



Sequence biostratigraphy and paleoenvironmental reconstruction in the Early Eocene Figols Group of the Tremp Basin (south-central Pyrenees, Spain)

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The mixed siliciclastic-carbonate succession of the early Eocene Figols Group (Spanish Pyrenees) was deposited on the shelf in a tectonically active basin, under oxic conditions, in shallow to moderately deep marine waters (close to the lower boundary of the photic zone) influenced by river discharge from adjacent emerged lands. The dinoflagellate cyst, palynofacies and foraminiferal records from the Merli-Esdolomada outcrop section, exhibit major changes referable to the interplay between relative sea-level fluctuations and variations in efficiency of the fluvial systems. The paleoenvironmental interpretation of palynological and calcareous microfaunal records allows to define a sequence stratigraphic framework even in the Merli-Esdolomada sedimentary cycles composed mainly by fine-grained deposits. At the same time, the firm regional stratigraphic framework of the Figols Group, available from previous studies, allows new insights on the paleoecology of extinct taxa.

The section investigated spans two 3rd order sequences. The upper sequence reflects more marginal marine conditions than the lower one, thus pointing to an overall shallowing trend with time. In the lower sequence the maximum flooding interval is characterised by a rich and diverse microfauna, highest relative abundances of marine phytoplankton and typically neritic dinoflagellate cyst assemblages dominated by *Spiniferites* and *Cordosphaeridium*. The final phase of the highstand systems tract, in proximity of the sequence boundary, is characterised by a decrease in abundance and diversity of dinoflagellate cysts, with the dominance of the lagoonal genus *Polysphaeridium*, and by decreased microfaunal diversity.

Palynological records permit the reconstruction of activation and deactivation phases

of the fluvial systems, variations in runoff from the hinterland, nutrient delivery to the sea and paleoproductivity in surface waters of the Eocene Tresp Basin. The overall abundance of *Spiniferites* and the scarcity of peridinioid cysts, *Lingulodinium*, *Pedias-trum* and *Botryococcus* algae are interpreted to indicate oligotrophic conditions. Intervals where the temporary disappearance of *Spiniferites* corresponds to highest relative abundances of *Operculodinium* and herbaceous debris are interpreted as the main evidence for river plumes and denote periods of enhanced fluvial discharge reflecting a Milankovitch-type cyclicality. Within the maximum flooding zone, a *Thalassiphora patula* acme corresponding to the local disappearance of *Homotryblium* is deemed to record the distal expression of a fluvial activation which triggered water salinity stratification. Despite broad morphological similarities, *Homotryblium* exhibits more cosmopolitan preferences than *Polysphaeridium*, which is instead confirmed as a lagoonal euryhaline taxon. The increase of *Spinizonocolpites* pollen toward the top of the Figols Group records the north-westward migration of *Nypa* mangrove-palms from southern Europe during the mid Early Eocene.