

## The Cellon section

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**Locality** - On the eastern flank of Mt. Cellon/Creta di Collinetta, at coordinates N 46°36'32", E 12°56'31".

**Lithostratigraphic unit** - Uqua Fm., Ploecken Fm., Kok Fm., Cardiola Fm., Alticola Fm. and Rauchkofel Fm.

**Age** - Katian-Lochkovian (Upper Ordovician – Lower Devonian); Am. ordovicicus Zone to Icr. postwoschmidt Zone.

**What to see** - The reference section for many Silurian studies in the world. The stratotype of Uqua, Plöcken, Kok, Cardiola and Alticola formations, and type locality of several Silurian fossils.

### How to get there

The Cellon section is located in a narrow avalanche gorge on the eastern flank of Mt. Cellon, at an altitude of about 1500 m, close to the Austrian/Italian border. It is accessible by a short walk along path n. 427-3 from Plöcken Pass/Passo di Monte Croce Carnico (Fig. 1).



Figure 1. Location map of the Cellon section.

### Historical outline

The Cellon section probably represents the most famous Silurian section in the world, and is the reference section for many Ordovician, Silurian and Devonian studies. The section has been famous since 1894, when Geyer (1894) first described the rock succession exposed here. The conodont fauna from the section was studied and described by Walliser (1957, 1964), whose pioneering work on the section included the first proposed Silurian conodont zonation (Walliser, 1964). Subsequent studies on the Cellon section have documented the composition and distribution of several fossil groups (bivalves, brachiopods, nautiloids, graptolites, foraminifers, ostracods, acritarchs, chitinozoans, trilobites and corals), microfacies, isotope signatures, taphonomic and palaeo-environmental indicators and eustatic sea-level changes. For a complete review of the previous studies on the Cellon section refer to Corradini et al. (2015).

Beside Walliser (1957, 1964), a few papers deal on conodonts from the Cellon section: Ferretti & Schönlaub (2001) revised the biostratigraphy of the Ordovician part of the

section, Corradini et al. (2015) updated the Silurian conodont biostratigraphy, and Corrigan et al. (2016) studied the Lochkovian part.

The Cella section is the type section of five lithostratigraphic units: Uqua Fm. (Schönlaub & Ferretti, 2015a), Plöcken Fm. (Schönlaub & Ferretti, 2015b), Kok Fm. (Ferretti et al., 2015a), Cardiola Fm. (Ferretti et al., 2015b) and Alticola Fm. (Ferretti et al., 2015c).



**Figure 2.** Views of the Cella section. **A.** panoramic view of Mt. Cella/Creta di Collinetta, with indication of the lithostratigraphic units. **B.** detail of the units of the Cella section (box in fig. a). **C.** the Ordovician part of the Cella section. **D.** the lower part of the Silurian sequence at Cella section. **E.** the Silurian/Devonian boundary beds at Cella section.

