Marine Evidence Conference 2024

Selecting sites for coastal restoration using the 'Mini Buoy'

Dr Cai Ladd | c.j.t.ladd@swansea.ac.uk
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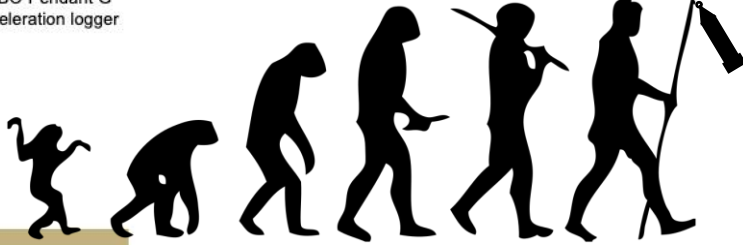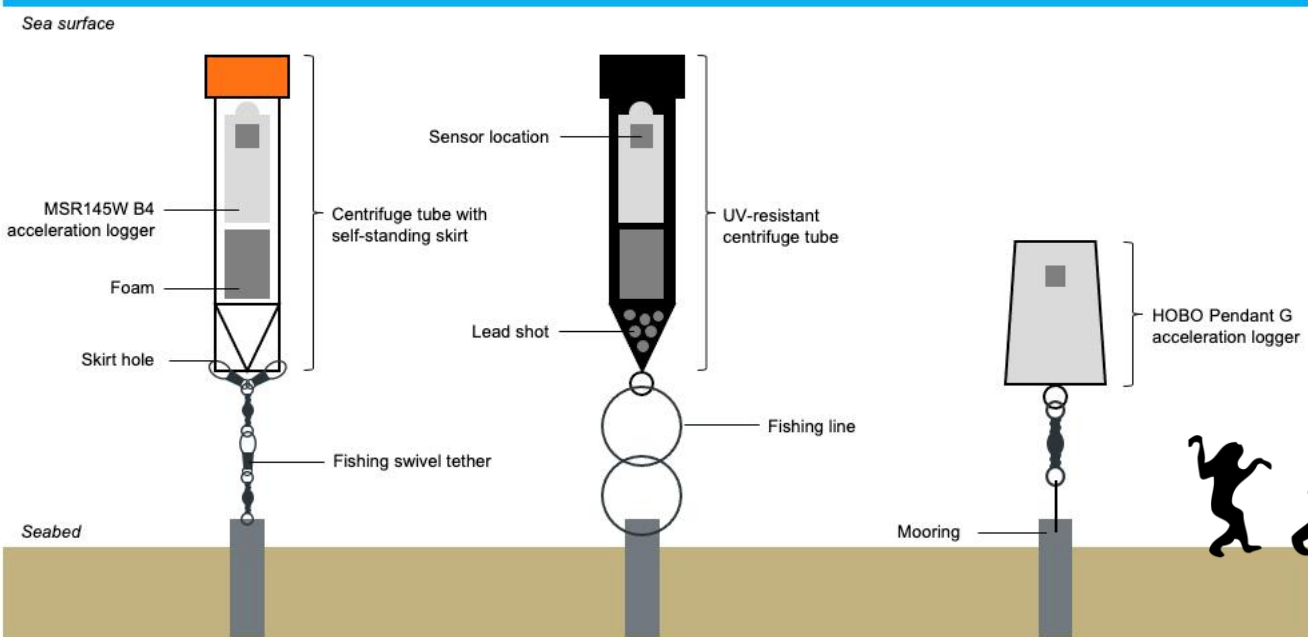# **Challenge** establishing on the intertidal

The wrong species

The wrong location

Concept the B4, B4+, and Pendant Mini Buoys

Concept

- A plastic float, pinned to the ground contains an accelerometer data logger

- Acceleration along the y-axis can be used to interpret the start (1) and end (4) of an **inundation event**

- Persistent dip in acceleration indicates a **current**. The stronger the current, the greater the dip (2)

