EO in Coastal Risk Management

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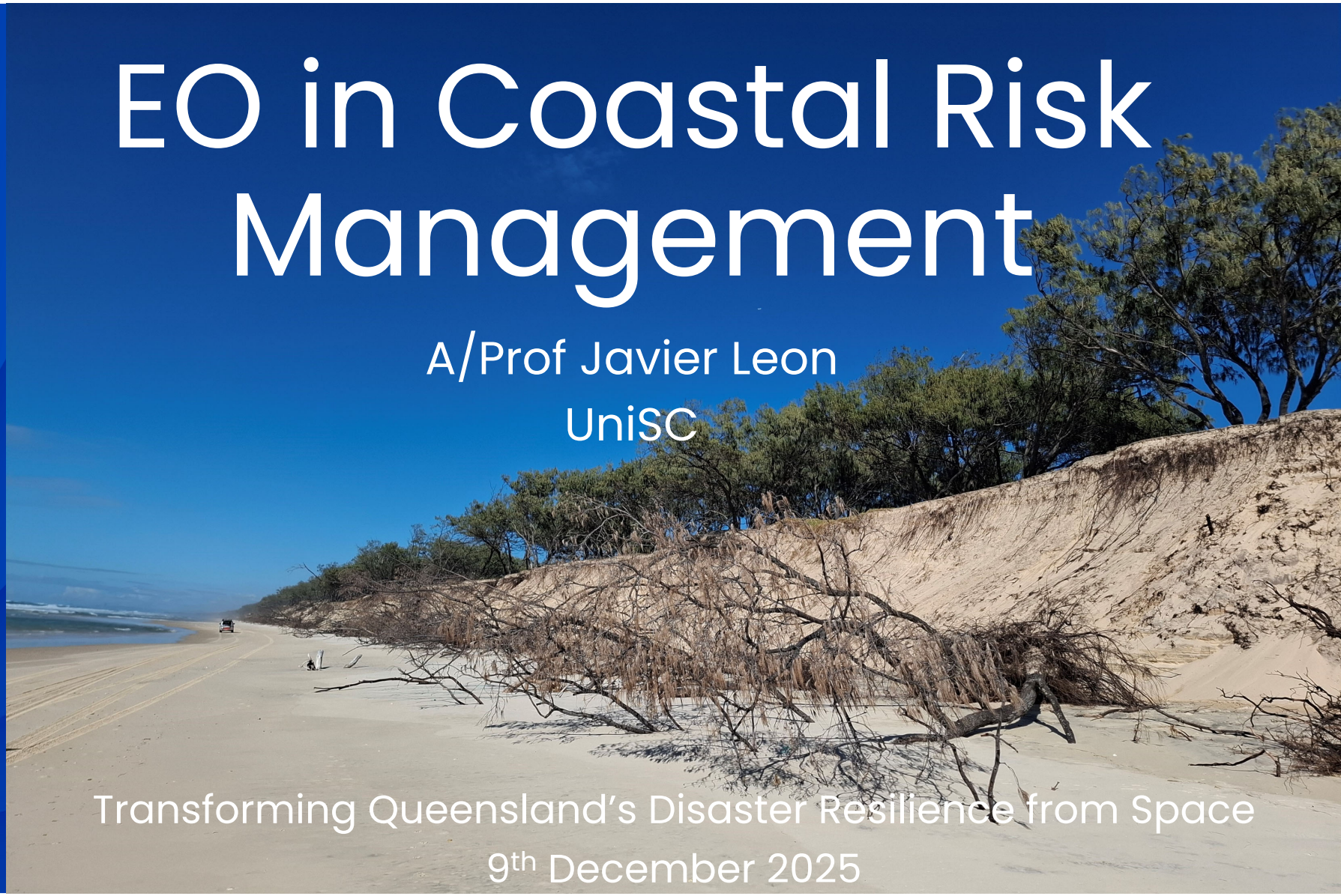
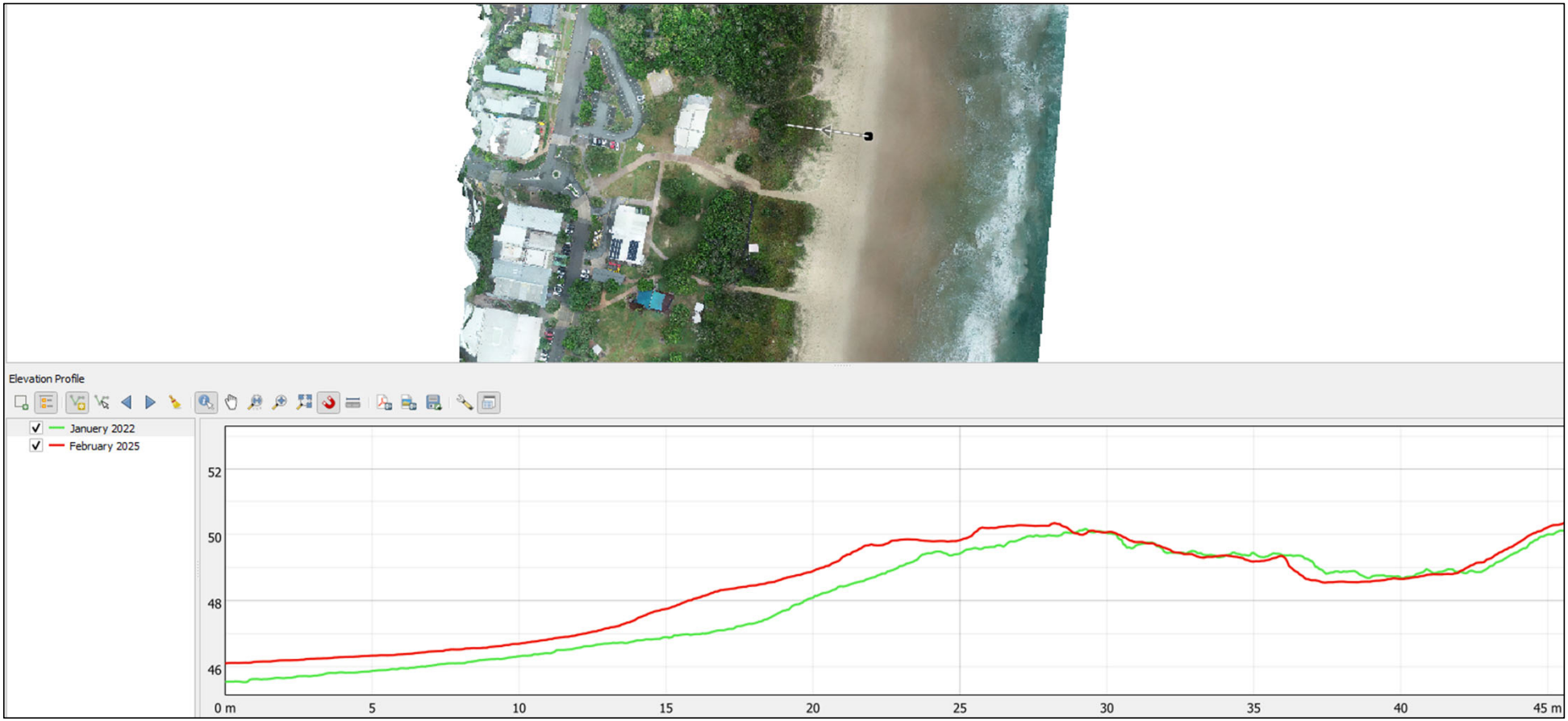


