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Loboliths (crinoids) and conodont biostratigraphy of the Genna Ciuerciu Section (SE Sardinia)

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LOCALITY about 900 m West of Silius, at geographic coordinates 39°30'53"N, 9°17'01"E.

LITHOSTRATIGRAPHIC UNIT Ockerkalk limestone (informal unit).

AGE late Silurian (Ludlow-Pridoli), *siluricus* to *detortus* conodont zones.

WHAT TO SEE lobolith bearing horizon; typical Ockerkalk limestone; Ludlow/Pridoli boundary.

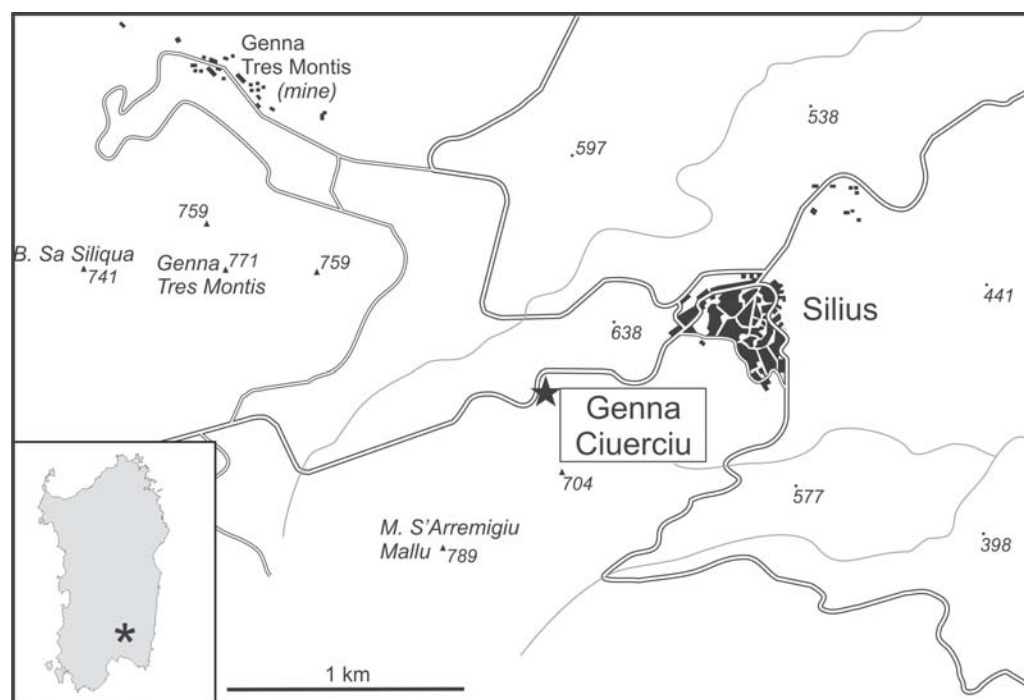


Fig. 1 - Location map of the Genna Ciuerciu Section.



Fig. 2 - a) Panoramic view of the Genna Ciuerciu Section. b) Close up view with indication of the lobolith level and the position of selected conodont samples; the Ludlow-Pridoli boundary is also approximated.