- Swaying back-and-forth in acceleration indicates a passing **wave**. The greater the variation, the larger the wave (3)
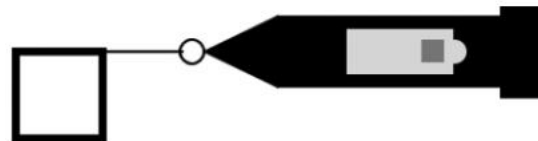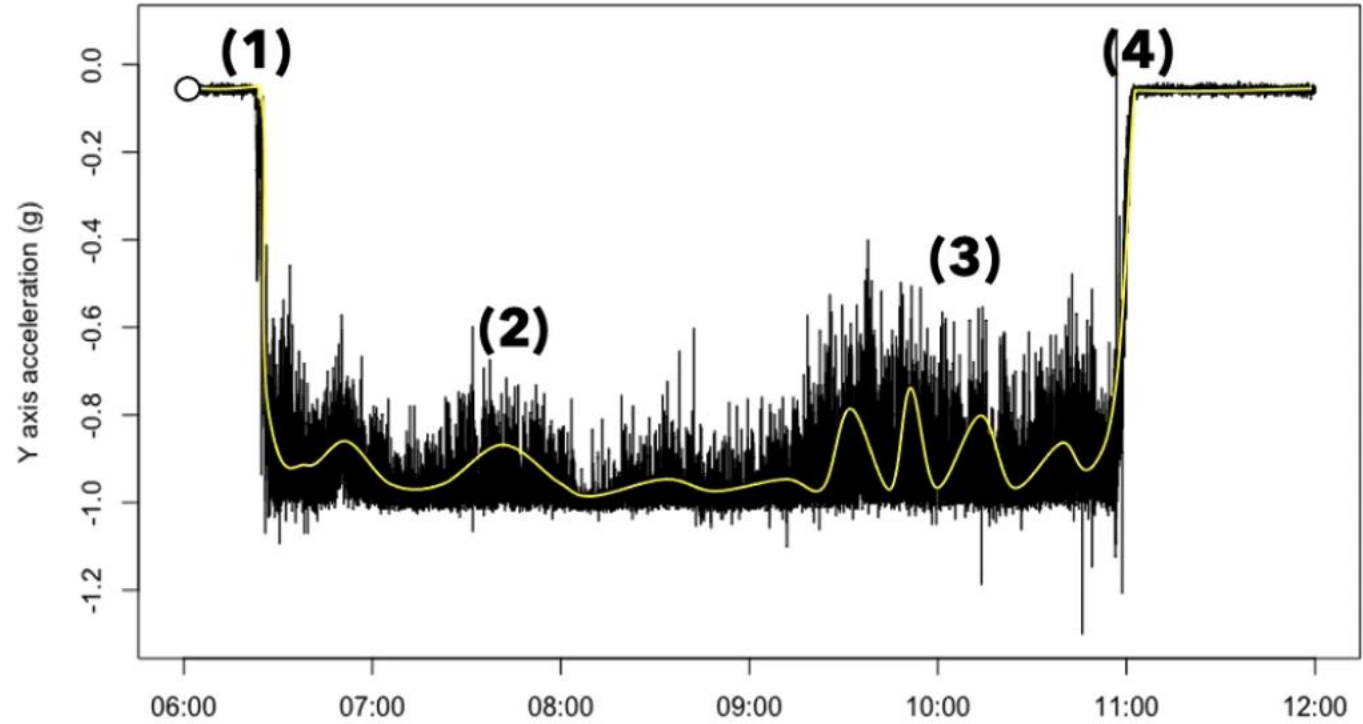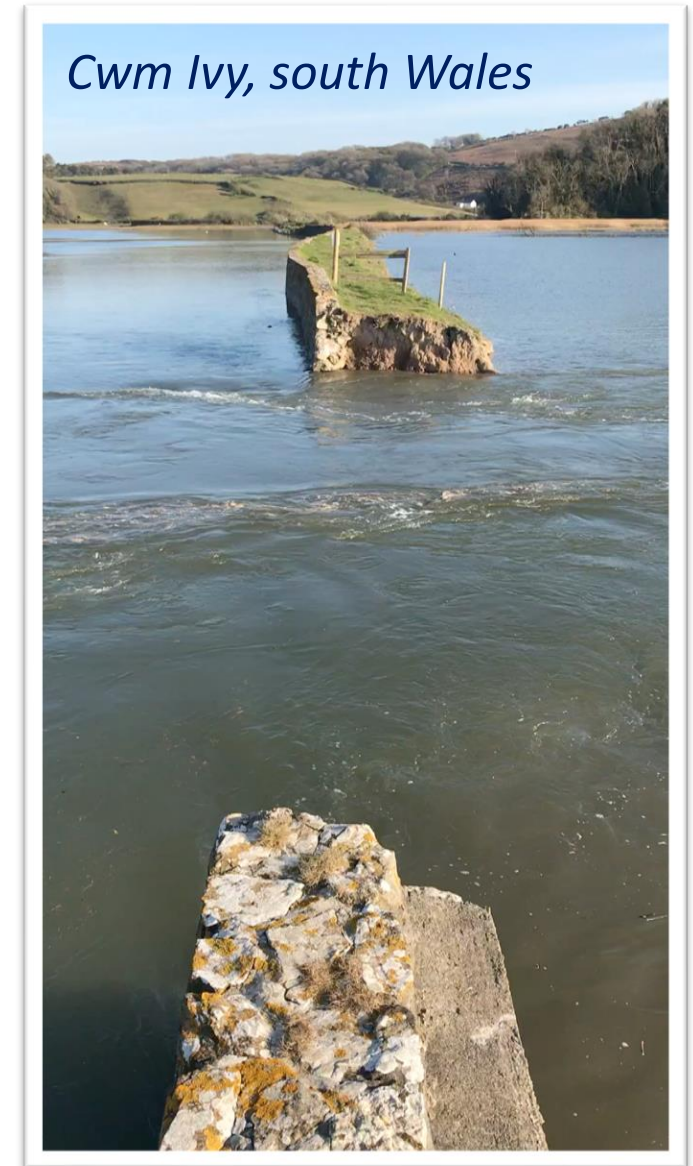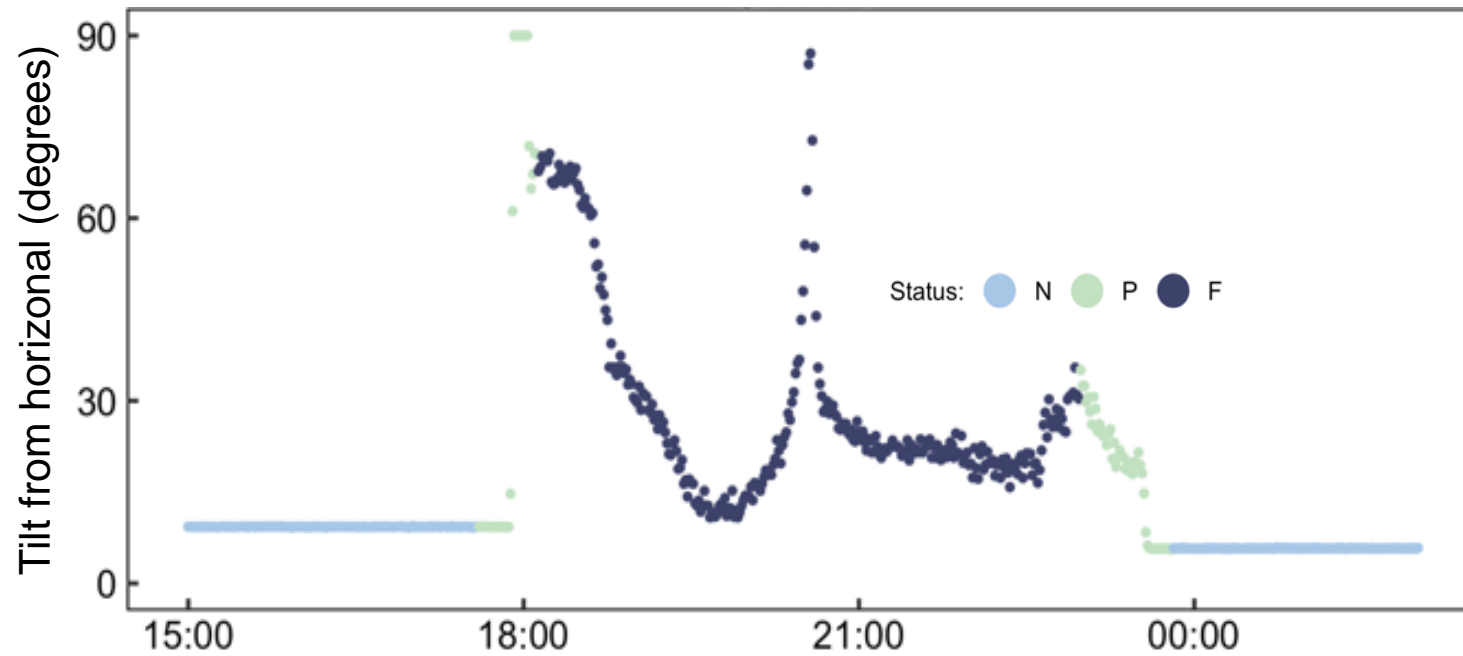