

Victorian Coastal Monitoring Program

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Environment
Land, Water
and Planning



THE UNIVERSITY OF
MELBOURNE

Overview

- What is the Victorian Coastal Monitoring Program (VCMP)?
- What is being collected
- Outcome objectives
- Citizen Science UAV coastal monitoring

Program Context

- The VCMP is part of the overarching 'Protection of Victoria's Iconic Beaches and Coastline Program 2016-2020' funded by the Sustainability Fund
- Coastal Protection Infrastructure Upgrade Program (\$20M)
- Protection of Victorian Beaches, including Port Phillip Re-nourishment Program (\$2.3M)
- Victorian Coastal Monitoring Program (VCMP) (\$4M)
- The 3 component programs are steered by the Coastal Project Governance Group, while each individual component has its own 'working group'.

Consolidation

- Data review and State of the Coast Report
 - Bibliographic review of historic studies and data sets. Studies to be spatially referenced and searchable.
- Updated coastal DEM (2017)
 - Integration of all LIDAR, MBES and hydrographic data to create an updated topography and bathymetry product at 2.5m and 10m resolution
- State-wide risk assessment
 - Identify priority sediment compartments for investment and monitoring

A wide-angle photograph of a coastal landscape. In the foreground, there is a sandy beach with sparse, dry, clumpy vegetation. The middle ground features a large, gently sloping sand dune that stretches across the frame. The dune's surface is mostly bare sand with some small plants. To the right, the ocean is visible with white-capped waves breaking onto the shore. The sky is a clear, pale blue with a few very small, distant clouds. The overall lighting is bright and even, suggesting a sunny day.

What is Being Collected?

Offshore Data Acquisition



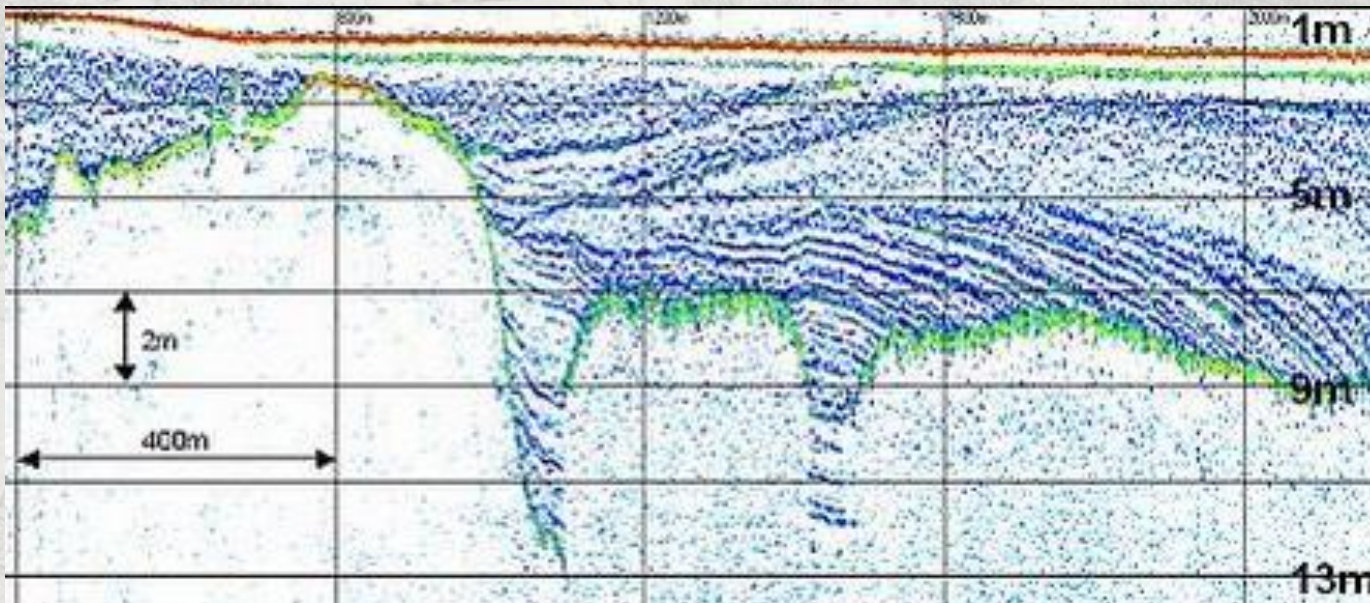
Offshore Data Acquisition

- Multibeam Sonar and backscatter
- Historical LiDAR data (2007)
- Approximately 3 Nm from coast
- Identification of sediment compartments



