

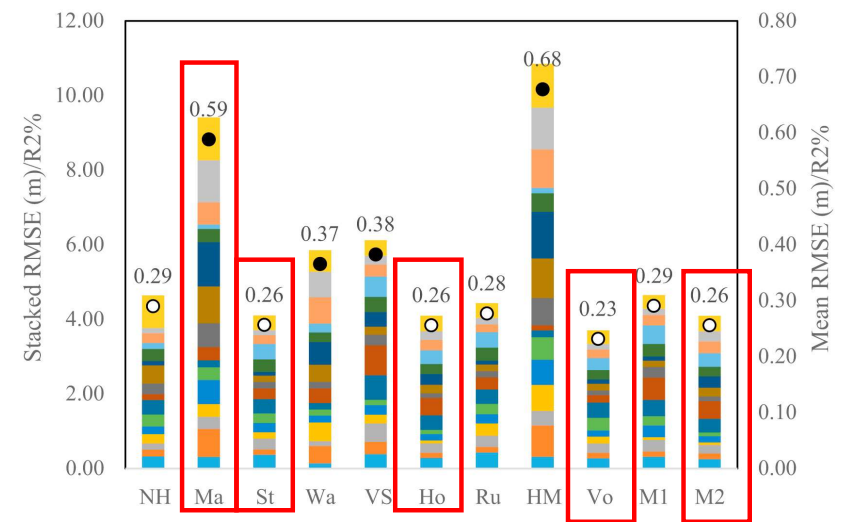
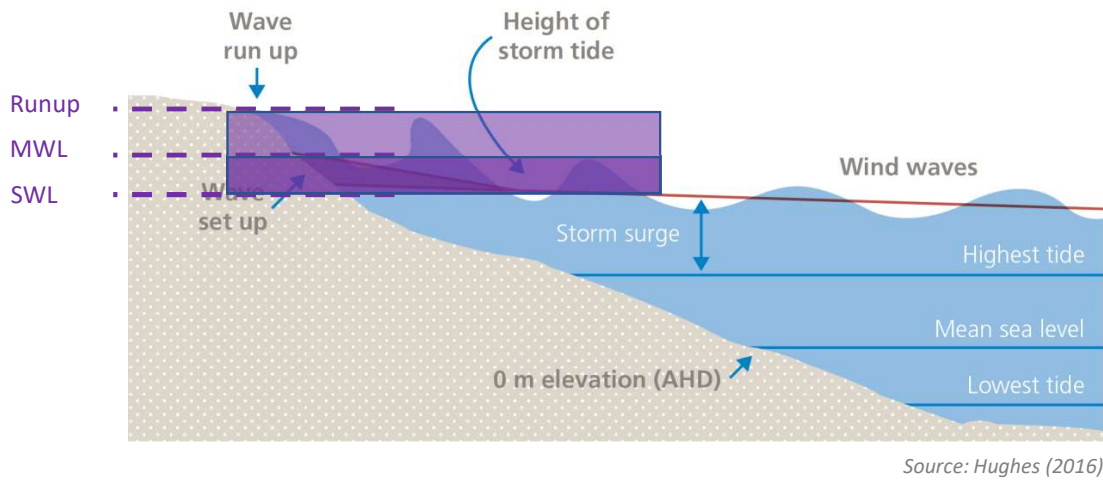


It's a Setup!