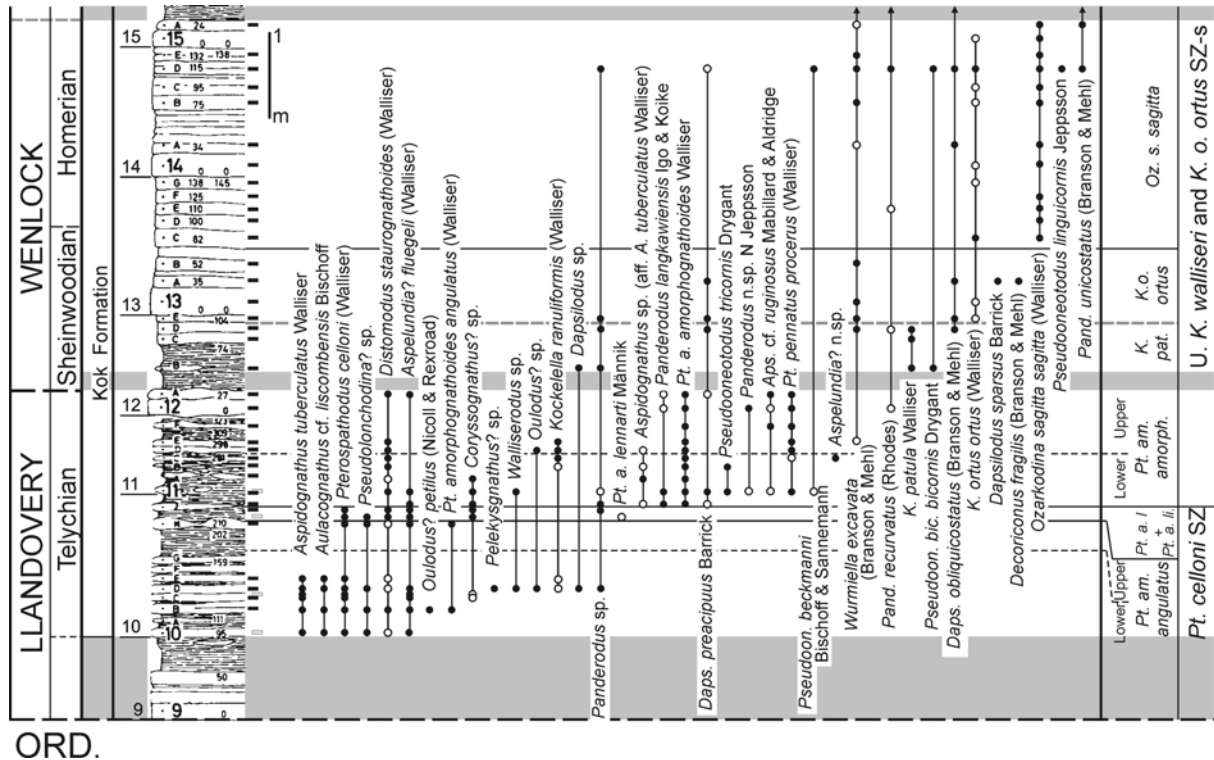
### Lithology and fossil content

The section exposes rocks from the Upper Ordovician to the Lower Devonian and represents the classical exposure of the Silurian “Plöcken facies”. However, although the conformable sequence

suggests continuity of sedimentation, several small gaps have been recognized, reflecting eustatic sea level changes in an overall shelf water environment (Schönlaub et al., 1994).

The following lithostratigraphic units can be recognized (from base to top) (Figs. 2-6):

1) Valbertad Formation. Lithology: greenish and greyish siltstones and shales. Thickness: More than 100 m. Age: Katian based on the occurrence of the deep-water *Foliomena* brachiopod fauna (Harper et al., 2009).



**Figure 3.** Stratigraphic log and conodont distribution in the Llandoverly and Wenlock part of the Cellon section (after Corradini et al., 2015).

2) Uqua Formation. Lithology: Greyish to brownish flaser limestone with layers of bioclastic debris. Thickness: 4.96 m. Age: Katian (Upper Ordovician), *Amorphognathus ordovicicus* conodont Zone (beds 1-5).

3) Plöcken Formation. Lithology: Grayish siltstone intercalating with impure bioclastic limestone at the base and grading into calcareous pyritic limestone and sandstone higher in the section. The lowermost strata of the formation are evidently of diamictite origin, the upper strata display contorted deformation structures, slumping, channel fillings and interbeds of fossil debris. Thickness: 6.17 m. At the base index fossils of the Hirnantian Stage (brachiopods, graptolites) clearly indicate the onset of this Stage (Jaeger et al. 1975). In addition, a carbonate- $\delta^{13}\text{C}$  excursion possibly corresponding with the HICE prominent peak in carbonate- $\delta^{13}\text{C}$  at the Katian-Hirnantian boundary (Bergström et al., 2009) has been documented (Schönlaub et al., 2011). Age: Hirnantian (Upper Ordovician), *Amorphognathus ordovicicus* conodont Zone (beds 6-8).

4) Kok Formation. Lithology: Well bedded brownish ferruginous nautiloid limestone, at the base alternating with black shale and marly interbeds. Thickness: 13.5 m. Age: Llandoverly to Ludlow, *Pterospirifer celloni* SZ to *Ancoradella ploeckensis* conodont zone (beds 9-19).