Sediment Compartments

- Sub-bottom profiling to understand sediment volumes and depth to Pleistocene calcarenite
- Benthic grab to characterise sediment

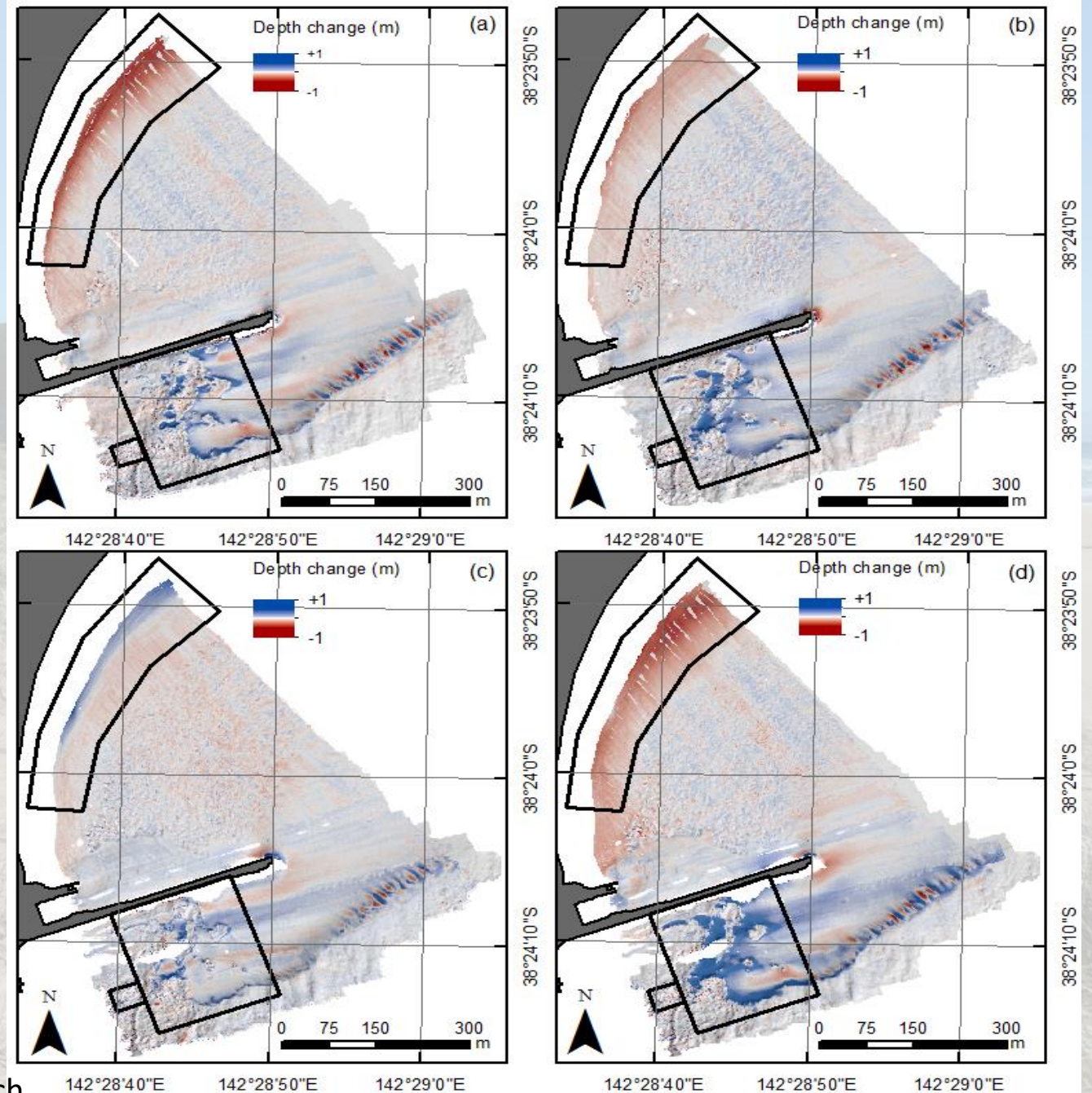
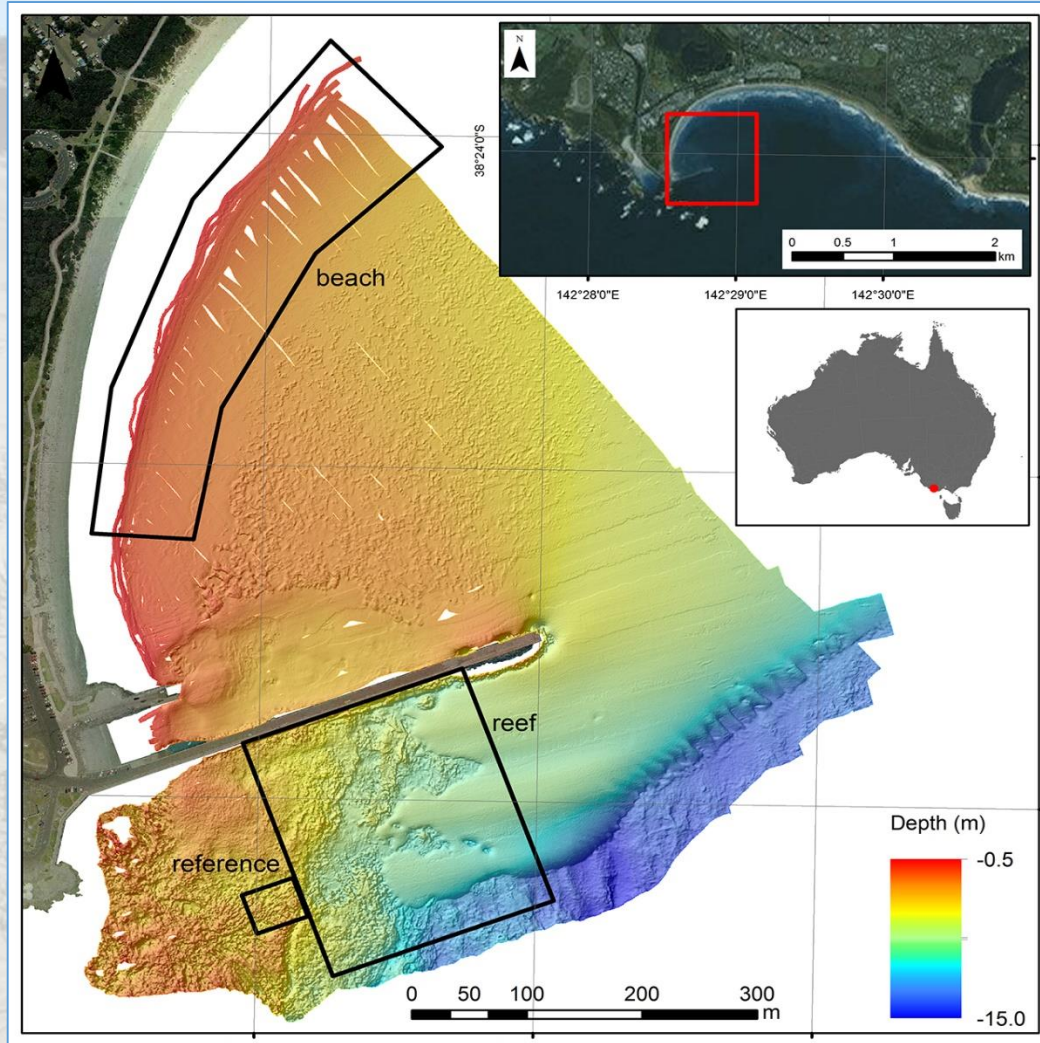


