LATERAL VARIABILITY OF SANDSTONE COMPOSITIONS: DETRITAL ZIRCON U-PB AND PETROGRAPHIC INSIGHTS INTO SEDIMENT MIXING IN AN EMERGENT FORELAND BASIN SYSTEM

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ABSTRACT

The Eocene Castissent sandstone of the south-central Pyrenean foreland basin provides an opportunity to examine the vertical and lateral compositional variability of a single continuous source-to-sink system. World-class seismic scale outcrops of fluvial to deep marine depozones of the Castissent Fm and its deep marine equivalents (Fosado and Arro Turbidites) preserve an entire sediment delivery system from proximal alluvial deposits to distal submarine fan deposits. Preliminary detrital zircon (DZ) geochronometric results from the Castissent, Fosado and Arro Fms indicate the sandstone provenance progressively changes in downstream direction. A number of processes have been hypothesized to lead to this change, including sediment staging, recycling of floodplain material, hydrodynamic fractionation of the heavy mineral phase, and sediment mixing from axis transverse tributaries mixing with the axis parallel main trunk river system. This project aims to examine the sediment composition sampled from the main trunk river, tributary rivers, and the deep marine equivalents to model the relative sediment contribution from different source catchments. We hypothesize that the relative sediment contribution from the rapidly exhuming Pyrenean fold-thrust belt sources drowns out the signal of the axial foreland derived sediment supply, producing the observed compositions in the deep marine record. To test this hypothesis we will systematically examine the variability in provenance proxies of the system as a function of N-S location (transverse to axial) and intra-formational hydrodynamics. The results from this study will aid in the understanding of Pyrenean foreland basin evolution, and are translatable to other foreland basin systems around the world.

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