Rosanne Hart
PhD Candidate – The University of Newcastle
rosanne.hart@uon.edu.au



Runup – back to the basics



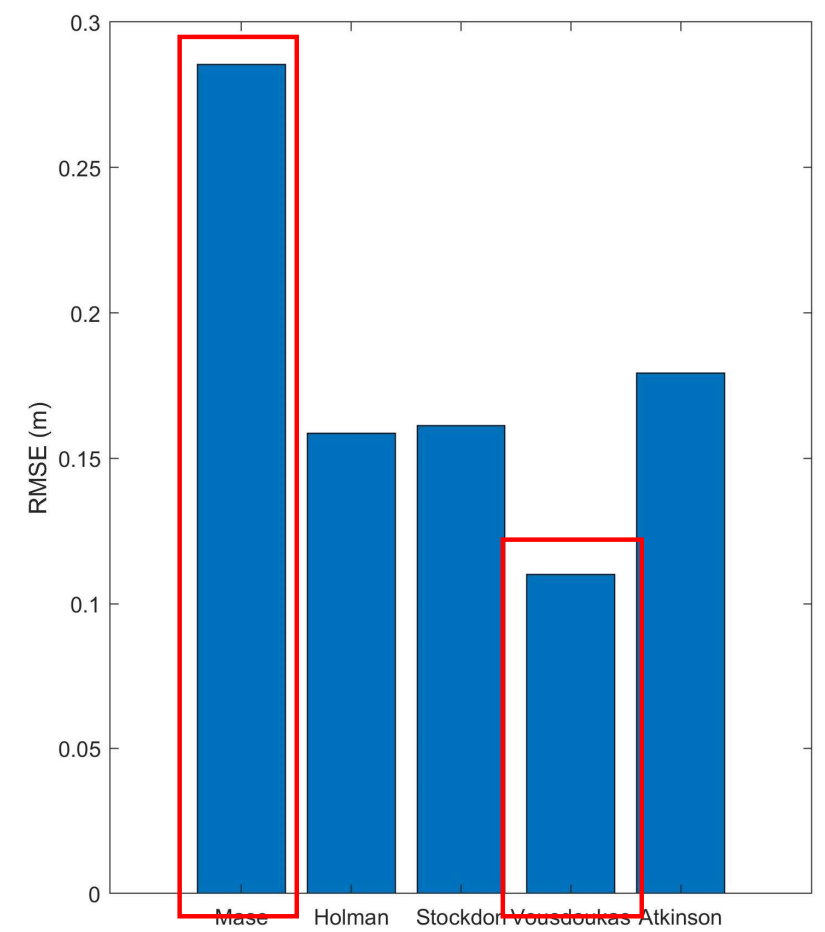
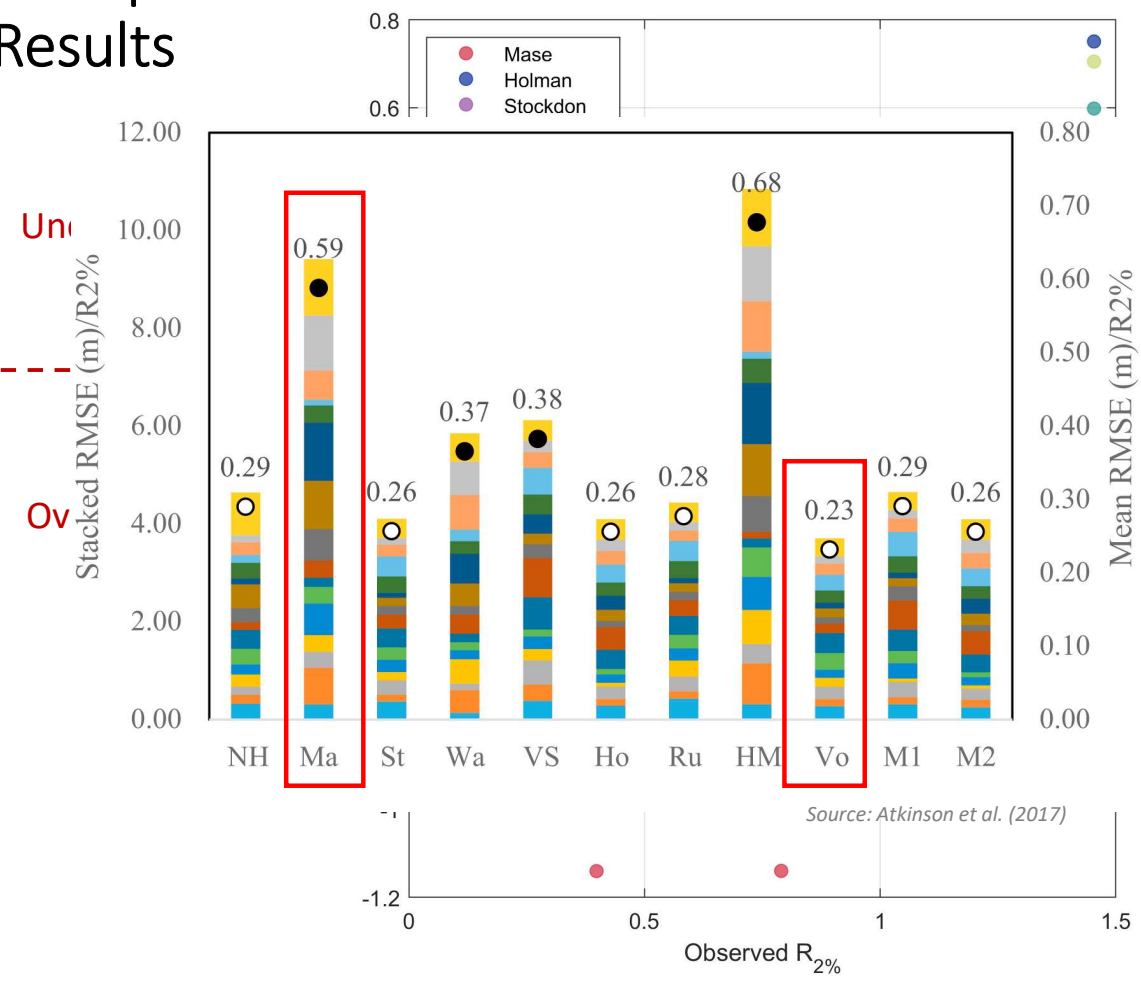
Source: Atkinson et al. (2017)

Even the best performing runup models still result in RMSE of 25% of the $R_{2\%}$ value.