5) Cardiola Formation. Lithology: Dark gray to black limestone with marly and shaly interbeds. Thickness: 3.5 m. Age: Ludlow, *A. ploeckensis* to *Polygnathoides siluricus* conodont zones (beds 20-24A).

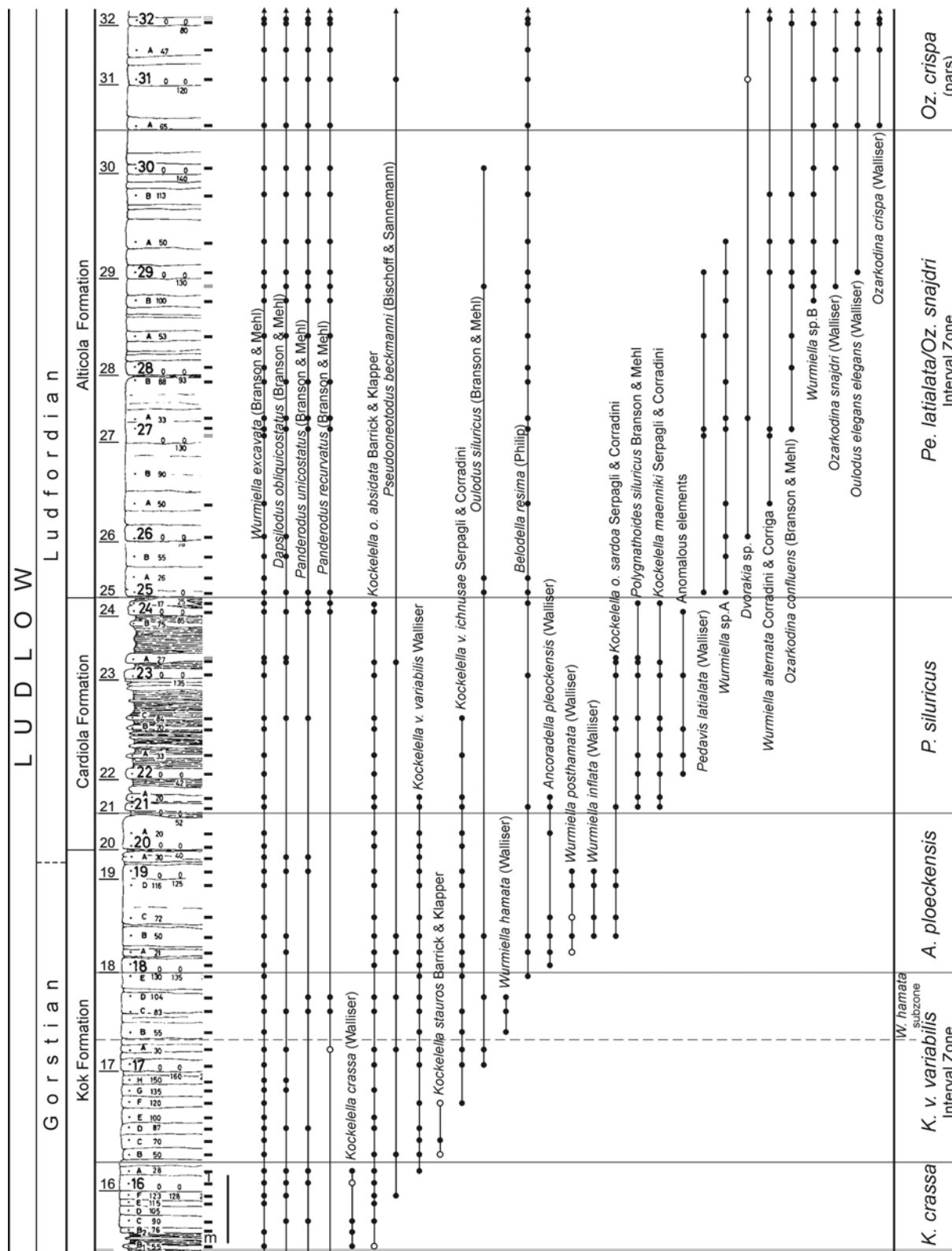


Figure 4. Stratigraphic log and conodont distribution in the Ludlow part of the Cellon section (after Corradini et al., 2015).

