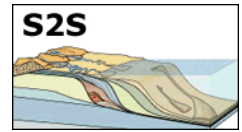


# Partial Removal of Highstand Inner Shelf Muddy Clinothems During Early Sea level Fall and Contemporaneous Mud Transfer to Adjacent Upper slopes, Gulf of Papua



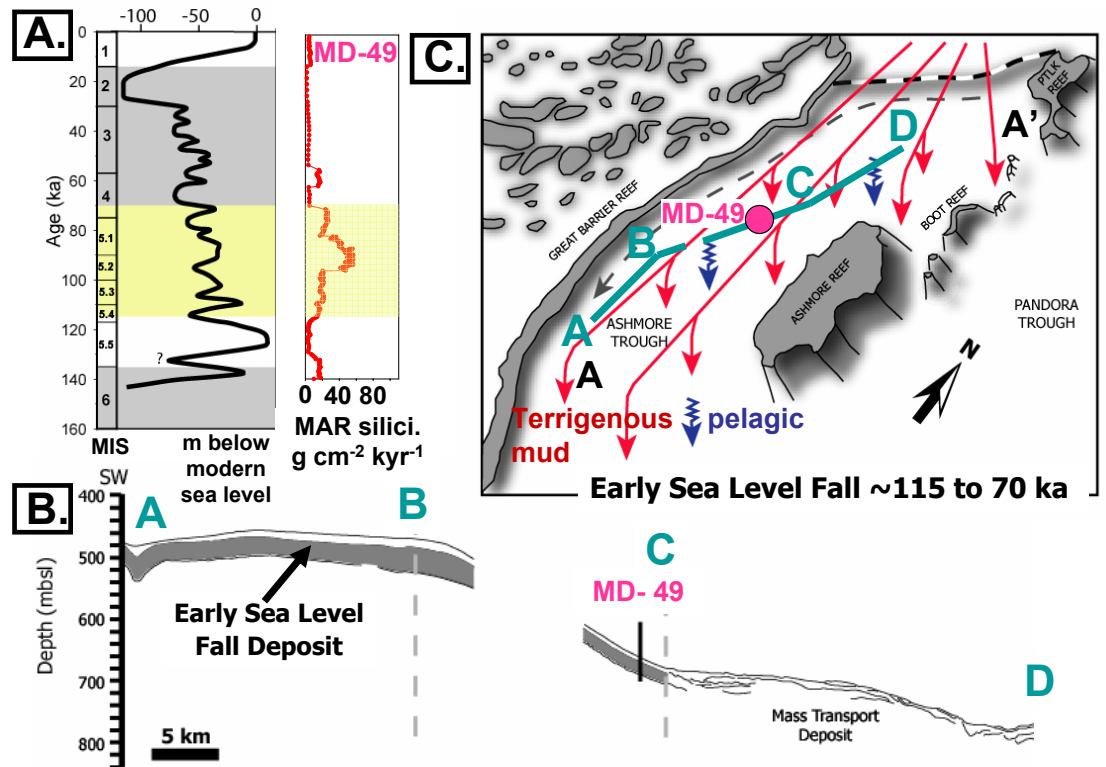
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Muddy, 20-40 m thick, clinothems were deposited on the Gulf of Papua (GoP) inner shelf during the late Holocene sea level highstand (Slingerland et al., 2008)\*. Maximum mud accumulation had also to occur on the GoP inner/mid shelf during the last interglacial penultimate highstand (MIS 5.5 (5e) ~ 130 to 115 ka), that ended by a rapid ~ 50 m sea fall, followed by an interval, ~ 115 to 70 ka, when sea level oscillated between 50 and 20 m below modern sea level (Fig. A; Lambeck and Chappell, 2001)\*. A siliciclastic mud unit, deposited during this ~ 115 to 70 ka interval and characterized by unusually high accumulation rates (~ 15 to 60 g/cm<sup>2</sup>\*kyr; i.e. at core MD-49 - Fig. A), is well imaged in 3.5 kHz profiles as a distinctive semi-transparent homogeneous 18 to 50 m-thick package, in Ashmore Trough, a basin adjacent to the GoP shelf (Francis, 2007; Figs. B - C). This unit, thickest on the western part of Ashmore Trough upper slopes, thins downslope to the east and from north to south. During this interval of overall sea level fall, unlithified siliciclastic muds, stored as today on inner/mid shelf clinothems during the penultimate highstand, were systematically exposed, reworked, and transported as suspended material across the narrowed shelf, helped by the effect of strengthened tidal currents (Harris et al., 2005)\*. The muds were ultimately delivered to Ashmore Trough, helped by contour currents preferentially transporting sediment in a southwesterly direction, from the northern Ashmore shelf margin along its western slope (Fig. C).

Figure: Sea level curve for the last 150 kyr or last full glacial cycle (A) (Lambeck and Chappell, 2001\*). Following the last interglacial penultimate highstand (130 to 115 ka), the interval of early sea level fall (~ 115 to 70 ka) is characterized in Ashmore Trough by unusually high mud accumulation (A) in particular in the western upper slope of Ashmore Trough (B). Penultimate highstand clinothem muds, reworked during early sea level lowering, transported across the shelf edge, were ultimately delivered to Ashmore Trough by contour currents, preferentially transporting sediment in a southwesterly direction, from the northern Ashmore shelf margin along its western slopes (C).



Francis, J.M. (2007), Late Quaternary sediment dispersal and accumulation on slopes of the Great Barrier Reef mixed siliciclastic-carbonate depositional system, Gulf of Papua, Papua New Guinea and north Queensland Margin, Australia, Ph.D. Dissertation, 304 pp., Rice University, Houston, TX.