This research

- Identifies the magnitude of error from empirical runup models that incorporate a component for wave setup.
- Investigates the different ways to measure setup using a simple and versatile setup.
- Compares empirical setup measurements with those obtained in from field observations using proposed measurement techniques.

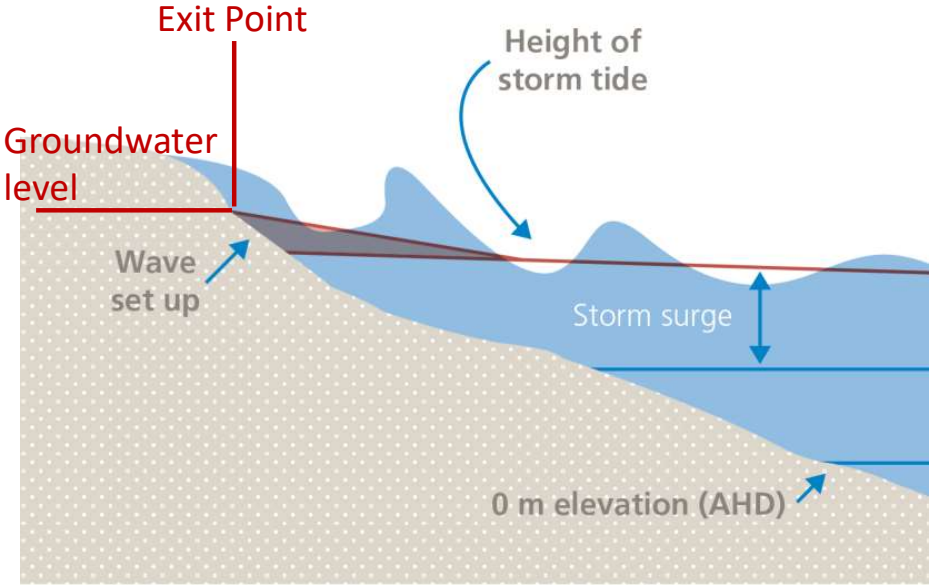
Runup Model Results



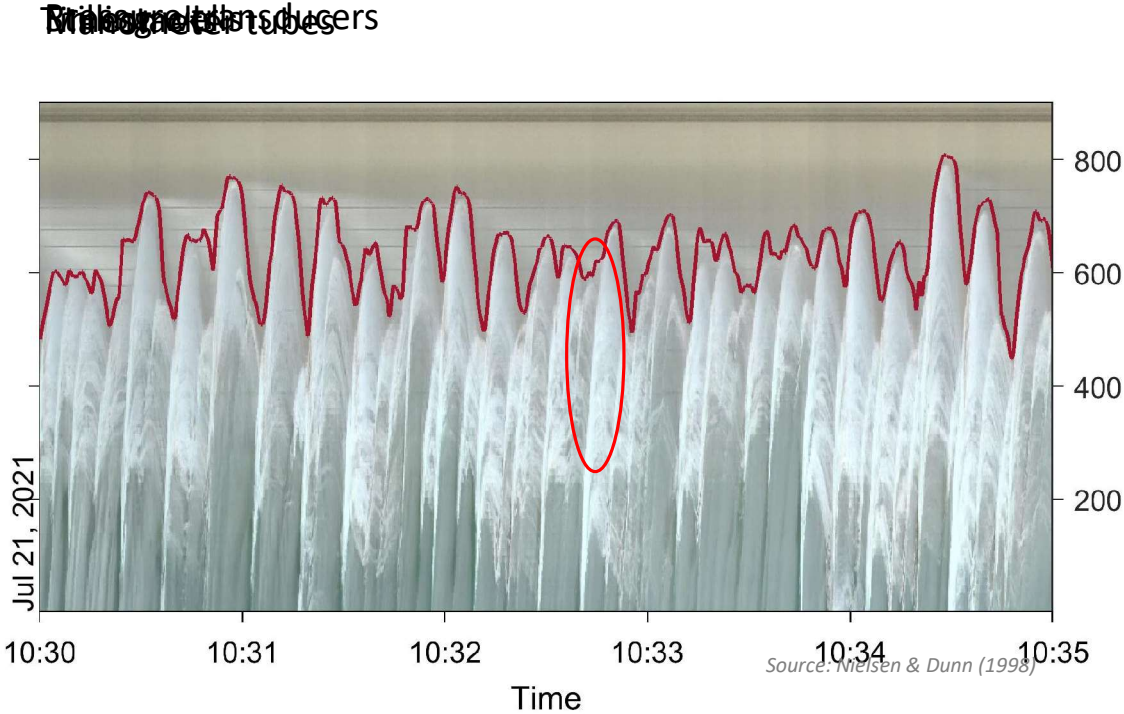
This research

- Identifies the magnitude of error from empirical runup models that incorporate a component for wave setup.
- Investigates the different ways to measure setup using a simple and versatile design that can be used on different beach types.
- Compares empirical setup measurements with those obtained in from field observations using proposed measurement techniques.