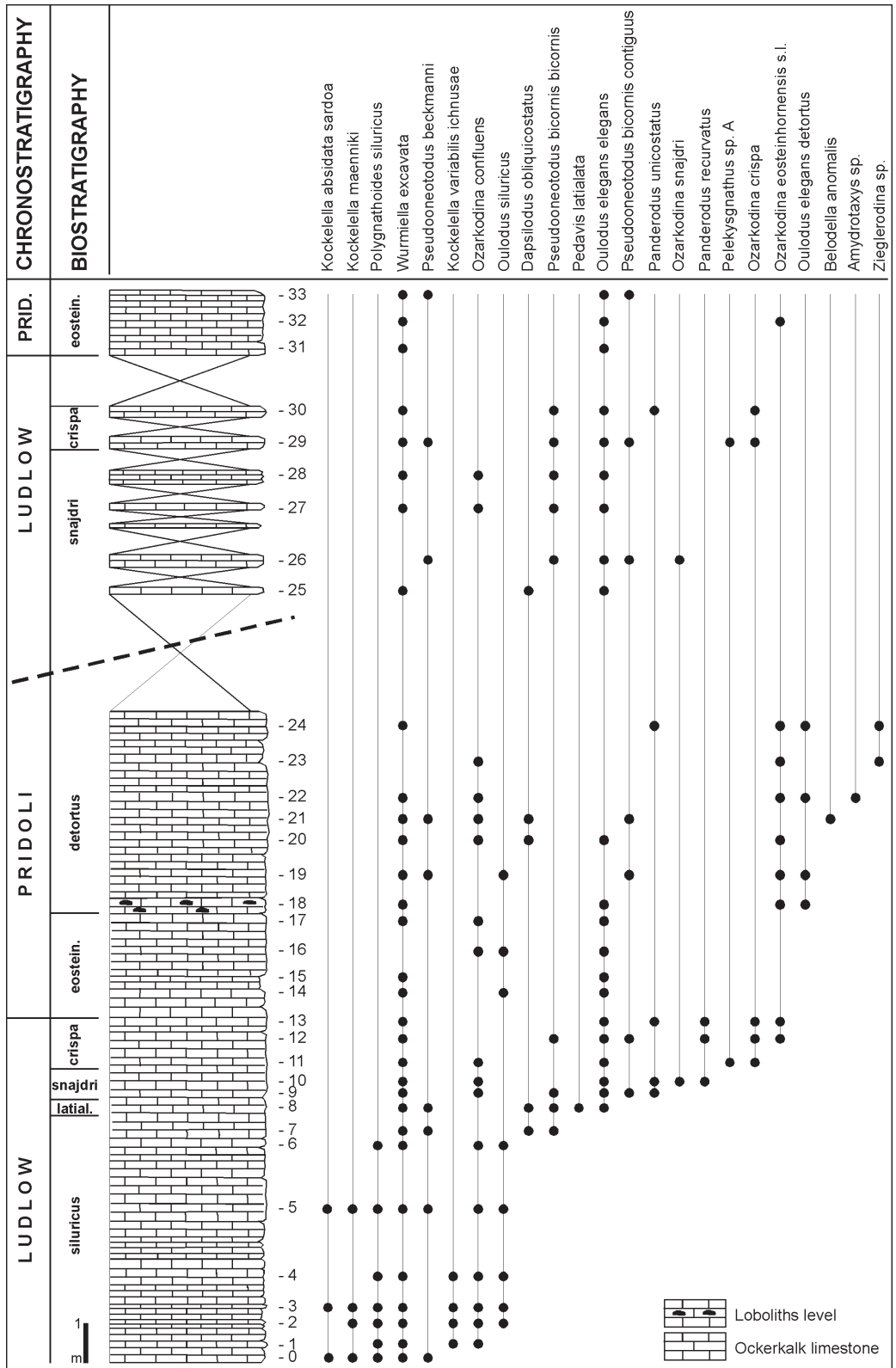
HOW TO GET THERE

The Genna Ciuerciu Section is located in the Silius area, few hundreds meters from the village, just along the Sant'Andrea Frius-Silius road (Fig. 1). A succession of the Ockerkalk limestone of late Silurian age is here exposed. The Ludlow/Pridoli boundary is also visible in the section (Fig. 2).

HISTORICAL OUTLINE

This locality has been stratigraphically studied mostly in the last decade (Barca et al., 1994, 1995; Corradini et al., 1998, 2002, 2004). Together with the nearby Silius Section, the Genna Ciuerciu Section is a reference section for the Sardinian Ockerkalk.

Fig. 3 - Stratigraphical log of the Genna Ciuerciu Section and occurrences of conodont taxa. Numbers on the right of the column indicate conodont samples.