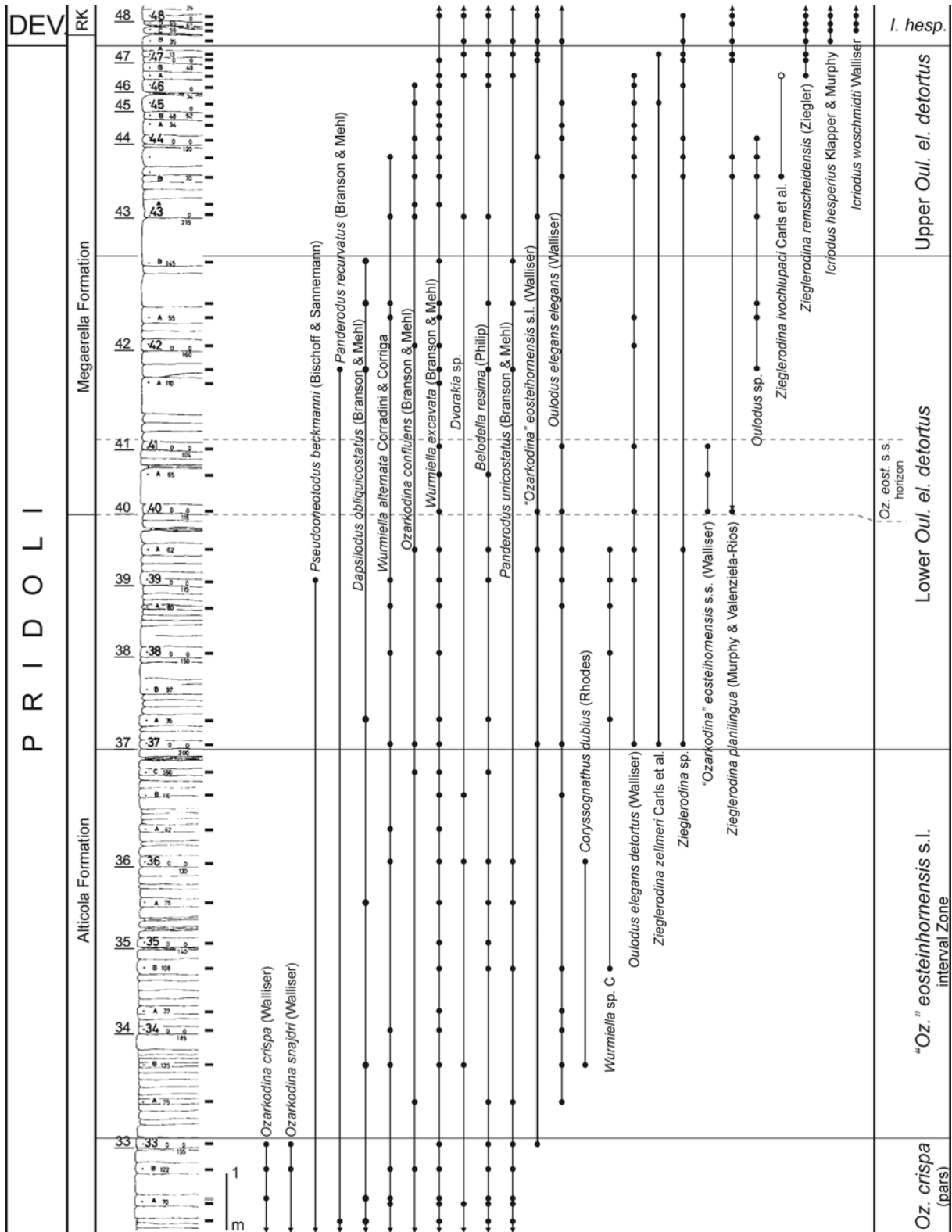


Figure 5. Stratigraphic log and conodont distribution in the Pridoli part of the Cellon section (after Corradini et al., 2015).