Setup – what is it and how is it measured?



Source: Hughes (2016)

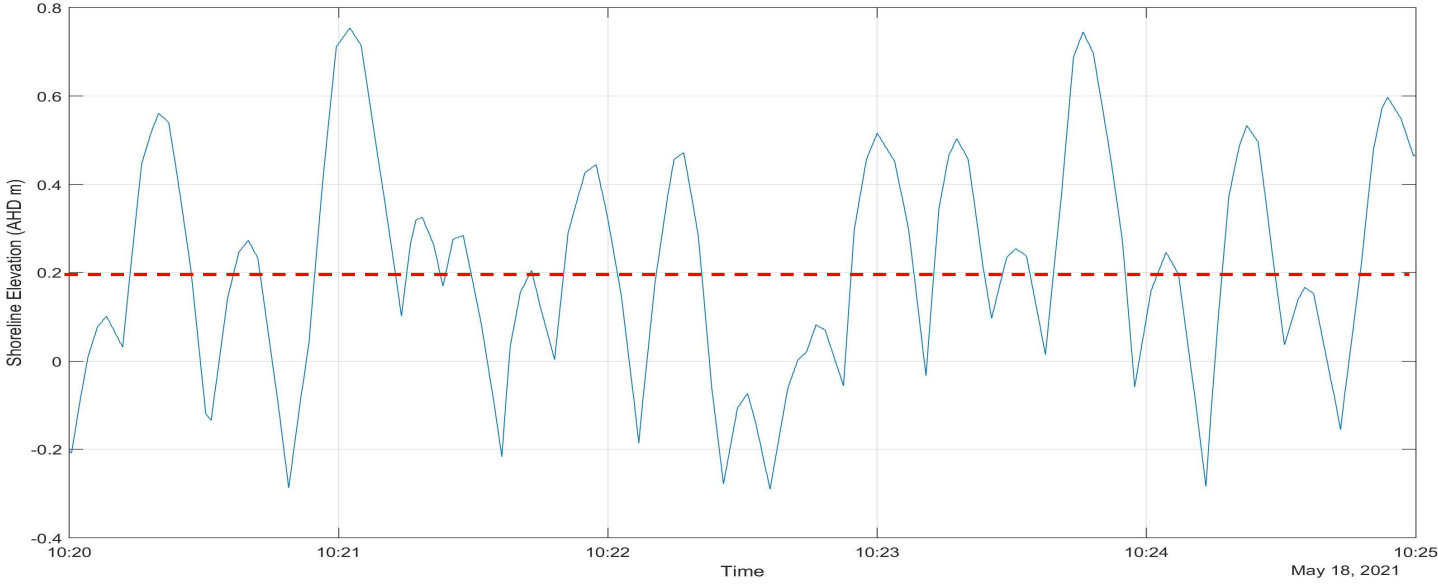


Source: Weisen & Dunn (1998)

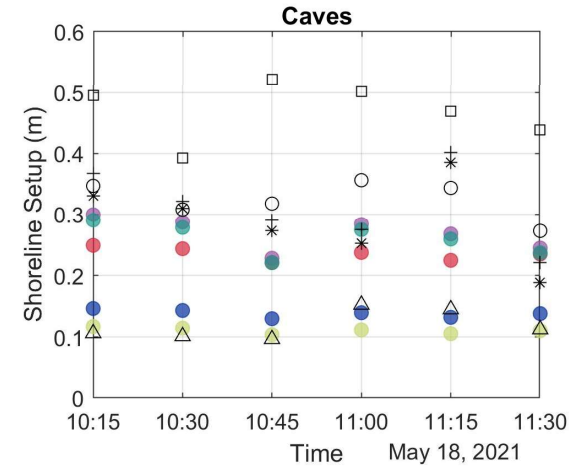
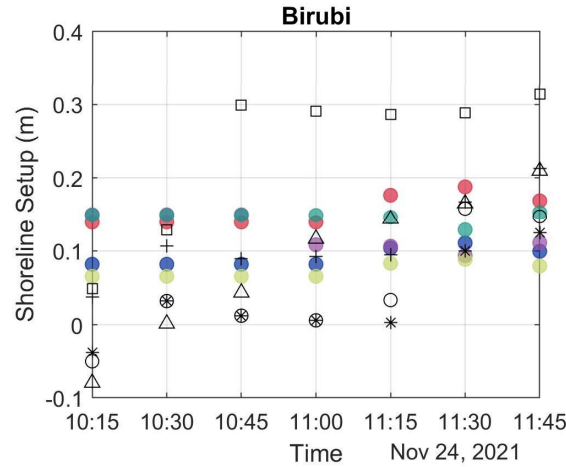
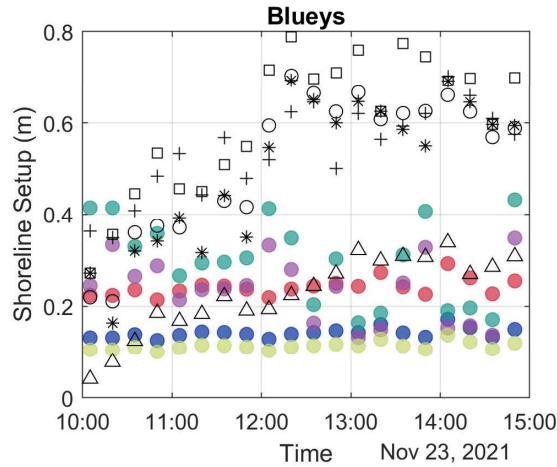
Setup measurement methods