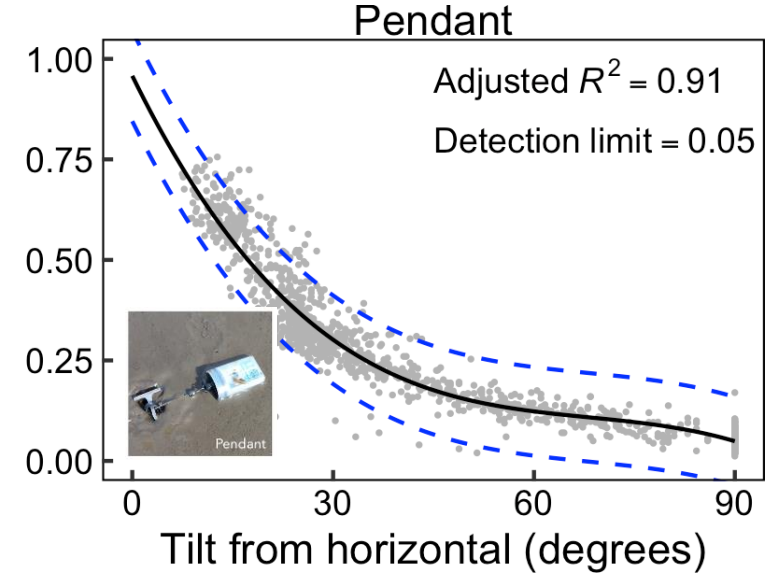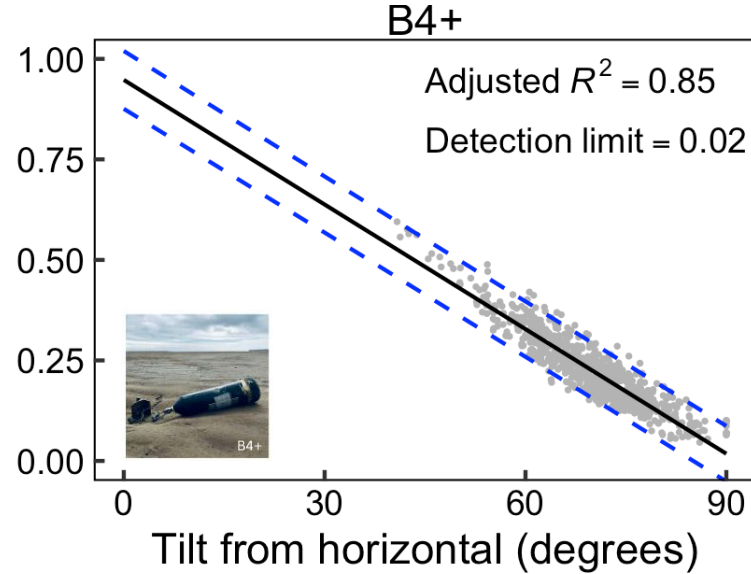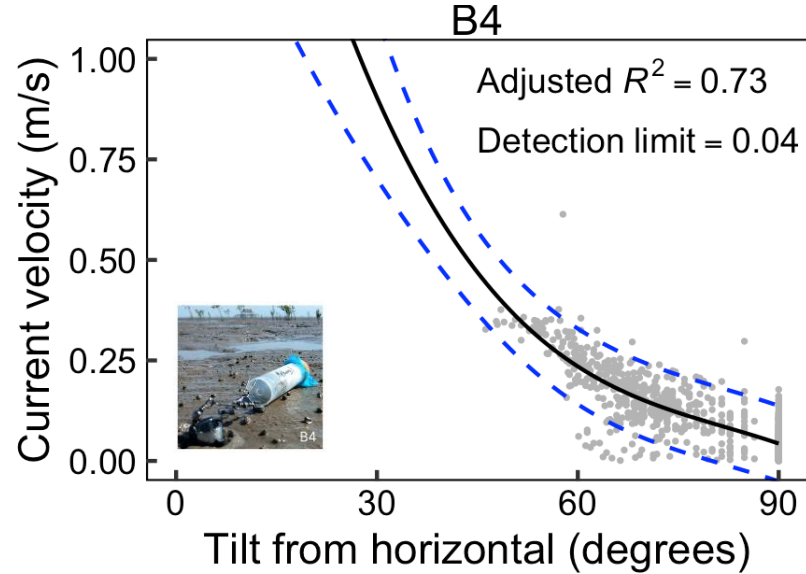
Calibration inundation status