The Genna Ciuerciu Section documented for the first time in Sardinia the *Pedavis latialata*, *Ozarkodina snajdri* and *Ozarkodina crispa* conodont biozones. This section is the type locality of two conodont taxa: *Kockelella maenniki* Serpagli & Corradini and *Kockelella absidata sardoa* Serpagli & Corradini.

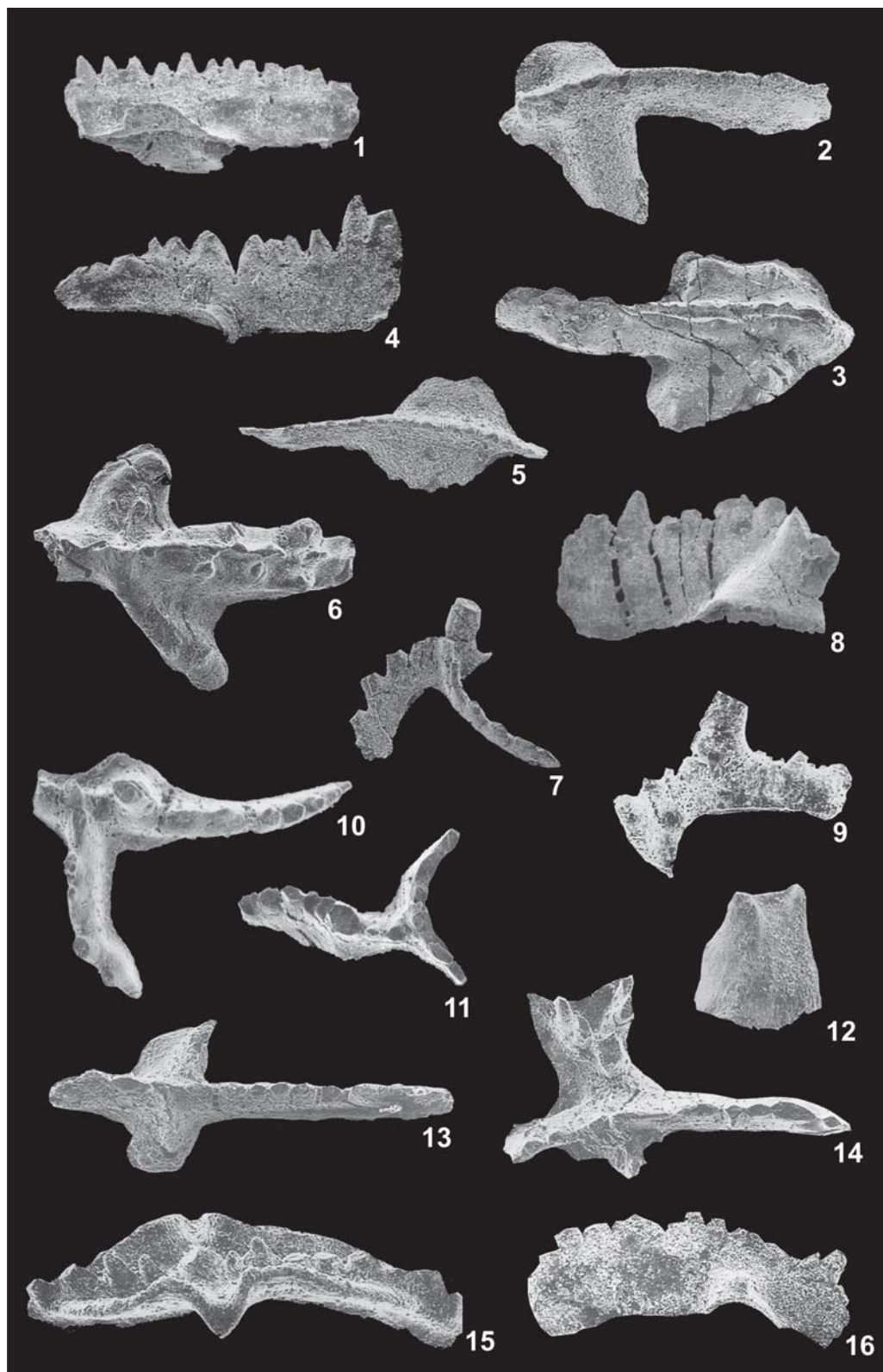
LITHOLOGY

The Ockerkalk is an argillaceous limestone with a distinctive flaser-texture. Its blue-grey colour is frequently weathered to ochre, as also the name suggests. Over 25 metres of nodular limestone in typical Ockerkalk facies are exposed in the Genna Ciuerciu Section.

The section is continuous only up to the top of the hill (levels 0 to 24). As evidenced by the repetition of some conodont biozones, upper beds cropping out on the eastern slope of the hill (levels 25 to 33, for a thickness of about 10 metres) are only apparently continuous, being separated from the lower part of the section by a local overthrust (Fig. 3).

Plate 1

- Fig. 1 - *Ozarkodina eosteinhornensis* s.l. (Walliser, 1964) Pa element IPUM 28207; sample GCIU 20 (*detortus* Zone); lateral view, x70.
- Figs. 2-3 - *Ozarkodina crispa* (Walliser, 1964).
2. Pa element α morph, IPUM 25927; sample GCIU 11 (*crispa* Zone); upper-lateral view, x70.
3. Pa element β morph IPUM 25928; sample GCIU 11 (*crispa* Zone); upper view, x45.
- Fig. 4 - *Ozarkodina confluens* (Branson & Mehl, 1933), Pa element IPUM 25884; sample GCIU 9 (*snajdri* Zone); lateral view, x80.