Method 3: This method primarily consists of installing a pressure transducer in the seabed to measure the pressure. The pressure is then converted to the water level using the relationship between the pressure and the water level. The pressure is measured by the transducer and the water level is obtained from this pressure transducer.

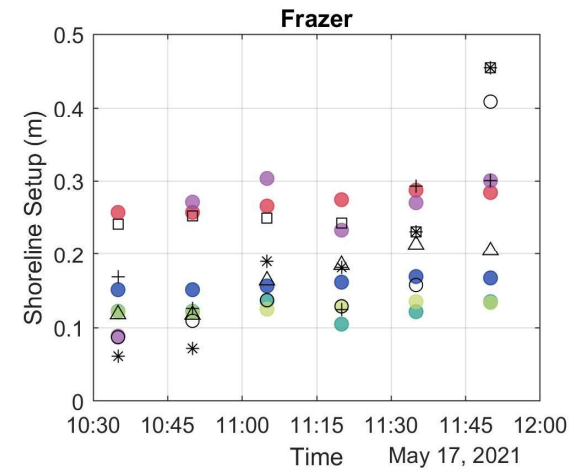
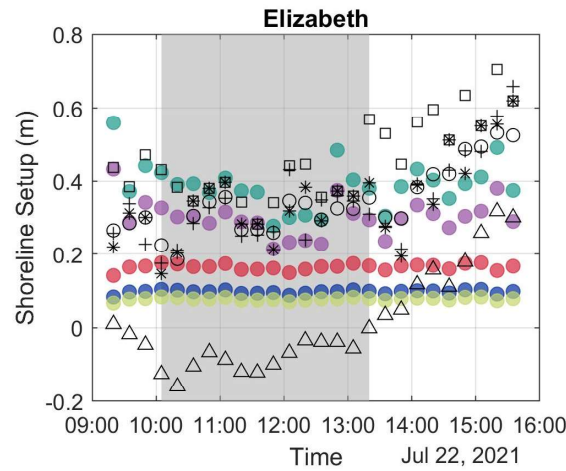
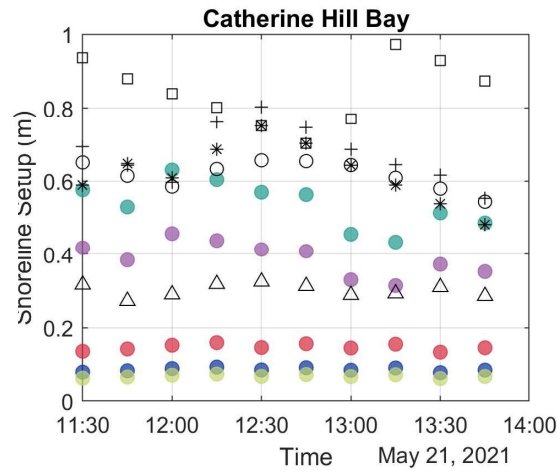
Pressure
Transducers



