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Flood-Dominated Deltaic Systems in a Tectonically Active Setting: Integration of Stratigraphy, Sedimentology and Biofacies (Lower Eocene Figols Group, Tremp-Graus Basin, South-Central Pyrenees)

In the eastern sector of the south-central Pyrenees, the lower Eocene Figols Group comprises a thick (up to 1000m) unconformity-bounded stratigraphic unit made up of mixed siliciclastic-carbonate systems deposited in relatively shallow water.

The sedimentary succession can be subdivided into a series of large-scale depositional sequences, which in turn are composed of metre-scale depositional sequences. These sequences are essentially composed of: 1) a lower forestepping-backstepping sandstone wedge of flood-generated deposits (mouth-bar and related delta-front sandstone lobes) that generally grades upward into a transgressive carbonate-rich facies and 2) an upper mudstone unit. Such small-scale cycles record activation and deactivation phases of the fluvial systems and are interpreted as the result of short-term changes in both base-level and climate (Milankovitch-type cyclicity).

Unfortunately, basinward from the depositional zone of the sandstone facies, these cycles are poorly expressed and the sedimentation is mainly recorded by fine-grained deposits. To improve confidence in the interpretation of these cycles in both their proximal and distal zones, a multidisciplinary approach based on sedimentological analysis and biofacies data was employed.

As a result, the integrated study of the microfossil content (foraminifers, nannofossils, palynomorphs) has provided a tight correlation between biosignals and sedimentary facies. At the same time, information obtained from sedimentology has provided a cross control of biosignals, thus allowing refinement of the paleoecological interpretation of extinct species.

In addition, biofacies analysis has been successfully used to recognize the main phases of fluvial activity and also small-scale sequences within fine-grained intervals where sedimentological control is loose.