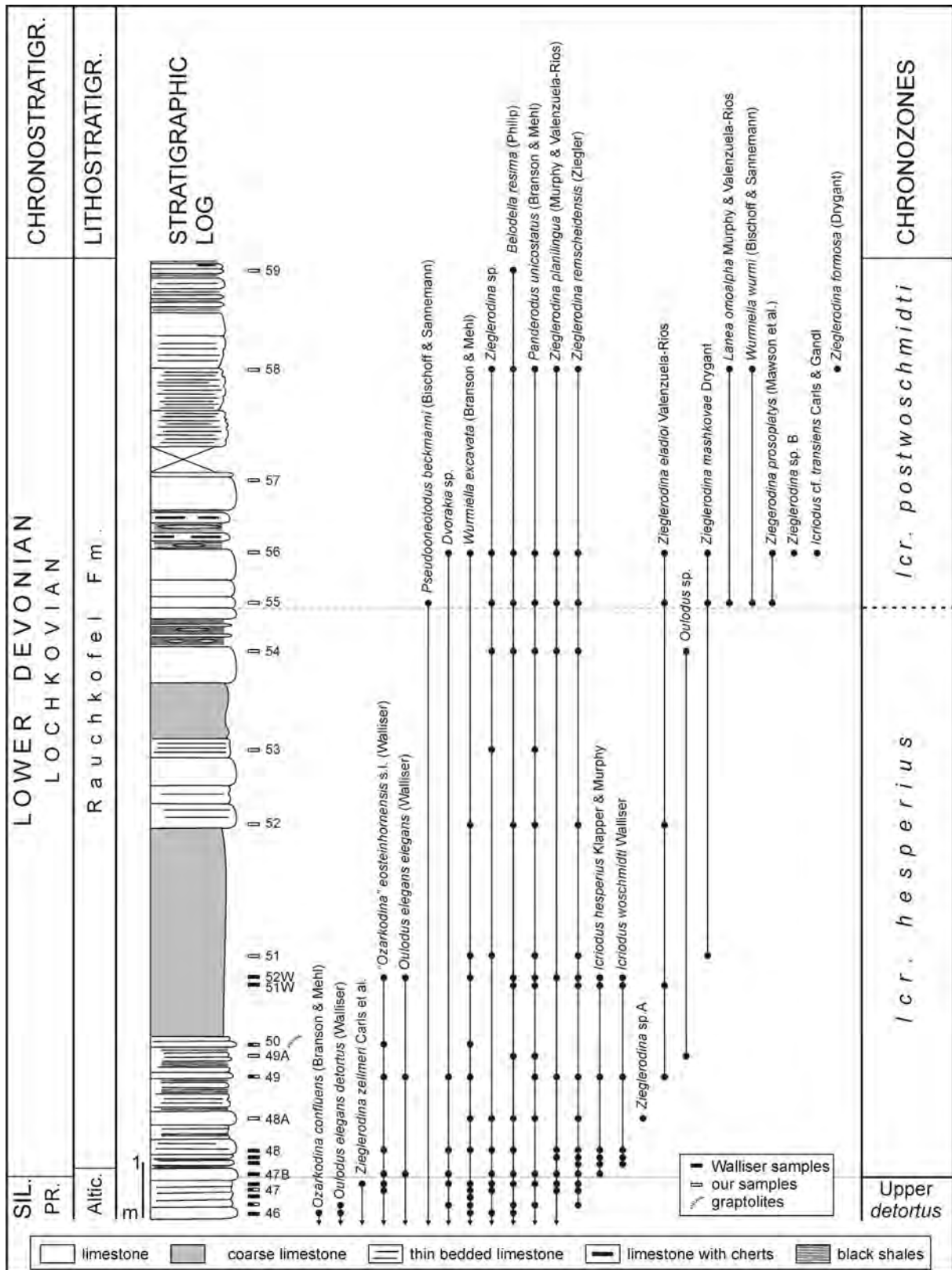