Setup measurements and empirical estimates



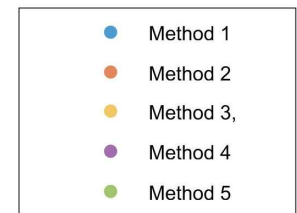
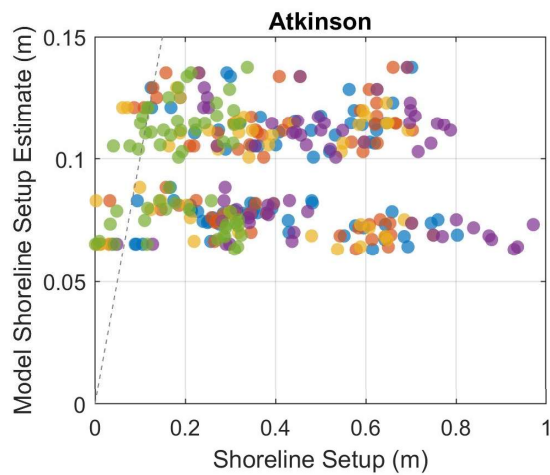
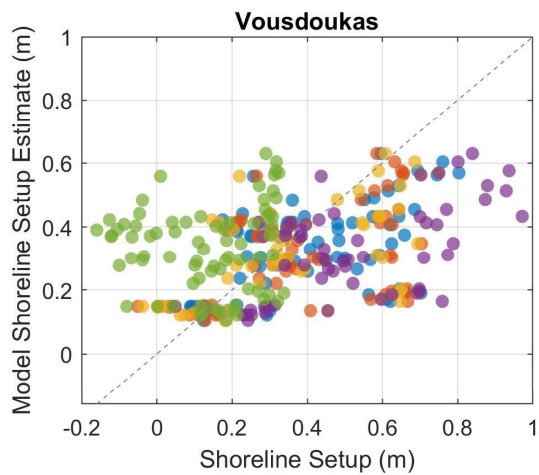
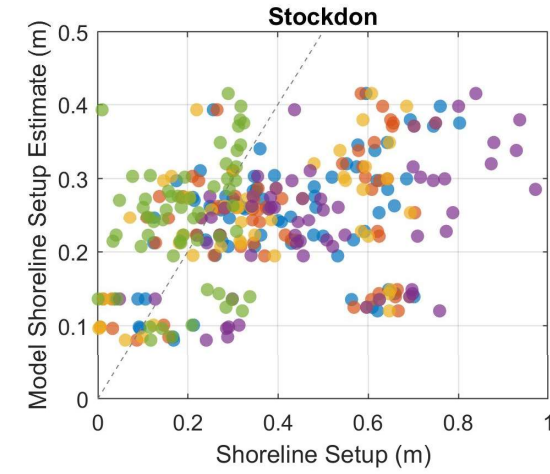
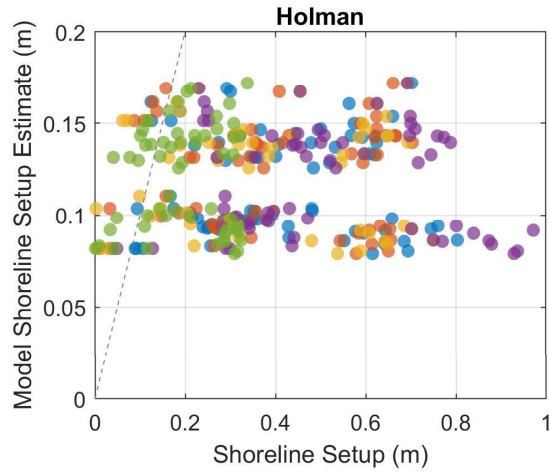
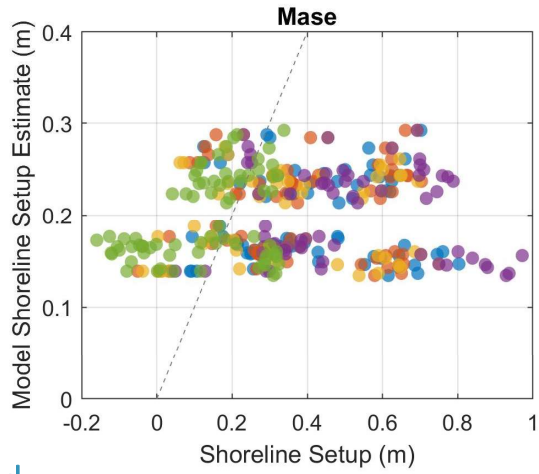
Beach Comparison



- + Method 1
- Method 2
- * Method 3
- Method 4
- △ Method 5
- Mase
- Holman
- Stockdon
- Vousdoukas
- Atkinson

