

The influence of clay mineralogy on the erosion thresholds of estuarine cohesive sediments

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Advances in understanding sediment stability within estuarine systems are inhibited by the complexity of the physicochemical properties of the cohesive sediment and their interactions within these chemically and biologically diverse and dynamic environments (Whitehouse *et al.*, 2000; Grabowski *et al.*, 2011). Of the key properties of cohesive sediments the geochemical characteristics have received the least attention, with little investigation into their influence on erosion within estuarine systems. The electrochemical nature of the sediments that control cohesion are subject to various geochemical influences within these environments, consequently having implications for sediment stability (Ravisangar *et al.*, 2001; Grabowski *et al.*, 2011).

A fundamental geochemical property of cohesive sediments is the clay mineralogy. The variance in characteristic properties between the different clay mineral groups is recognised as a significant factor in erosion resistance in terrestrial sediment studies (Igwe *et al.*, 1999; Wakindiki and Ben-Hur, 2002; Kasanin-Grubin, 2013). This knowledge has yet to be applied to the sediment stability within the contrasting geochemical environments of estuaries (Allen, 2000; Zhu *et al.*, 2008; Grabowski *et al.*, 2011).

Through a series of laboratory and field studies this research aims to establish how variance in clay mineral composition of estuarine sediments influences erosion. This poster summarises the results of the study, identifying distinct differences in erosion thresholds between sediments with contrasting clay mineralogies. Furthermore, changes to erosion resistance of the clay mineral groups are observed between marine and freshwater eroding fluids during shear strength testing, identifying the influence of water chemistry on the stability of the different clay mineral suites.

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