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Giant buried sediment mounds on the Western Saharan margin (NW Africa): Origin, evolution and paleoceanographic implications

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Newly acquired 2D multi-channel seismic profiles along the Western Sahara margin, offshore NW Africa, reveal three giant, buried sediment mounds separated by broad troughs. These sediment mounds are at least 24 to 37 km-long, 12 to 17 km-wide and up to 1 km in height, showing an elongated geometry with a SE-NW orientation perpendicular to the continental margin. The evolution of the sediment mounds can be divided into three different stages: a) initial growth stage during Middle Eocene, b) main growth stage during Early Miocene and, c) maintenance stage during Middle Miocene. The sediment mounds were initiated on a Middle Eocene regional unconformity documenting a widespread canyon incision. After the Oligocene erosional events, the formation of the sediment mounds was intensified in the Early Miocene under the interaction of turbidity and contour currents. They halted at the Middle/Late Miocene boundary, at a widespread erosional event. Slope failures occurred frequently on the flanks of the sediments mounds and the upper slope, and resulting mass-transport deposits (MTDs) filled the troughs and deposited further downslope. Our analysis is important because the termination of the sediment mounds at the Middle-Late Miocene boundary marked a time interval when major palaeoceanographic changes occurred, and new depositional patterns were established along NW Africa. The identification of the sediment mounds are also ideal recorders for the initiation, intensification and evolution of bottom currents along the Western Saharan margin and further suggest that bottom currents have been capable of affecting slope deposition since the Middle Eocene.