



## **Stratigraphic evolution and paleogeographic setting of the Middle Jurassic-Early Cretaceous carbonate platforms in Eastern Sardinia (Italy)**

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The carbonate succession of eastern Sardinia (Orosei Gulf, Nuoro) records the shallow-water carbonate sedimentation on the Southern European passive margin from the middle Jurassic to the Early Cretaceous.

The base of the Mesozoic succession consists of Bajocian, discontinuous, thin lenses of riverine and lacustrine sediments (Genna Selole Fm.) that deposited above the Palaeozoic basement.

Carbonate sedimentation starts in the Bathonian-Callovian, with cross-laminated hybrid sandstones (with abundant extraclasts) that rapidly evolve to oolitic bedded dolostones (Dorgali Dolostone Fm. up to 150 m thick). Locally a disconformity is present within the base of this unit, whereas thin, Fe-rich, hard and firm grounds occur both at the base and at the top of the Formation, suggesting the presence of several hiatus during the Middle Jurassic. The age of this carbonate platform is not well-constrained, due to the scarce biostratigraphic control.

The transition to the overlying, carbonate platform to basin, depositional system is controlled by a marine transgression of Oxfordian age. The Monte Tului Lst. (up to 250 m thick) consists of platform to inner ramp facies with a dominant oolitic production. Locally coral-serpulid patch reefs, reefal and coarse breccias slope ramp facies are present. These deposits interfinger southwards with well bedded, fine grained, middle-outer ramp peloidal calcilutites, locally with chert nodules (Baunei Fm., 40 to 100 m.). This new formation represents the basinal sediment production of the

Oxfordian-Kimmeridgian depositional system.

The abovementioned depositional system is characterized by a shallowing upward trend, recorded by the platform progradation above basinal carbonates that ends during the uppermost Kimmeridgian. The top of the Monte Tului Lst. is characterised by subaerial exposures and fresh-water influence, as documented by pedogenic breccias, black pebbles and microfacies with caracean algae.

New biostratigraphic data (nanoplankton) place the following transgressive event in the Middle Tithonian when a new platform to basin carbonate system develops. The basinal facies (Pedra Longa Fm.) consists of thin bedded lime- mudstones and marly limestones of Tithonian-Berriasian age and spread over the shallow water facies of the underlying Tului Fm.

The thickness of the Pedra Longa Fm. range from few metres in the central area of the gulf to few tens of metres towards NE and SE, reflecting the existence of two gulfs separated by a relative carbonate high (Urzulei, Codula Sesine, Codula di Luna).

The overlying Monte Bardia Lst. (up to 600 m thick) consists of a prograding complex consisting of coral-hydrozoans patch reefs, proximal slope-ramp calcarenites with local slump scars, canalized intra-lithoclastic breccias and megabreccias. Slope facies downlap on the Pedra Longa Fm with a strong offlap-break. The prograding complex of the Monte Bardia Lst. grades upward into coarse grained bioclastic limestones organized in metre-thick shallowing-upward cycles, characterized by frequent tepees. The top of the Monte Bardia Lst. record a regressive trend by means of marly limestones interbedded with calcareous wackestone with mud cracks, fenestrae, bird's eyes, black pebbles and caracean algae. In the more basinal areas (where it lies on the Pedra Longa Fm.), the Monte Bardia Lst. is Berriasian in age, whereas in the inner part of the Orosei Gulf, shallow-water carbonate sedimentation dates back to the Tithonian.