

Erosion of cohesive shorelines: the contribution of shore platform downwearing. A case study on the London Clay, Kent coastline, UK.

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The most rapidly eroding clifffed shorelines in the United Kingdom are composed of semi-consolidated cohesive materials with extensive shore platforms fronting actively eroding cliffs. Research has focussed on understanding and measuring their cliff retreat rates rather than platform downwearing. Yet, irreversible platform downwearing is thought to be a primary cause of beach lowering, a key driver of cliff retreat and contributor of large volumes of fine-grained sediment to the coastal budget. Despite this, few direct measurements of clay platform downwearing exist and current understanding of the erosion mechanisms of cohesive shore platforms is limited.

This paper presents downwearing rates, measured over a ten year period across a shore platform in London Clay at Warden Point, Isle of Sheppey, Kent, UK using the specially designed Traversing Erosion Beam. The platform is 300 m wide with a gradient of 0.5 degrees and is backed by 48 m high cliffs. A thin mixed-sediment beach, \sim 8 - 20 m wide and 0.1 m deep, covers the landward edge of the platform.

Mean annual downwearing, on the upper to lower mid-shore, 2005 - 2015, is 17.52 ± 2.88 mm/yr. The highest downwearing rate, 29.85 ± 5.21 mm/yr, was recorded on the upper platform. The location of maximum downwearing has varied between measurement periods and is not consistently on one part of the platform. Downwearing is greatest during the winter period and lower during the summer.

The results provide evidence of the contribution that platform downwearing makes to cliff erosion and the coastal sediment budget. The findings will assist in the development both of models to enhance prediction of coastal retreat on cohesive shorelines and of strategies for their management and conservation.