

**Coral Buildups in Oligophotic, Nutrient-Rich, Siliciclastic Prodelta Settings (Late Eocene, Southern Pyrenees, Spain): An As Yet Unexplored Play?**  
Morsilli, Michele <sup>1</sup>; Bosellini, Francesca <sup>2</sup>; Pomar, Luis <sup>3</sup>; Aurell, Marc <sup>4</sup>; Papazzoni, Cesare A. <sup>5</sup> (1) Dipartimento di Scienze della Terra, Università di Ferrara, Ferrara, Italy. (2) Dipartimento di Scienze della Terra, Università di Modena e Reggio Emilia, Modena, Italy. (3) Departament de Ciències de la Terra, Universitat de les Illes Balears, Palma de Mallorca, Spain. (4) Departamento de Geología, Universidad de Zaragoza, Zaragoza, Spain. (5) Dipartimento di Scienze della Terra, Università di Modena e Reggio Emilia, Modena, Italy.

Cenozoic zooxanthellate corals are commonly considered to form framework-dominated buildups in shallow-, well-illuminated (euphotic) and oligotrophic conditions. In contrast, detailed outcrop study and facies-component analysis show that Eocene non-framework coral buildups also developed in turbid, oligophotic (poorly illuminated) and nutrient-rich conditions. The study area is located in the South-Central Pyrenean Zone (Jaca Basin). Here, middle to upper Eocene prodelta clay/marl succession passes, up-section, into prograding delta-front sandstones and, subsequently, into continental sandstones and conglomerates. Coral-rich lithosomes occur in the upper part of the clay/marls succession and are completely encased in clay.

Within coral buildups, facies consist of: 1) coral boundstone with different coral growth fabrics (platestone and domestone, and subordinate pillarstone and mixstone) and abundant red algae, in a mud-dominated matrix; 2) well-sorted fine-grained or poorly-sorted coarse-grained skeletal packstones with abundant coral fragments, red algae, bryozoans, benthonic foraminifers and rare planktonic foraminifers, locally rich in larger benthic foraminifers and siliciclastic sand; 3) red-algae-rich coral rudstone with pack-wackestone matrix; 4) bryozoan floatstone in a mud-dominated matrix. These carbonate lithofacies pass, laterally and vertically into 4) thinly laminated clay to marls with interbedded sandstone beds. Coral boundstone, and associated packstone and rudstone wedges, form single bioherms and discrete biostromes (1-8 m thick) that stack into larger carbonate buildups, commonly 20-30-m thick, with some up to 50-m thick. Facies associations, textures and photo-dependent components indicate these buildups to have grown in the oligophotic- (lithofacies 1, 2 and 3) and aphotic (lithofacies 4) zones, and in low energy conditions below fair-weather wave base, where they were only occasionally hit by storms. Dominance of corals and bryozoans (plankton catchers) over sponges and mollusks (plankton pumpers) indicates predominance of phyto- and zooplankton over picoplankton, which suggest mesotrophic conditions.

Our results highlight the contrast with present-day “classic” reef models, and suggests that by the late Eocene reef coral assemblages were able to thrive in low-light, low-energy, turbid and nutrient-rich conditions. The location of these coral buildups, encased in prodelta clays, can be regarded as a new, unexplored, potential play.