RESILIENCE TO CLUSTERED DISASTER EVENTS ON THE COAST – STORM SURGE

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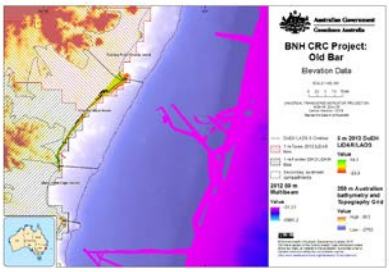
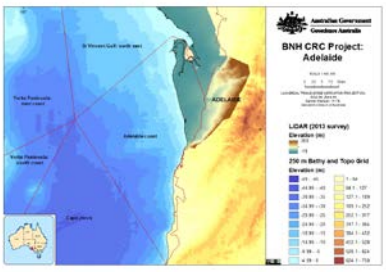
THE AIM OF THE PROJECT IS TO DEVELOP A NEW METHOD TO QUANTIFY THE POTENTIAL HAZARD ASSOCIATED WITH COINCIDENT AND CLUSTERED DISASTER EVENTS ON THE COAST, WITH AN INITIAL FOCUS ON STORMS THAT ERODE AND RESHAPE THE COASTLINE AND IMPACT ON BUILDINGS AND INFRASTRUCTURE. TO DATE, A RANGE OF BASELINE DATA HAS BEEN IDENTIFIED AND COLLECTED FOR TWO STUDY SITES WHERE EROSION IS AN ACTIVE MANAGEMENT ISSUE; ADELAIDE METROPOLITAN BEACHES (SA) AND OLD BAR (NSW MID-NORTH COAST). EXAMPLES OF INTEGRATED DATASETS FOR EACH STUDY SITE ARE PRESENTED WITH INITIAL RESULTS FROM THE STATISTICAL MODELLING OF STORM EVENTS.

DATA COLLECTION

- Baseline data has been collected for each study site to support geomorphic characterisation, clustered event modelling and shoreline erosion modelling.
- Data includes physiographic information (e.g. elevation), offshore wave buoy measurements and modelled hind-cast water levels (60 year time series).



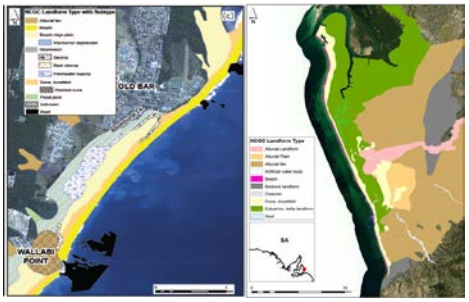
Integrated elevation data: Old Bar, NSW



Integrated elevation data: Adelaide

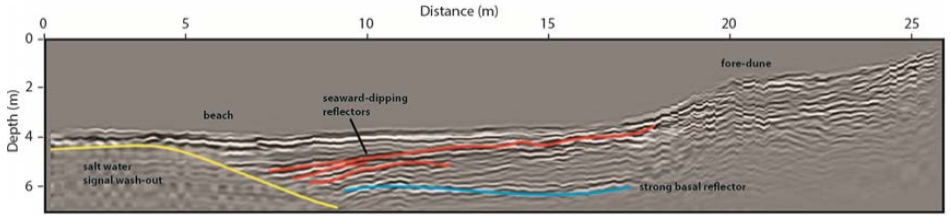
SITE CHARACTERISATION

- Geomorphic mapping used the National Coastal Geomorphic Classification in a coastal sediment compartment framework.
- Field investigations collected ground-penetrating radar (GPR) data to assist in defining a minimum thickness of beach and dune sediments at each study site.



Landform maps for each study site based on the National Coastal Geomorphology Classification Scheme

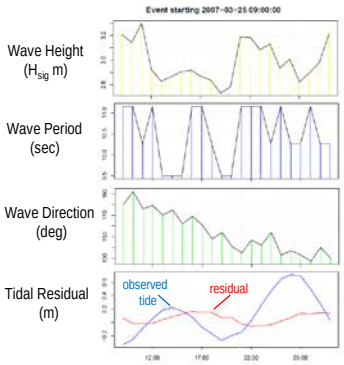
GPR acquisition at Semaphore, north Adelaide



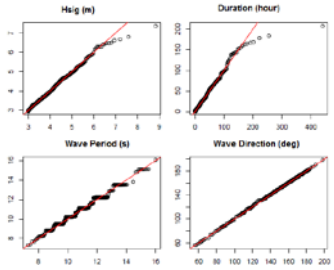
Interpreted GPR radargram of a cross-shore profile at Kingston Park (south Adelaide), showing sand thickness and internal structure to inform shoreline response modelling

STORM EVENT MODELLING

- Multivariate statistical approach within a probabilistic framework.
- Modelled the magnitude and frequency of storm events to give event exceedance probabilities and to construct synthetic storm events.
- Long-term synthetic time-series of storm events (10^6 years) generated.



Example storm events: NSW central coast, March 2007



Plots of simulated versus observed storm event parameters

NEXT STEPS

- Integrate long-term synthetic storm events with shoreline response model to understand the impact on beach morphology.
- Develop a hybrid morphological model to account for cross-shore and longshore processes.

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