- Search for abrupt shifts at start and end of inundation events and classify as **partial** inundation

Cwm Ivy, south Wales

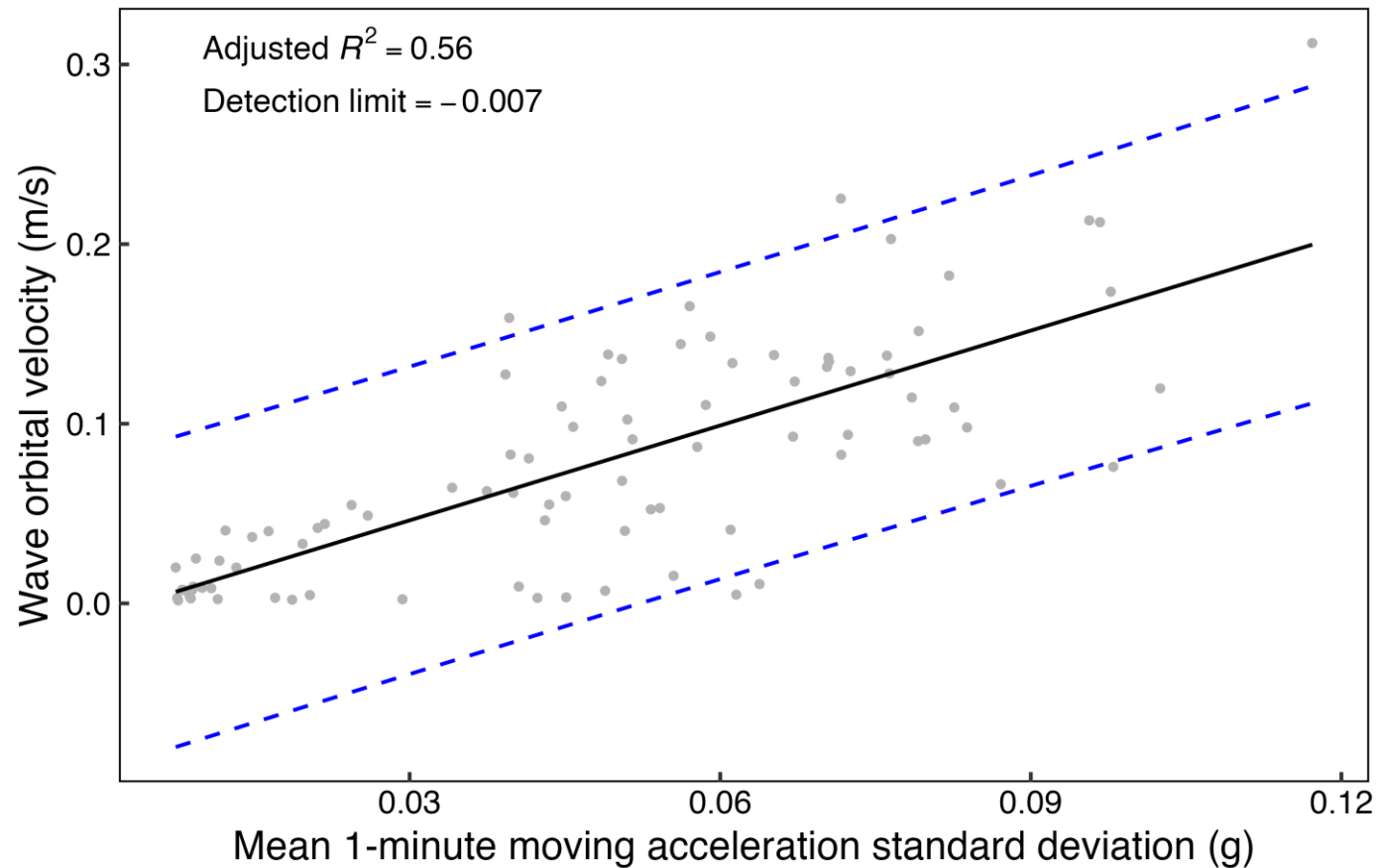Ladd et al. (submitted) *Limnol Oceanogr Methods*

Calibration current velocity

- Mean **current velocity** against mean y-axis tilt over 1-minute windows

Calibration wave orbital velocity and significant wave height

- Mean **wave orbital velocity** and **significant wave height** from Wave Directional Spectra analysis of ADV data, and correlated against 1-minute rolling standard deviation of acceleration in 10-minute windows

Adjusted $R^2 = 0.56$

Detection limit $= -0.007$

Wave orbital velocity (m/s)

Mean 1-minute moving acceleration standard deviation (g)

Ladd et al. (submitted) *Limnol Oceanogr Methods*

Analysis The Mini Buoy App 2.0

Application current projects

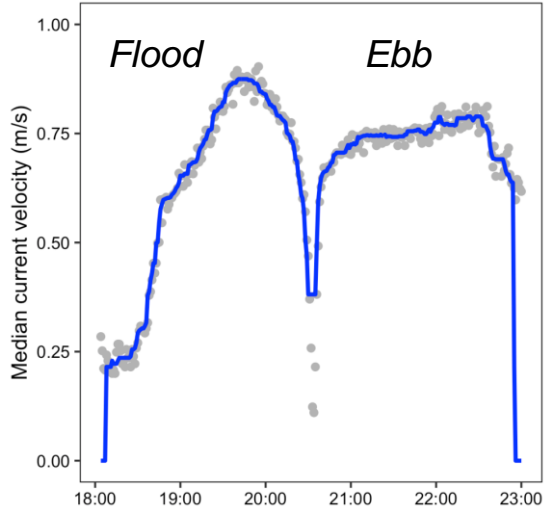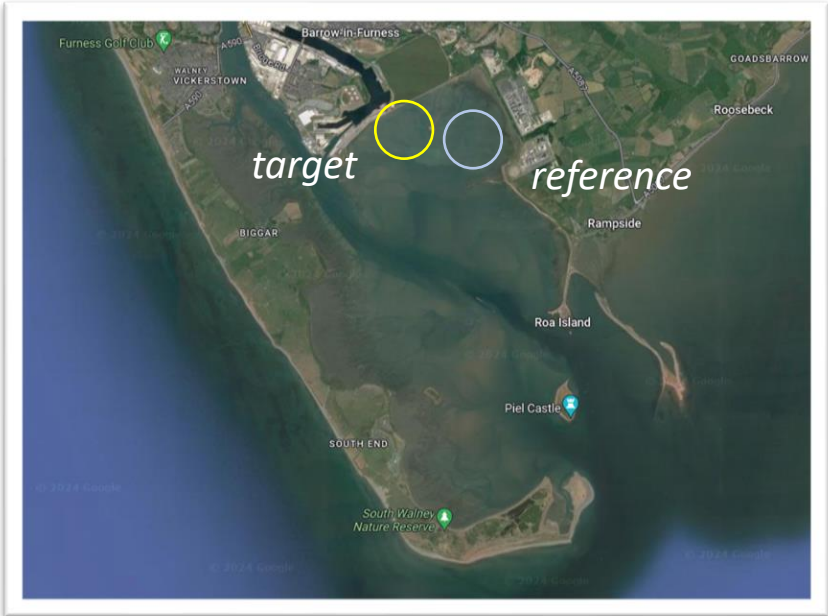Sediment flux to an unmanaged realignment site
Heidi Burgess + Jonathan Dale