- Fig. 5 - *Ozarkodina snajdri* (Walliser, 1964), Pa element IPUM 25930; sample GCIU 10 (*snajdri* Zone); upper view, x70.
- Fig. 6 - *Pedavis latialata* (Walliser, 1964), Pa element IPUM 25924; sample GCIU 8 (*latialata* Zone); upper view, x70.
- Fig. 7 - *Oulodus elegans elegans* (Walliser, 1964), Pb element IPUM 25890; sample GCIU 11 (*crispa* Zone); lateral view, x70.
- Fig. 8 - *Pelekygnathus* sp. A Corrìga & Corradini, 2009, Pa element IPUM 28208; sample GCIU 11 (*crispa* Zone); lateral view, x70.
- Fig. 9 - *Oulodus elegans detortus* (Walliser, 1964), Sc element IPUM 25886; sample GCIU 22 (*detortus* Zone); lateral view x100.
- Fig. 10 - anomalous element IPUM 28209; sample GCIU 1 (*siluricus* Zone); upper view, x 70.
- Fig. 11 - anomalous element IPUM 28210; sample GCIU 6 (*siluricus* Zone); upper view, x 80.
- Fig. 12 - *Pseudooneotodus bicornis* Bischoff & Sanneman, 1958; IPUM 25867; sample GCIU 9 (*snajdri* Zone); lateral view, x100.
- Fig. 13 - *Kockelella maenniki* Serpagli & Corradini, 1998; Pa element IPUM 25850; sample GCIU 3 (*siluricus* Zone); upper view, x70.
- Fig. 14 - *Kockelella variabilis ichnusae* Serpagli & Corradini, 1998, Pa element IPUM 25837; sample GCIU 3 (*siluricus* Zone); upper view, x70.
- Fig. 15 - *Polygnathoides siluricus* Branson & Mehl, 1933, Pa element IPUM 25898; sample GCIU 4 (*siluricus* Zone); upper-lateral view, x70.
- Fig. 16 - *Kockelella absidata absidata* Barrick & Klapper, 1976, Pa element IPUM 25857; sample GCIU 3 (*siluricus* Zone); lateral view, x70.