Transforming Queensland's Disaster Resilience from Space

9th December 2025

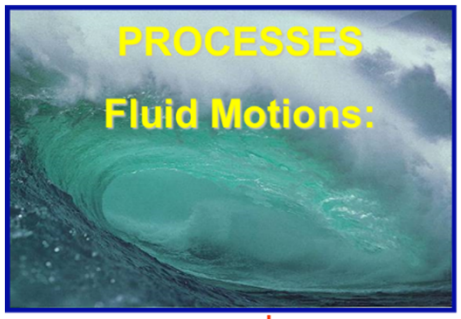
Can we stop coastal erosion?

~~Can~~ Do we need to stop erosion?



Coastal System

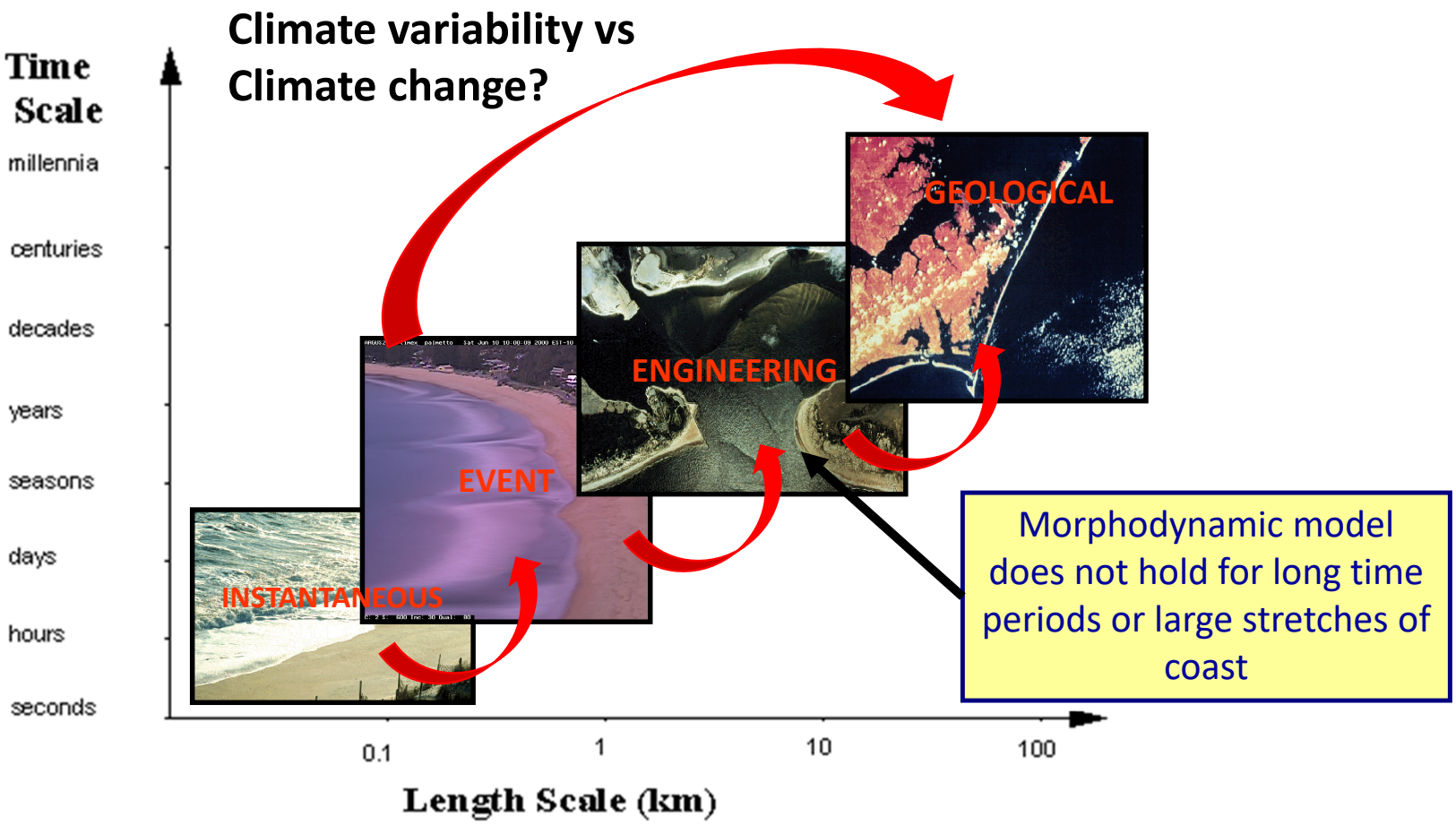
Dynamic equilibrium



Δt

"the mutual adjustment of **topography** and **fluid dynamics** involving **sediment transport**" *(Wright & Thom, 1977)*

Predictions



Solutions

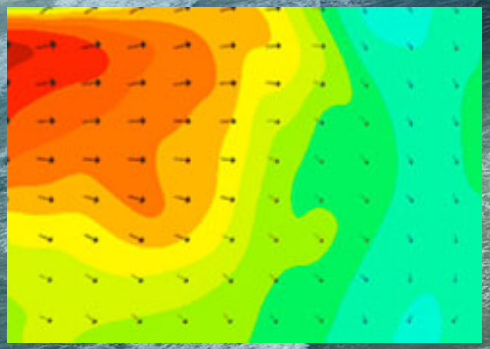
Managed retreat??

Nature-based solutions??

Mapping, monitoring, modelling

Case Study: **COASTS** (Coastal Change Observation and Analytics (multi-) Scale (multi-) Technology System

3x cloud-free Sentinel-2 (10m)
4x cloud-free WV-2/3 (2m)



Regional wave model (SWAN) and beach erosion model (XBeach) were developed and calibrated

27x drone surveys were undertaken using a survey-grade DJI Phantom 4 RTK drone between 2020-2023

Drones
Beach topography

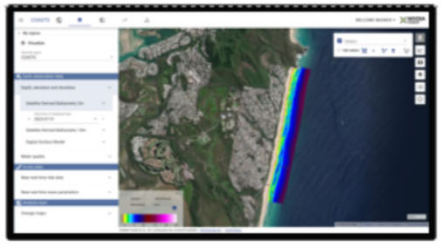
Satellites
Bathymetry
Turbidity
Shoreline

