

## ABSTRACT

Hecho Group megaturbidites (Mt) have been studied in the Jaca basin for nearly 50 years. These are thick resedimented carbonate layers, basin wide extensive, corresponding to the collapse of the carbonate platform growing on the Southern margin of the basin. Nine of them have been recognised, among which some can reach a thickness close to 200m, with 30m thick olistoliths in their lower term. It was long believed that they were confined to the Jaca basin and that their onset was triggered by tectonic activity of the Pyrenean orogen at that time. This study focuses on three stratigraphic section crossing, in the Jaca basin, the Mt-4 and Mt-5 and in the Aínsa basin, a megaturbidite corresponding to the Morillo M-III member. For the first time, this study proposes that a megaturbidite may have reached the Aínsa basin, even if several authors already previously recognised lithological similarities with Mt-5 and Mt- 4.

Megaturbidites have been studied in other basins but the trigger mechanism allowing the displacement of up to 200km<sup>3</sup> of platform carbonate rocks to the basin floor remains debated. Among others, tectonic oversteepening, seismicity and relative sea-level fall are three potential triggers often mentioned. Our study aims to decipher the influence of either mechanism on the deposition of the studied megaturbidites.

Based on isotopic stratigraphy, organic matter (Rock-Eval) and bulk rock mineralogy (XRD), we show that the megaturbidite encountered within the Aínsa basin matches the Mt- 5. This has important implications for the basin correlations across the Boltaña anticline. First, it implies that the Banastón Turbiditic System (TS) in the Jaca basin is coeval to deposition of the Morillo and Guasó formations in the Aínsa basin. Second, it suggests that the Cotefablo TS would correlate with the Banastón and Aínsa formations in the Aínsa basin.

Our results show that global sea-level fall may have played a major role in the deposition of these megaturbidites, because we find no major tectonic event contemporaneous with the deposition of both megaturbidites whereas correlation with existing sea-level curves suggest that megaturbidites emplacement took place during global sea-level lowstands. Finally, our study highlights the potential influence of the growing carbonate platform on the carbon isotopes within the Jaca basin.

**Keywords:** *Megaturbidites, Hecho Group, Isotope stratigraphy, Jaca, Aínsa, Eustatism, Trigger mechanism*