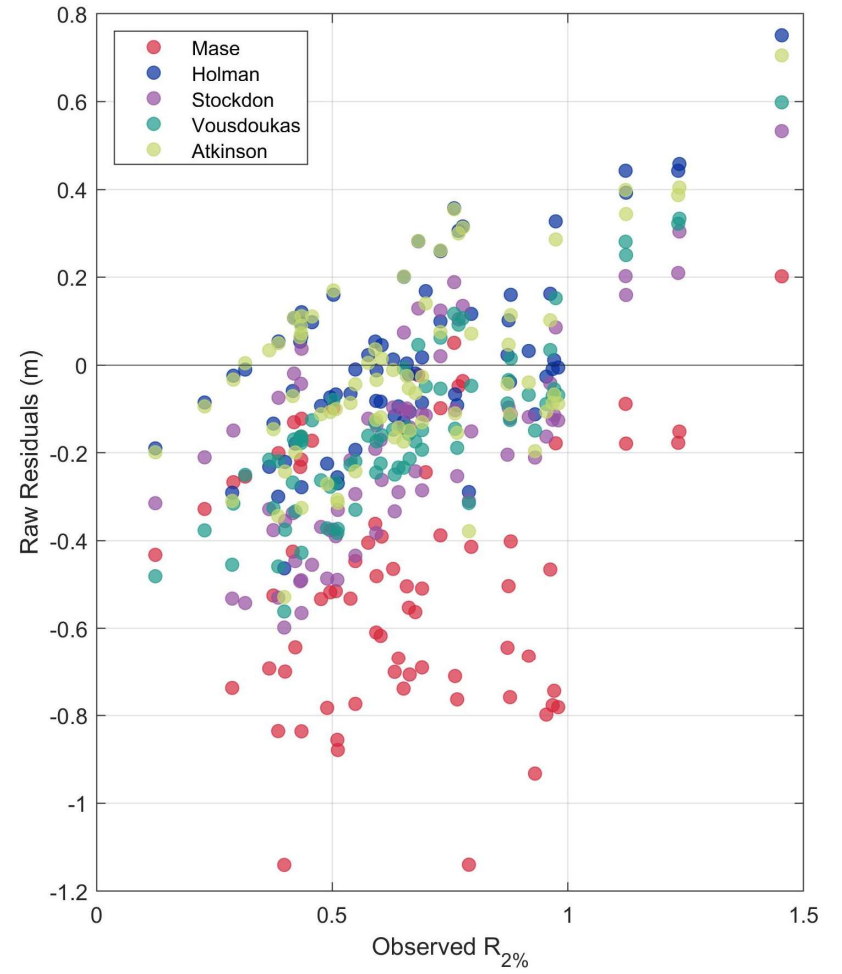
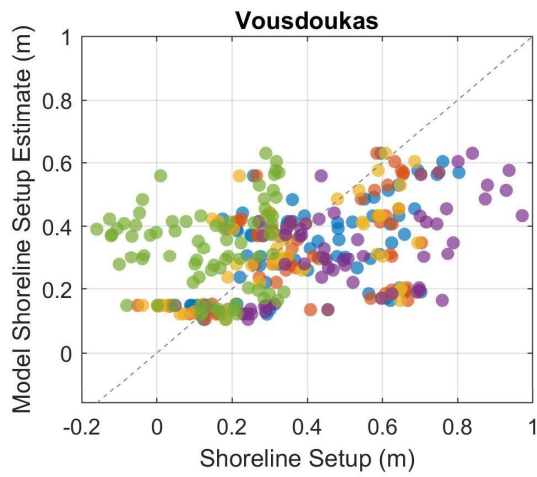
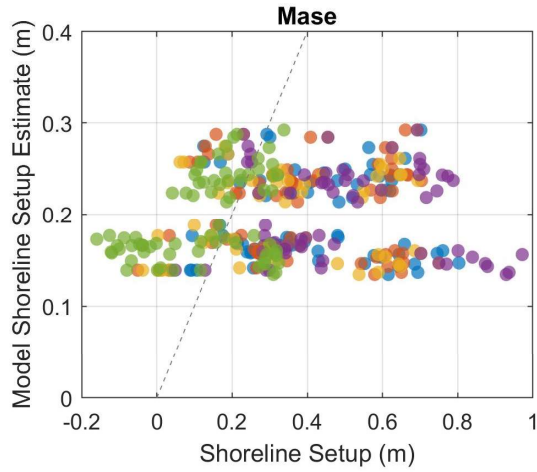
Setup measurements and empirical estimates