FOSSIL CONTENT

Crinoids (loboliths and crinoidal stems) are the only macrofossils clearly visible in the outcrop. Loboliths, with well-preserved local geopetal structures, occur with their typical ovoidal outline in level 18 (Fig. 4). The diameter of their bulbous holdfasts may be as much as 20 cm, in full agreement with other reports from the northern Gondwana sector. Unfortunately, owing to matrix lithification, they can not be isolated differently from those found in the Fluminimaggiore area (Iglesiente; southwestern Sardinia) in a slightly younger horizon (Gnoli et al., 1988). The lobolith bearing horizon is assigned to the *Oul. el. detortus* conodont Zone in good stratigraphical agreement with other scyphocrinoid records in southeastern Sardinia (reported but not stratigraphically assigned by Jaeger, 1977 and Barca & Jaeger, 1990) and with the uppermost Silurian lobolith-horizon known in Europe and in North Africa (Haude, 1972, 1992).

Very rare nautiloid cephalopods can be observed in the lower part of the section.

The main microfacies is represented by a micritic mudstone with sparse biotrititic concentrations of thin-shelled bivalves, ostracodes, brachiopods, gastropods, trilobites, crinoids, rare small cephalopods and sponge spiculae (Ferretti & Serpagli, 1996; Corradini et al., 2002). A crinoidal content increase is observable in thin sections across levels 16 and 18, belonging to the bank which ends up in the lobolith-level.

Among microfauna, conodonts are abundant throughout the section and allowed a detailed biostratigraphy (see below). However, the occurrence rate is very variable, ranging from 5 elements per kg (sample GCIU 16) to 120 elements per kg (sample GCIU 20). The preservation is not very good, being many specimens broken and/or texturally altered. Conodonts are black (Colour Alteration Index = 4.5-5).

Twenty-three conodont apparatuses, belonging to thirteen genera have been recovered from the Genna Ciuerciu Section (Fig. 3). *Kockelella maenniki* Serpagli & Corradini and *Kockelella absidata sardoa* Serpagli & Corradini have their *stratum typicum* in level GCIU 3.

BIOSTRATIGRAPHY

Six late Silurian conodont zones have been reported from this section: *siluricus* (levels 0-7), *latialata* (level 8), *snajdri* (levels 9-10), *crispa* (levels 11-13 and 29-30), *eosteinhornensis* s.l. (levels 14-17 and 31-33) and *detortus* (levels 18-24).



Fig. 4 - A lobolith from level GCIU 18. Scale bar = 2 cm.

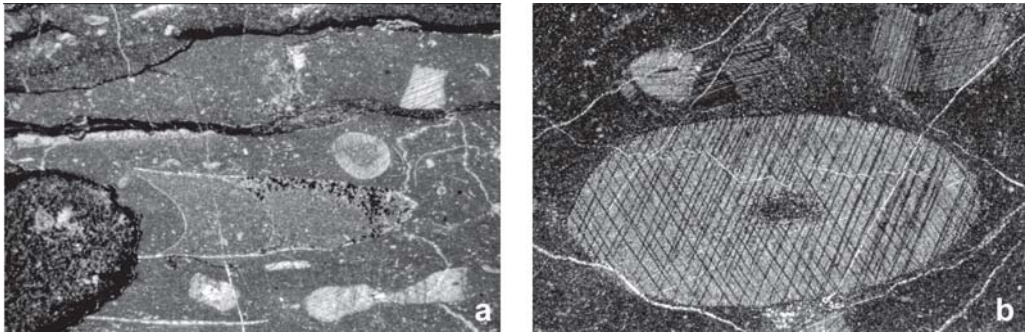


Fig. 5 - Typical Ockerkalk microbiofacies of the Genna Ciuerciu Section. a) Bioclastic wackestone with a cephalopod shell and sparse crinoidal fragments; sample GCIU 16, x8 (refigured after Barca et al., 1995). b) Close view of a crinoidal ossicle; sample GCIU 16, x16.

