Constraining geological ages of the depositional alluvial infills in the Bassée region based on ESR and OSL dating methods

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Résumé

Valleys bottoms and alluvial terraces in their edges hold sedimentary archives that are essential for reconstructing past environmental conditions, particularly in response to external perturbations such as climate fluctuations (e.g., base-level or water discharge changes in relation with glacial/interglacial cycles) and tectonic forcing. Radiochronology is essential to determine the age of alluvial terraces and valley bottom. Chronological constraints obtained through both direct and indirect dating of alluvial infill of the valleys bottoms provides key insights into landscape evolution and geomorphic processes. This study focuses on the stratigraphic architecture and chronology of two distinct fluvial terraces (TIV, +52 m RH; and TIII, +22 m RH) as well as the alluvial infill sequences of the valley bottom in the upstream Seine River alluvial plain, La Bassée area. The ESR and OSL dating methods were applied in the fluvial deposits. For the first time, the chronological ages of terraces and valley bottom were tentatively correlated with glacial/interglacial cycles. The obtained results suggest that the highest terrace, TIV, contains sediments deposited during the MIS 20-18, representing the oldest dated fluvial deposits in this area (ages comprised between 798 and 756 ka). Terrace TIII was dated as a part of MIS 10 (376 and 359 ka). Considering these two terraces an incision rate comprised between 75 and 71 m/Ma during the 750-360 ka interval. In contrast, samples from the current valley bottom were dated as part of Marine Isotopic Stage MIS 2. Evidence from other valleys recorded at least two Marine Isotopic Stage MIS 6 and MIS 2, suggesting that MIS 6 deposits in the valley were not entirely removed during the Weichselian glaciation MIS 2.

Mots-Clés: Bassée area, ESR, OSL, Alluvial infill

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