian boundary section described before includes the locus typicus of *Septatrypa subsecrata* (EBNER 1976, PLODOWSKI 1976).
In the field the carbonatic levels are indicated by red letters. Collection of conodont samples and perhaps some brachiopods is possible.

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