PALAEOENVIRONMENT

A quiet pelagic environment below normal wave-base and with bioclastic input variable in time and probably in space, especially in the crinoidal fraction, was suggested (Barca et al., 1995). Interestingly, the crinoidal enrichment looks higher in the present section if compared to the nearby Silius Section (Corradini et al., 1998, 2002).

FURTHER NOTES

The Ludlow-Pridoli boundary should be placed between beds 13 and 14, just above the last occurrence of *Ozarkodina crispa*.

Anomalous conodont elements, mainly ramiforms with extra bars (Pl. 1, figs. 10-11), have been reported from the lower part of the *siluricus* Zone, up to sample GCIU 6 (Corradini et al., 1996). The authors referred these occurrences to “pre-event” P-episodes, characterized by abundant and diverse planktonic communities.

REFERENCES

- BARCA S., CORRADINI C., FERRETTI A., OLIVIERI R. & SERPAGLI E. (1994). Conodont evidences from the “Ockerkalk” of Southeastern Sardinia (Silurian, Silius area). In Schönlaub H.P. & Kreutzer L.H. (eds.), IUGS Subcommission on Silurian Stratigraphy. Field Meeting Eastern+Southern Alps. *Berichte der Geologischen Bundesanstalt*, 30/1994, 30: 126.
- BARCA S., CORRADINI C., FERRETTI A., OLIVIERI R. & SERPAGLI E. (1995). Conodont biostratigraphy of the “Ockerkalk” (Silurian) from Southeastern Sardinia. *Rivista Italiana di Paleontologia e Stratigrafia*, 100 (1994): 459-476.
- BARCA S. & JAEGER H. (1990). New geological and biostratigraphical data on the Silurian in SE Sardinia. Close affinity with Thuringia. *Bollettino della Società Geologica Italiana*, 108 (1989): 565-580.
- CORRADINI C., FERRETTI A. & SERPAGLI E. (2002). The “Ockerkalk” limestone in the Genna Ciuerciu Section (SE Sardinia, Italy). *Rendiconti della Società Paleontologica Italiana*, 1: 255-260.
- CORRADINI C., FERRETTI A. & SERPAGLI E. (2004). The “Ockerkalk” limestone (late Silurian) of the Silius area: paleobiological content and biostratigraphy. In “Sardinian Paleozoic basement and its Meso-Cainozoic covers (Italy)”. 32 IGC-Field Trip Guide Book-P39: 18-20.
- CORRADINI C., FERRETTI A., SERPAGLI E. & BARCA S. (1998). The Ludlow-Pridoli Section “Genna Ciuerciu” west of Silius. In Serpagli E. (Ed.), Sardinia Field-trip Guide-book, ECOS VII. *Giornale di Geologia*, 60, Spec. Issue: 112-118.
- CORRADINI C., OLIVIERI R. & SERPAGLI E. (1996). Possible relationship between anomalous conodonts and Silurian oceanic episodes. *Neues Jahrbuch für Geologie und Paläontologie Monatshefte*, 1996-H.12: 737-746.

- FERRETTI A. & SERPAGLI E. (1996). Geological outline, community sequence and paleoecology of the Silurian of Sardinia. *Rivista Italiana di Paleontologia e Stratigrafia*, 102: 353-362.
- GNOLI M., LEONE F., OLIVIERI R. & SERPAGLI E. (1988). The Mason Porcus section as reference section for Uppermost Silurian-Lower Devonian in SW Sardinia. *Bollettino della Società Paleontologica Italiana*, 27 (3): 323-334.
- HAUDE R. (1972). Bau und Funktion der Scyphocrinites-Lobolithen. *Lethaia*, 5: 95-125.
- HAUDE R. (1992). Scyphocrinoiden, die Bojen-seelilien in hohem Silur-tiefen Devon: *Palaeontographica A*, 222: 141-187.
- JAEGER H. (1977). The Silurian-Devonian boundary in Thuringia and Sardinia. In Martinsson, A. (Ed.): The Silurian-Devonian boundary. IUGS, s. A, 5: 117-125.