Z. Noltii restoration, Barrow-in-Furness
Cumbria Wildlife Trust

Viability of poldering to create saltmarsh in the UK

NRW + Jonathan Dale

Geomorphic health of Solway Coast habitats
CLEARcoasts

Application detecting saltmarsh tipping points

Expanding edge

Eroding edge

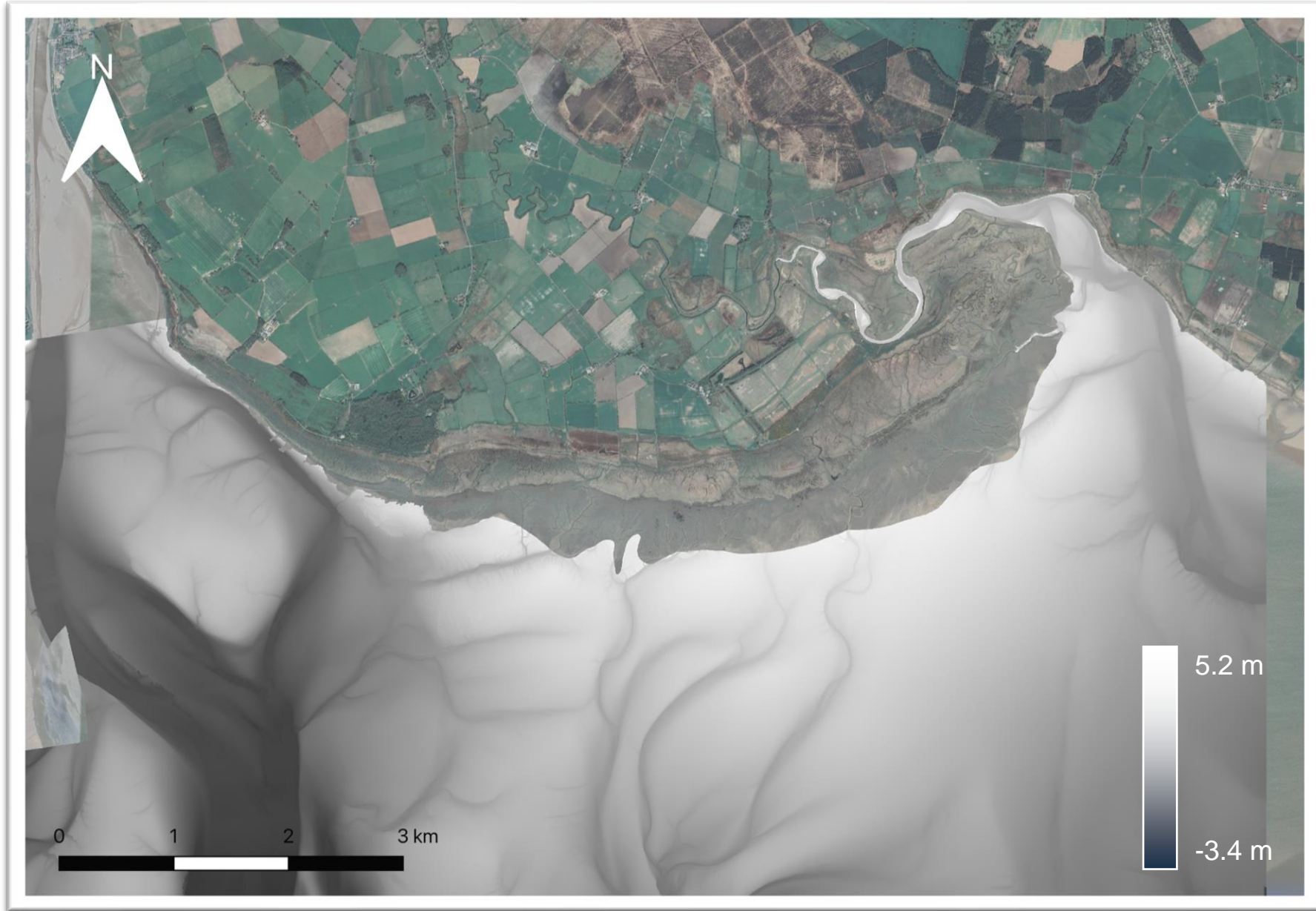# **Application** detecting saltmarsh tipping points

