



## **Campano-Maastrichtian paleoenvironment, paleotectonics and sediment provenance of Western Anambra Basin, Nigeria: Multiproxy evidences from the Mamu Formation**

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Our research aimed at comparing the sediment provenance and the paleoceanographic conditions prevailing for the rift (pre-Santonian) versus post rift (post-Santonian) stages of Nigerian section of the West African Rift System (WARS). We undertook a high-resolution investigation of the sedimentological (outcrop studies and laser diffraction particle size analysis), mineralogical (XRD), palynofacies, and geochemical (ICP-MS and XRF) aspects of the late Campanian-middle Maastrichtian Mamu Formation in the western section of the Anambra Basin, Nigeria. Four measured sections exposed in Uzebba (composite), Auchi, Okpekpe, and Imiegba were investigated, and seven lithofacies were identified and grouped into central basin, marsh, bay, barrier, beach, and washover fan facies association as well as meandering fluvial-tidal channel facies association interpreted as indicative of a tidally influenced wave dominated estuarine paleoenvironment. Mineralogical and palynofacies characterization reveal the heterogeneous nature of the dark mudstone lithofacies, which varies from a more proximal, low salinity phytoclast and quartz dominated marsh and bay facies with organic facies C and CD to deep-water higher salinity, palynomorph and clay dominated central basin facies organic facies BC and C. In addition, regardless of the oxic conditions prevailing in the water column, XRD analysis and palynological observations reveal whole or partial diagenetic pyrite infilling of phytoclasts, palynomorphs and skeletal debris, which suggests local reducing conditions below the sediment–water interface. Consistent with recent Campano-Maastrichtian paleogeographic and paleoclimatic models we observed a dominance of kaolinite, a high chemical index of alteration exceeding 90%, and a predominantly low index of compositional variability values (<1%), which signifies mineralogical maturity of the sediments due to sediment recycling and intensive chemical weathering under humid tropical paleoclimate. Furthermore, trace and major element discriminant plots revealed a felsic-intermediate provenance for the sediments under passive margin paleotectonic regime, which is in agreement with the regional distribution, geology, and geochemistry of the pre-Santonian and the Precambrian basement rocks in the area.