

The Portixeddu Formation in the Punta Pedrona Section

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LOCALITY About 3 Km North-East of Portixeddu village.

STRATIGRAPHIC UNIT Portixeddu Formation.

AGE Upper Ordovician (Caradoc-Ashgill).

LOCATION

The Punta Pedrona Section is located in the Fluminimaggiore area, along the Fluminimaggiore-Portixeddu road and 1 km North of “Ponte su Amadori” bridge (Fig. 1). A continuous sequences of the uppermost part of Portixeddu Formation is here exposed.

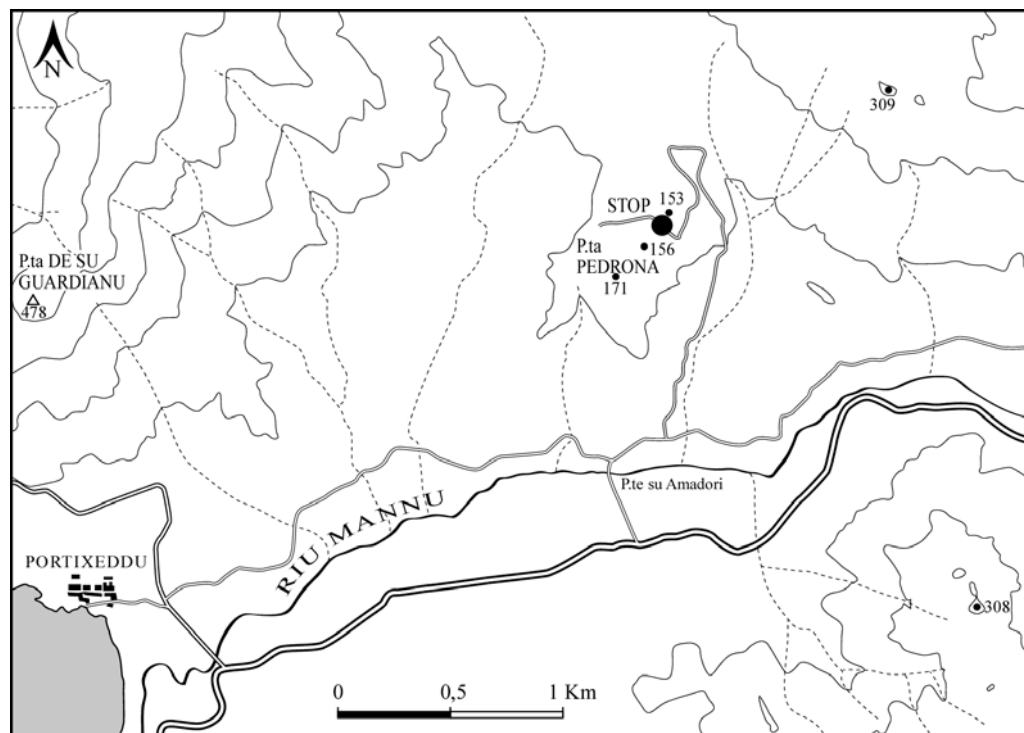


Fig. 1 - Location map of Punta Pedrona Section.

HISTORICAL OUTLINE

This fossiliferous locality has been discovered in the eighties.

Among the 27 species of brachiopods described by Havlicek *et al.* (1986), five species have been recorded and illustrated (Pl. 9, fig. 4-7, 17 and Pl. 5, fig. 8-13) from this locality. Briozoans have been investigated by Conti & Serpagli (1984) and Conti (1990), who documented 9 species (Fig. 3, p. 90) and illustrated some of them (Pl. 8, figs 3-4, 7; Pl. 19, fig. 4). Leone *et al.*, (1991) assigned the same brachiopod fauna to the lower Asghill BH4 horizon and referred also on the occurrence of few species of trilobites (Pl. 2, figs 3, 6). Hammann & Leone (1997), in their monographic paper on the Upper Ordovician trilobites of Sardinia, investigated also this locality (Por7a) where seven species belonging to the TH3a horizon have been recognised.

The area has been also investigated in two thesis (Lippold, 1992; Mura, 1993). At present time, the Punta Pedrona section is still under study (Loi & Dabard, 2002; Botquelen *et al.*, 2002) in order to clarify the relationships between shellbeds, faunal associations and sequence architecture in very high frequency sea-level change.

LITOLOGY

The Punta Pedrona section (Fig. 2) consists mainly of richly fossiliferous dark-grey fine sandstones, siltstones and shales (a and b in Fig. 2), dipping southwestwards at an angle of about 50°. In argillaceous facies (b in Fig. 2), silty laminae get scarce and siliceous nodules are present (Leone *et al.*, 1991; Loi & Dabard, 2000, 2002). Phosphatic nodules and crusts are present in the more proximal sandy-silty facies. Towards the top of the section, siltstones, shales and marlstone prevail (c in Fig. 2). The fossils are generally concentrated (shellbeds) in storm layers with pavements and channels and they are associated with proximal, as well as distal facies.