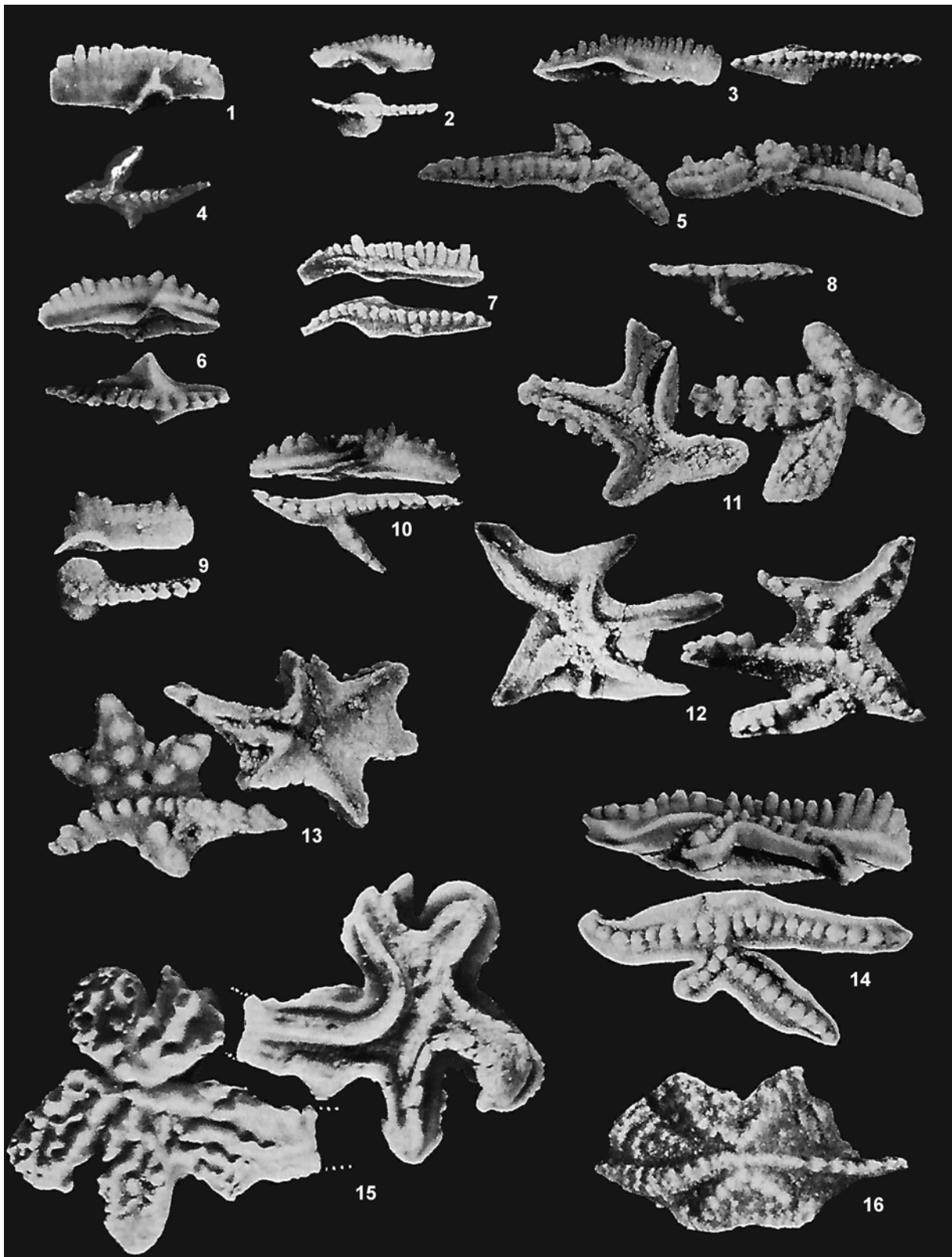