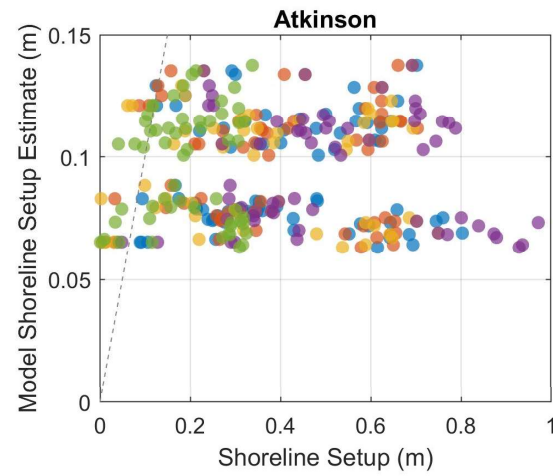
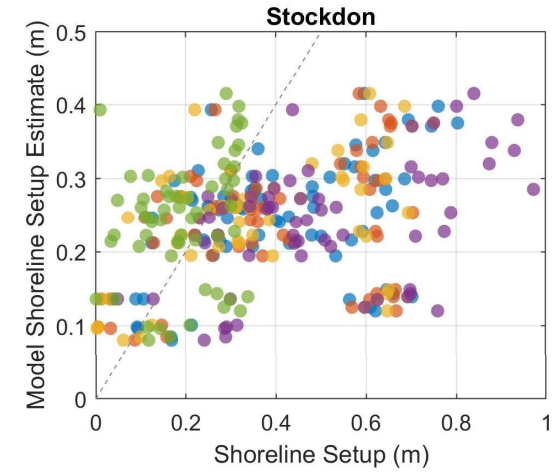
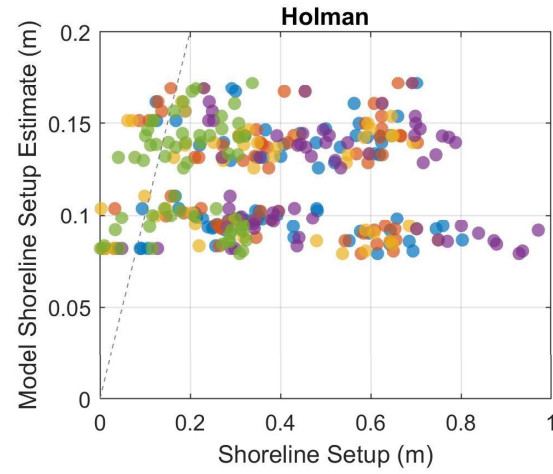
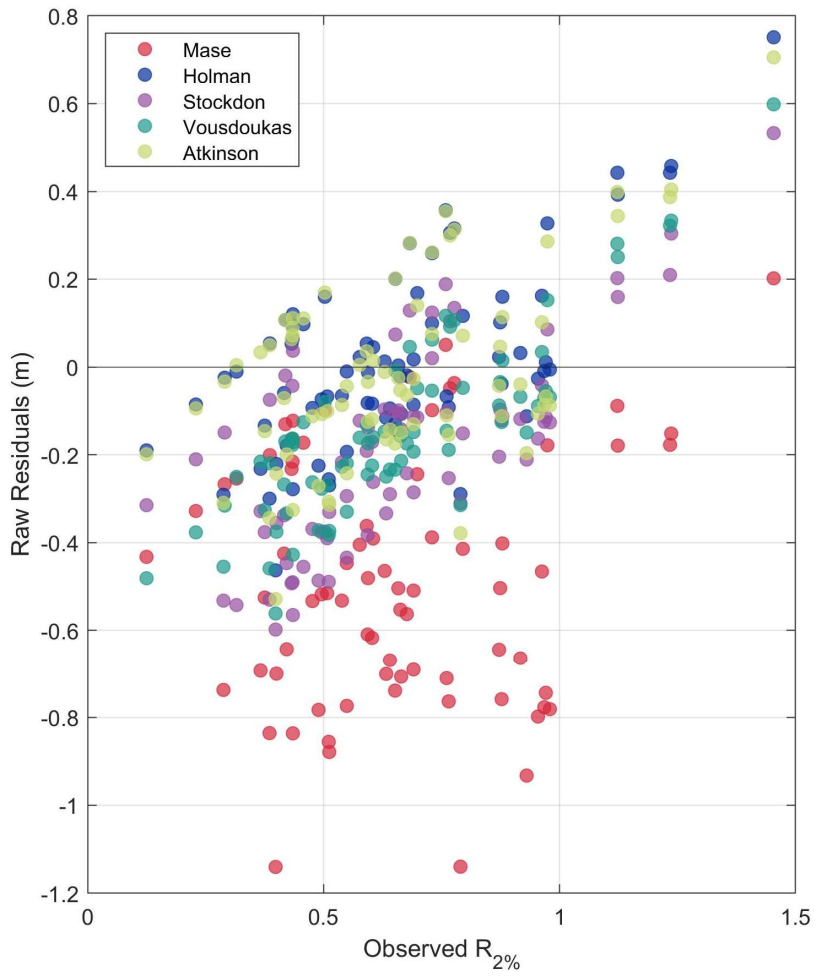
Model and Method Comparison



Setup measurements and empirical estimates

Model and Method Comparison





Conclusions

- It is possible to measure setup on all beach types using a simple, low-cost experimental design.
- Inaccuracies with setup estimates contributing to high RMSE of empirical runup models.
- Runup models incorporating a setup component that factor in beach slope, parameter for offshore bar/s and tidal phase likely to improve accuracy of estimates.

Thank you



ATKINSON, A. L., POWER, H. E., MOURA, T., HAMMOND, T., CALLAGHAN, D. P. & BALDOCK, T. E. 2017. Assessment of runup predictions by empirical models on non-truncated beaches on the south-east Australian coast. *Coastal Engineering*, 119, 15-31.

HUGHES, M. G. 2016. Coastal waves, water levels, beach dynamics and climate change. In: COASTADAPT (ed.). Gold Coast, Australia.: National Climate Change Adaptation Research Facility.

NIELSEN, P. & DUNN, S. L. 1998. Manometer tubes for coastal hydrodynamics investigations. *Coastal Engineering*, 35, 73-84.