In situ instruments
Tides
Temperature
Wave height and direction
Current speed and direction

Analytics
Change analysis
Transects
Time series
Erosion / deposition

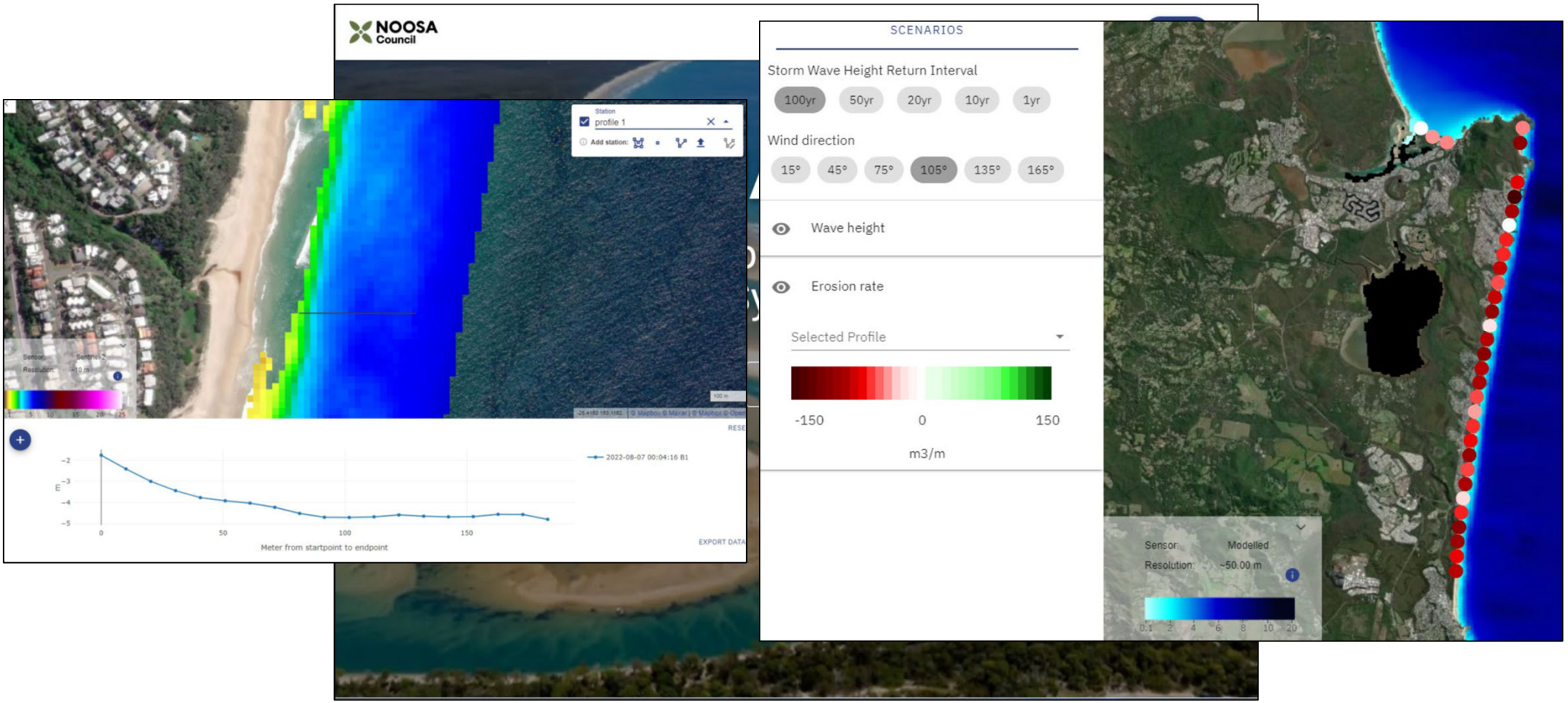
Hydrodynamic modelling
Wave height
Erosion rates
Storm scenarios
Coastal erosion forecasting

Visualisation and delivery
Web-based, interactive
Thresholds and alerts



- Forecasting, Planning, Management:
  - Erosion, Deposition
  - Storm events
  - Coastal hazards
  - Beach safety
  - Inundation
  - Climate change

Case Study: COASTS



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Challenges


BLOCK 01
NODE 01
NODE 04
NODE 05
NODE 03
BLOCK 01
NODE 01
NODE 02

Next Steps

- Continued monitoring & improvement with new datasets (e.g. fixed-cameras, TLS) and updating existing data/models
- Training & embedding
- Transfer to other locations


Thank you