Figure 6. Stratigraphic log and conodont distribution in the Lochkovian part of the Cellon section (after Corrigan et al., 2016).



**Figure 7.** Holotypes of conodont taxa established by Walliser (1964) from the Silurian of Cellon section. All refigured after Walliser (1964).

1. *Ozarkodina eosteinhornensis* (Walliser), sample C 40. 2. *Wurmiella inflata* (Walliser), sample C 19. 3. *Ozarkodina sagitta sagitta* (Walliser), sample C 14. 4. *Pterospathodus pennatus pennatus* (Walliser), sample C 10J. 5. ?*Wurmiella hamata* (Walliser), sample C 17B. 6. *Pterospathodus celloni* (Walliser), sample C 10J.

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6) Alticola Formation. Lithology: Gray to pinkish nautiloid limestone with some thin marly layers and coarse bioclastic interbeds. Thickness: 28 m. Age: Ludlow to Pridoli, *Pedavis latialata*–*Ozarkodina snajdri* IZ to *Icriodus hesperius* conodont zone (beds 25-47B).

7) Rauchkofel Formation: Lithology: Blackish platy and laminated limestone with black marly and shaly interbeds. Thickness: 80 to 120 m. Only the lower part of the unit has been studied for conodonts and graptolites (Walliser, 1964; Jaeger, 1975; Corrigan et al., 2016). Age: Lochkovian (Lower Devonian), *Icriodus hesperius* – *Icr. postwoschmidti* zones (bed 47C-59 and above).

Higher in the mountain, the Kellerwand, Vinz and Cellon Fm. are exposed.

### Palaeoenvironment

In general, the sequence of the Cellon section was deposited into a shallow to moderately deep offshore environment. Even if the conformable sequence suggests a continuity from the Ordovician to the Devonian, several small gaps in sedimentation have been recognized, reflecting eustatic sea-level changes (Schönlaub et al., 1994). In the upper Ordovician part marine sediments are strongly affected by the Hirnantian glacial event (Schönlaub et al., 2011).

### Conodonts

The original conodont collection of O.H. Walliser from the Cellon section is stored in the Geoscience Centre of the Georg-August University of Göttingen, Germany, under repository number GZG 1613. It includes about 35.000 conodont elements from about 220 samples from the Upper Ordovician to the basal Devonian. Smaller collections from the sections are stored in several institutions as reference material.

Conodonts are in general well preserved and quite abundant, even if with some differences in the various parts of the section. According to the more recent faunal revisions (Ferretti & Schönlaub, 2001; Corradini et al., 2015; Corrigan et al., 2016) 103 conodont taxa (species and subspecies), belonging to 39 genera have been documented from the section (Figs. 3-6).

The Cellon section is the type locality of 16 conodont taxa described by Walliser (1964) (Fig. 7).

### Biostratigraphy

Eighteen conodont Zones have been discriminated in the Cellon section (Figs 3-6).

The whole Ordovician part of the section is attributed to the *Am. ordovicicus* Zone (Ferretti & Schönlaub, 2001). In the Silurian 15 Zones have been recognized from the upper Llandovery to the end of the Pridoli Series (Corradini et al., 2015) However, some of the uppermost Llandovery and Wenlock biozones, most probably corresponding to black shale intervals, have not been found. In the lower Lochkovian two biozones were discriminated (Corrigan et al., 2016). For details and complete conodont occurrence we refer to Figs 3-6.

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**Figure 7.** continued.

**7.** ?*Wurmiella posthamata* (Walliser), sample C 19; **8.** *Pterospathodus amorphognathoides angulatus* (Walliser), sample C 10B. **9.** *Kockelella ranuliformis* (Walliser), sample C 11C. **10.** *Pterospathodus pennatus procerus* (Walliser), sample C 11D. **11.** *Pedavis latialata* (Walliser), sample C 27. **12.** *Ancoradella ploeckensis* Walliser, sample C 19; **13.** *Kockelella patula* Walliser, sample C 12C. **14.** *Pterospathodus amorphognathoides amorphognathoides* (Walliser), sample C 11D. **15.** *Hadrognathus staurognathoides* Walliser, sample C 11C. **16.** *Aspidognathus tuberculatus* Walliser, sample C 10D.



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