Erodibility of vertically exposed salt marsh cores

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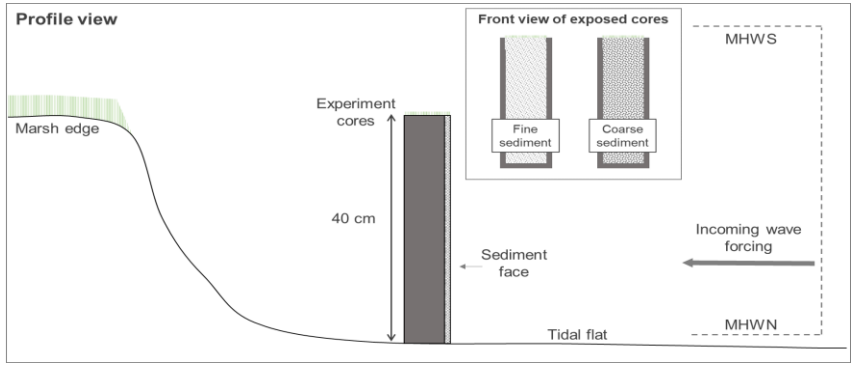
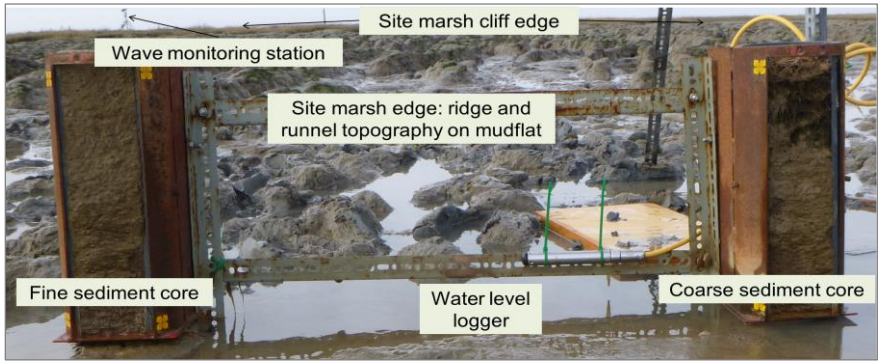
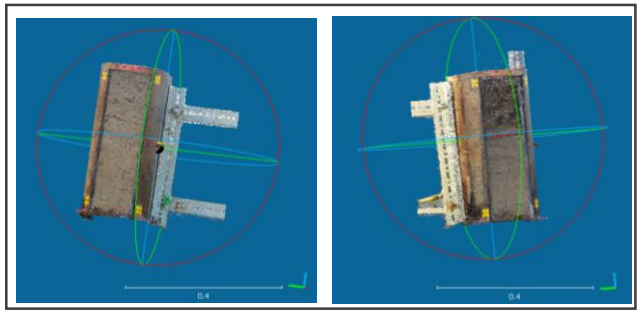
- Predicting long-term persistence of salt marsh systems requires improved understanding of lateral erosion at seaward marsh margins
- Pilot experiment to investigate small-scale (cm/mm) processes on vertically exposed cores of salt marsh sediments at tidal flat / salt marsh transition
- Volume change found to be small (mm-scale) – sediment loss greatest in coarser sediments around vegetation structures

- Two 40 cm depth cores from UK salt marshes of known sedimentology:
  - **Tillingham, Essex Coast: fine silt-clay sediment**
  - **Warton, Morecambe Bay: coarse sand-dominated sediment**
- Exposed to in-situ conditions on Tillingham tidal flat November 2018 – February 2018







- Repeat digital camera images for structure-from-motion (SfM) photogrammetry
- Time series of 3-D point clouds - cloud-to-cloud distance comparisons show change to core face topography
- SfM methods useful for future monitoring at mm-scales

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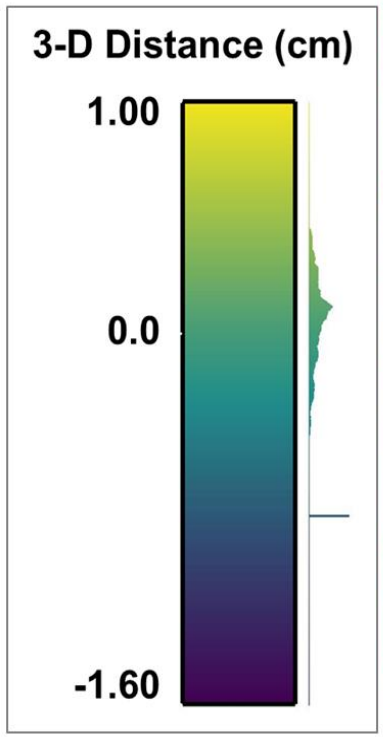
3-D Distance change in the vertical core faces between point clouds captured on 17th December 2018 and 26th February 2019