- Distance to the threshold plane positively correlated with **elevation**

- Straight line equation can be used to transform a **Digital Elevation Model** of the tidal flat into D2T values
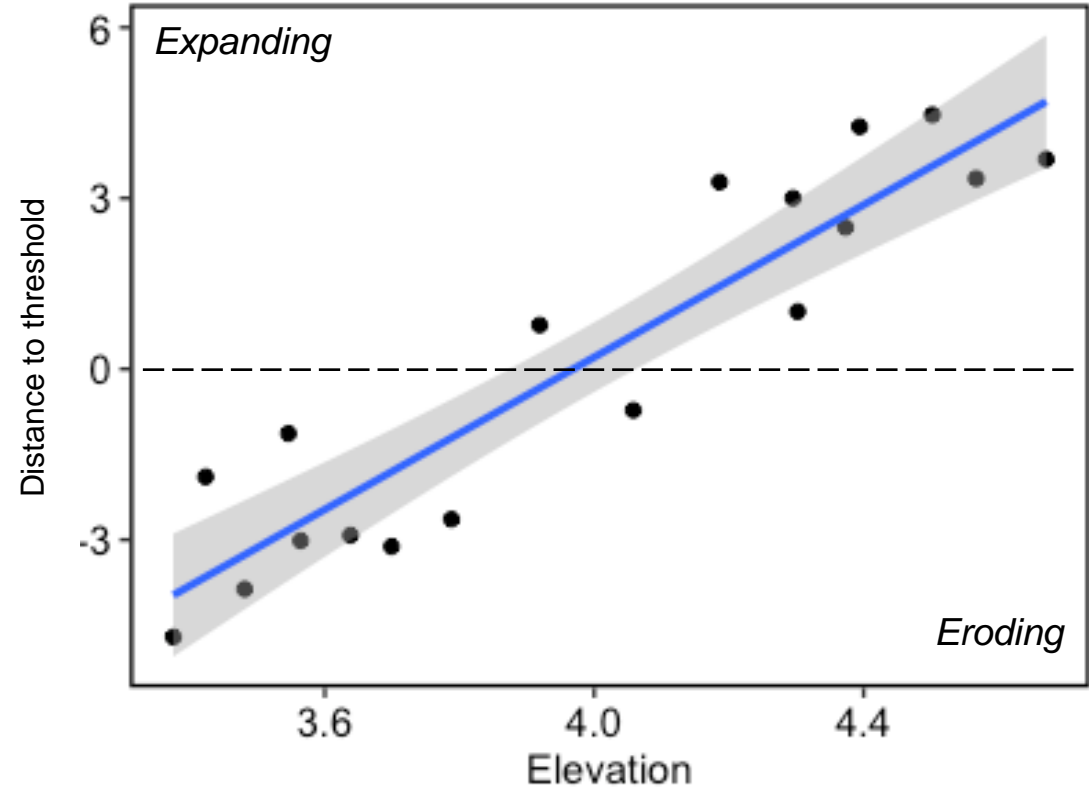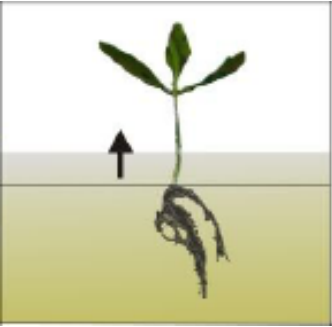
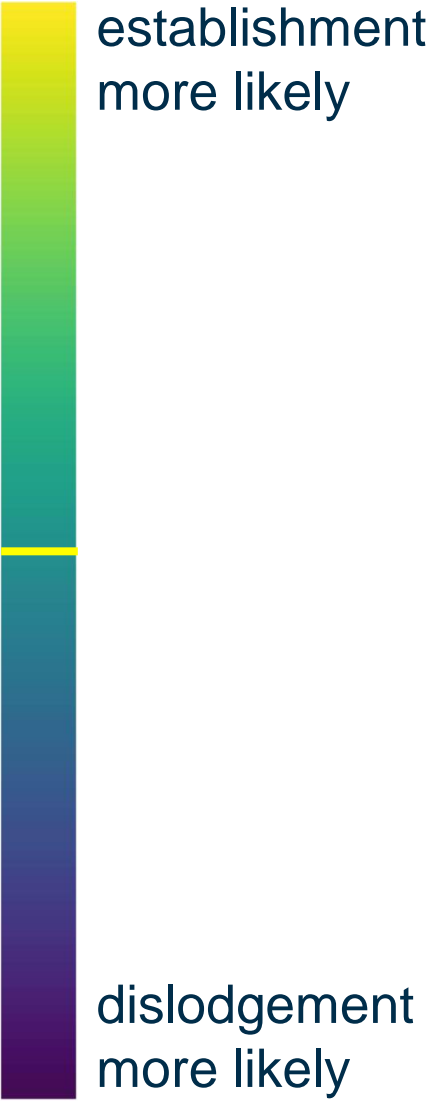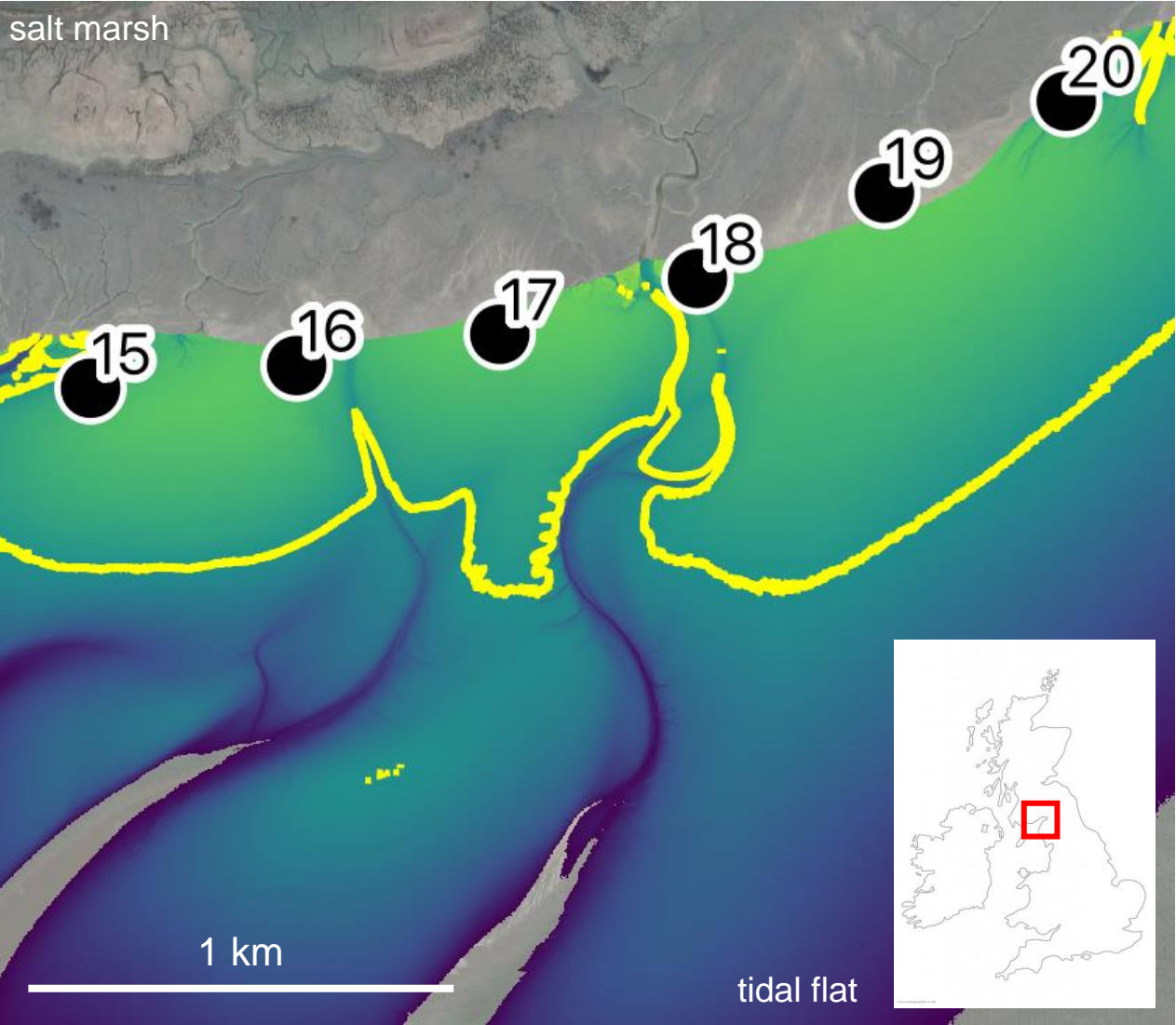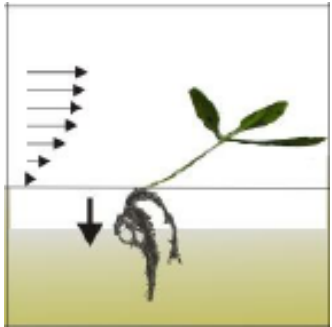# Application detecting saltmarsh tipping points

Application detecting saltmarsh tipping points

Summary

- Mini Buoys are a low-cost and open-source alternative to conventional hydrographic sensors

- Data can be used to predict the likelihood of coastal wetland establishment or erosion

- A valuable tool for community engagement in shaping coastal management planning

Diolch yn fawr.