Dasycladalean green algae from the Paleocene shallow water successions of the Pyrenean Basin

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The Pyrenees is proving to be a key-area to analyse many of the sedimentary and biotic changes that marked the early Paleogene evolution of warm (sub) tropical marine environments. During that time, this alpine chain formed a large intra-plate marine embayment opening towards the north Atlantic (the so-called Pyrenean basin), with a deep central depression surrounded by broad shallow-water marginal shelves on the south, east and northern sides. In the shallow areas, sedimentation was defined by carbonate platforms developing a whole range of sub-environments (beaches, tidal flats, lagoons, bioclastic accumulations and reefs), whereas (hemi)pelagic deposits (“Scaglia like” limestone-marl alternations) with shelf-derived breccias and turbidites characterised the slope and basin domains. The remnants of both shallow and deep water successions crop out extensively along the western and south-central Pyrenees, allowing detailed sedimentological and biostratigraphic analyses and the accurate reconstruction of platform-basin sections.

Three main evolutionary phases have been differentiated during that interval, each one showing a distinctive platform-basin depositional model and a characteristic range of both litho- and biofacies.

The first evolutionary phase took place during the Danian and was characterised by the dominance of carbonate sedimentation on both platform and deep settings. The Danian platform succession is a 300 m-thick carbonate package interpreted as representative of a complete sequence of recovery of shallow environments after the K-P boundary. The climax of the recovery phase is represented by the upper Danian Lizarraga complex (NP4 zone); a thick barrier-reef complex showing well-diversified coralgal assemblages that extended laterally for about 300 km.

The second evolutionary phase encompassed the Selandian and Thanetian stages. It started with sea level fall evidenced in the platforms by a conspicuous karstification surface. The re-flooding of the shallow areas was a stepwise process, defined by the deposition of the Usabide and Legunbe complexes. Both units developed a characteristic ramp profile and were mainly characterised by foramol facies.

The third evolutionary phase developed during earliest Eocene (early Ilerdian) times (NP10 to NP 11 Zones). In platform areas, this phase developed under widespread transgressive conditions (the so-called Ilerdian transgression) and is exemplified by foramol-dominated carbonate ramps.

The rich dasycladalean assemblages illustrated herein belong to reef faces and secondly to lagoonal environment of the Lizarraga complex (upper Danian, first evolutionary phase). The reefal assemblages, dominated by Broeckella belgica Morellet & Morellet and Triploporella apenninica Baretti, show the closest similarities with those from the Western Aquitaine (Deloffre, 1980) and Sardinia (Dieni et al., 1985).
The occurrence of a new Bornetellid taxon together with other counterparts allows to supply further data to interpret the position and arrangement of reproductive organs in fossil genera such as *Dactylopora* and *Zittelina*.

References