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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 ph*ase 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 ad arrangement of reproductive organs in fossil genera such as *Dactylopora* and *Zittelina*.

References

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