PALAEOBIOLOGICAL CONTENT

The rich and diversified fauna of the Punta Pedrona section is mainly represented by bryozoans, brachiopods, cystoids, crinoids, ostracodes, gastropods, cornulites, trilobites and, subordinately, by bivalves, conularids, cyclocrinids, cephalopods, graptolites and solitary rugose corals.

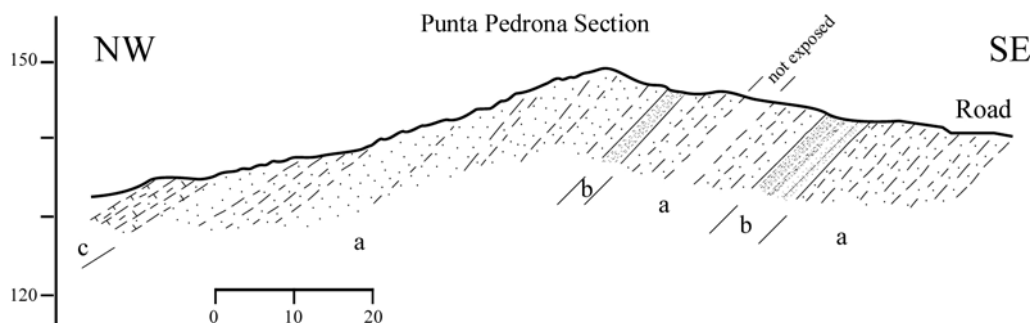


Fig. 2 - Punta Pedrona cross section; a, b and c: lithological reference (see text).

The species of the following taxonomic groups have been recognised:

- Bryozoans:

Anaphragma meneghinii, *Anaphragma regolare*, *Ceramophylla* sp., *Ceramopora discoidalis*, *Ceramopora italica*, *Chasmatopora corniculata*, *Graptodictya meneghinii*, *Hallopora cystoidalis*, *Hallopora elegantula*;

- Articulate brachiopods:

Nicolella actoniae, *Iberomena sardoa*, *Dolerorthis maxima*, *Dolerorthis intermedia*, *Eoplectodonta* (Kozlowskites) *ichnusae*, *Eridorthis angustisulcata*, *Eoanastrophia pentamera*, *Porambonites* (Porambonites) *magnus*, *Longvillia mediterranea*, *Leptaena* sp., *Onniella novaresei*, *Saukroductia reticula*, *Paucicrura ichnusae* e *Triplesia* sp.;

- Trilobites:

Dalmanitina (*Thuringaspis*) *lamarmorai*, *Neseuretinus turcicus*, *Nobiliasaphus* aff. *nobilis*, "*Illiaenus*" *creber*, *Selenopeltis* ? sp., *Lichas* n. sp. and *Deanaspis* aff. *vysocanensis*;

- Cystoids:

Oocystis vulgaris, *Corylocrinus europaeus*, *Heliocrinites* sp. and *Rhombifera bohémica*.

SEDIMENTOLOGY

The sediments of the Portixeddu Fm. in the Punta Pedrona section, show typical characteristics of the inner shelf environment not far below the normal wave base, being more littoral in the basal part and more offshore in the uppermost part.

Sedimentary facies are constituted by pluricentimetric to centrimetric sandy strata with hummocky cross stratification (HCS), separated by centimetric to decimetric argillaceous and silty layers. Gutter casts and furrow casts are present in the basal part of HCS strata.

Mudstones facies containing silty laminae, interbedded with some centimetric sandy/silty strata with HCS. Furrow casts are scarce and decameter scale.

Phosphatic nodules and crusts are present in the more proximal facies. Siliceous nodules are associated with clayey-silty facies in the more distal deposits.

Shellbeds are abundant in the whole formation and are associated with proximal, as well as distal facies. In all the environments, they are linked to storm processes. Differences between the two distinguished shellbeds types (A and B) are related to variations of the sedimentation rate, controlled by sea-level fluctuations. Type-B accumulations (see Botquelen *et al.*, 2002) can be associated to episodes of condensation in very high frequency eustatic signal.

BIOSTRATIGRAPHY

On the basis of brachiopods and trilobites, the BH4-TH3a horizon of the Portixeddu Formation has been assigned to lower Ashgillian time (Leone *et al.*, 1991).

PALAEOENVIRONMENT

According to the sedimentary structures, faunal associations and thaphonomical signatures, the Portixeddu Formation was laid down in a terrigenous storm-dominated shelf, between the proximal and the distal part of the upper offshore.

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REFERENCES

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