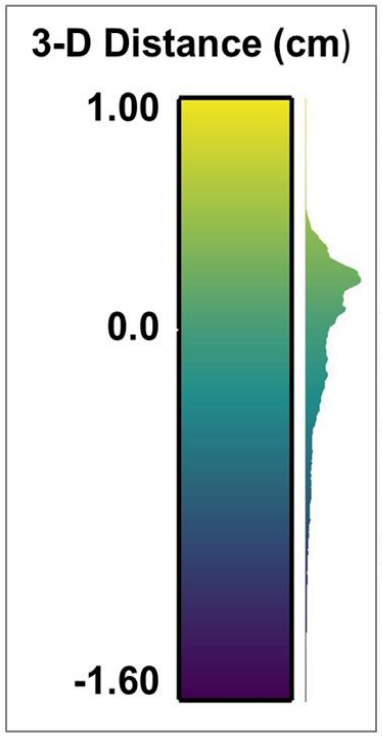
Tillingham

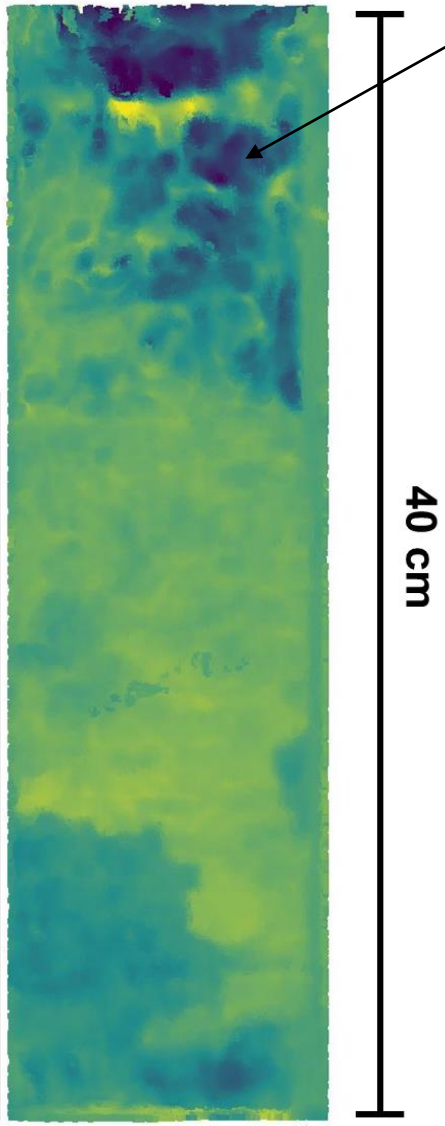
Fine sediment core - greatest sediment loss in bottom 10 cm



Warton

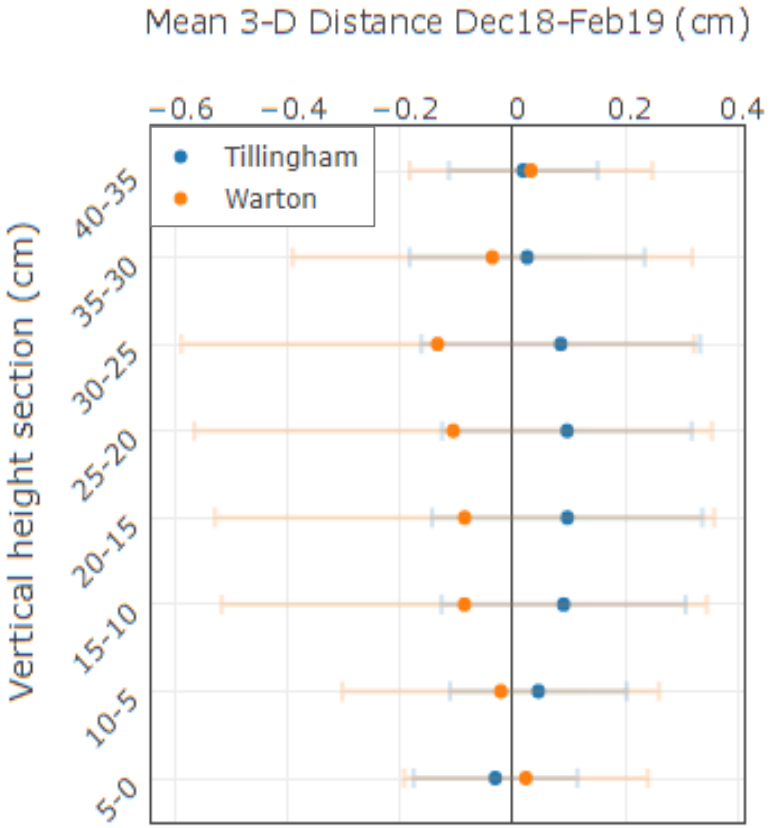
Some increase in 3-D distance – may be associated with swelling and biofilm





Greatest sediment losses seen in the top 15 cm of the Warton (coarse grain) core

Greater variability in change within coarser sediment



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3-D point cloud of Warton core face images from December 2018.

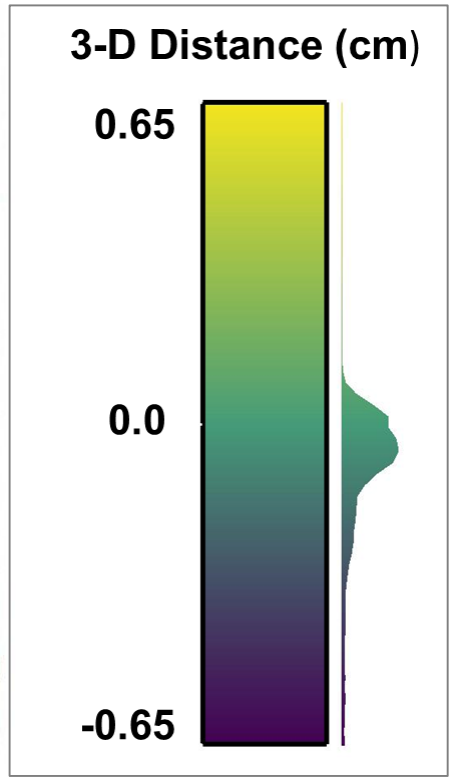
Sediment losses in coarse grain material appear strongly influenced by vegetation structures in the section immediately below the surface.

3-D distance heat-map shows substantial change in Warton core occurred rapidly between November 2018 and December 2018

Little change in the Tillingham core during this time interval.

Future analysis of water level data and meteorological data from monitoring period. Further experiments with cores from additional sites.

3-D distance between November 2018 and December 2018 Warton clouds (overlain on November cloud)



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