Sub-bottom profiling

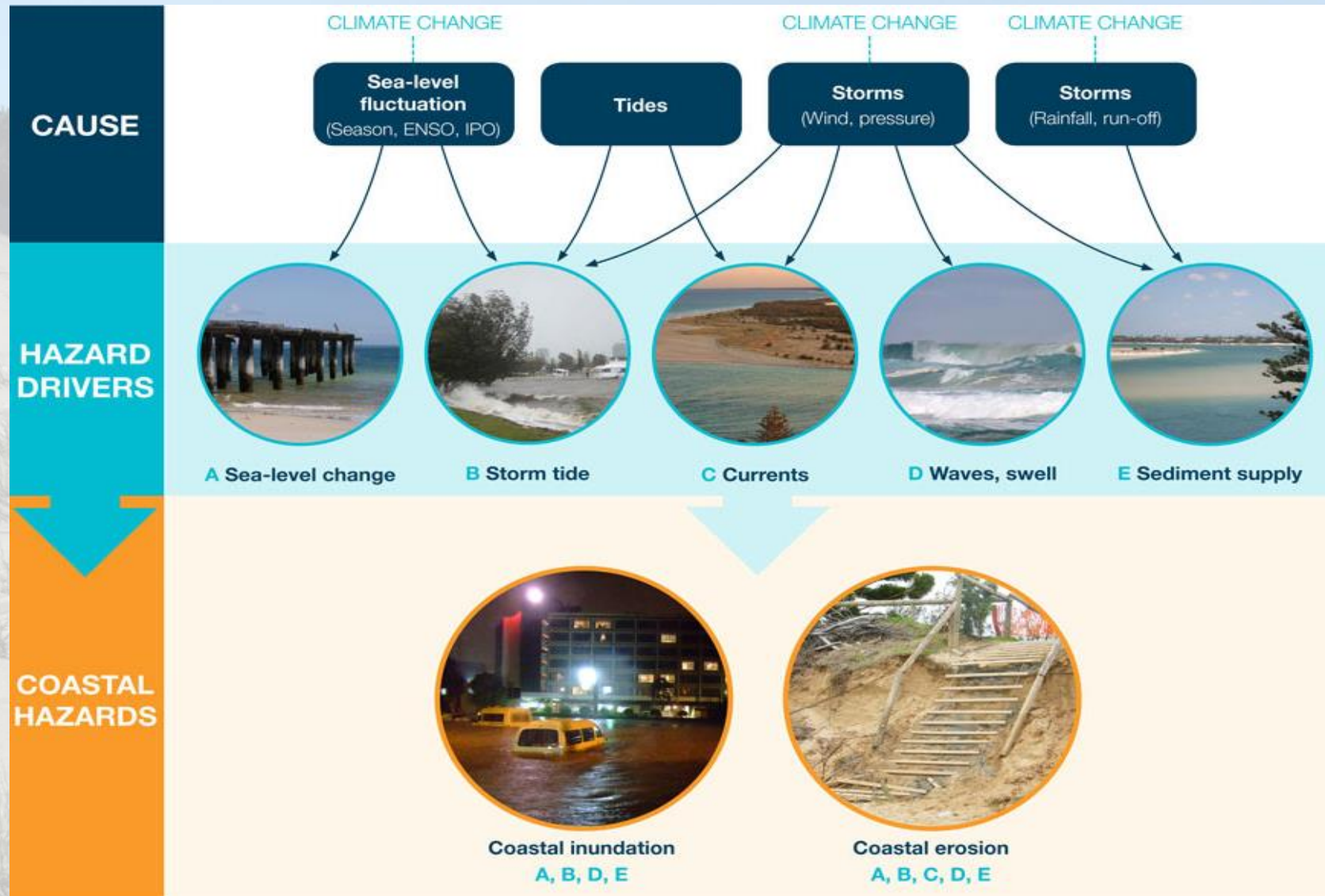


Benthic grab

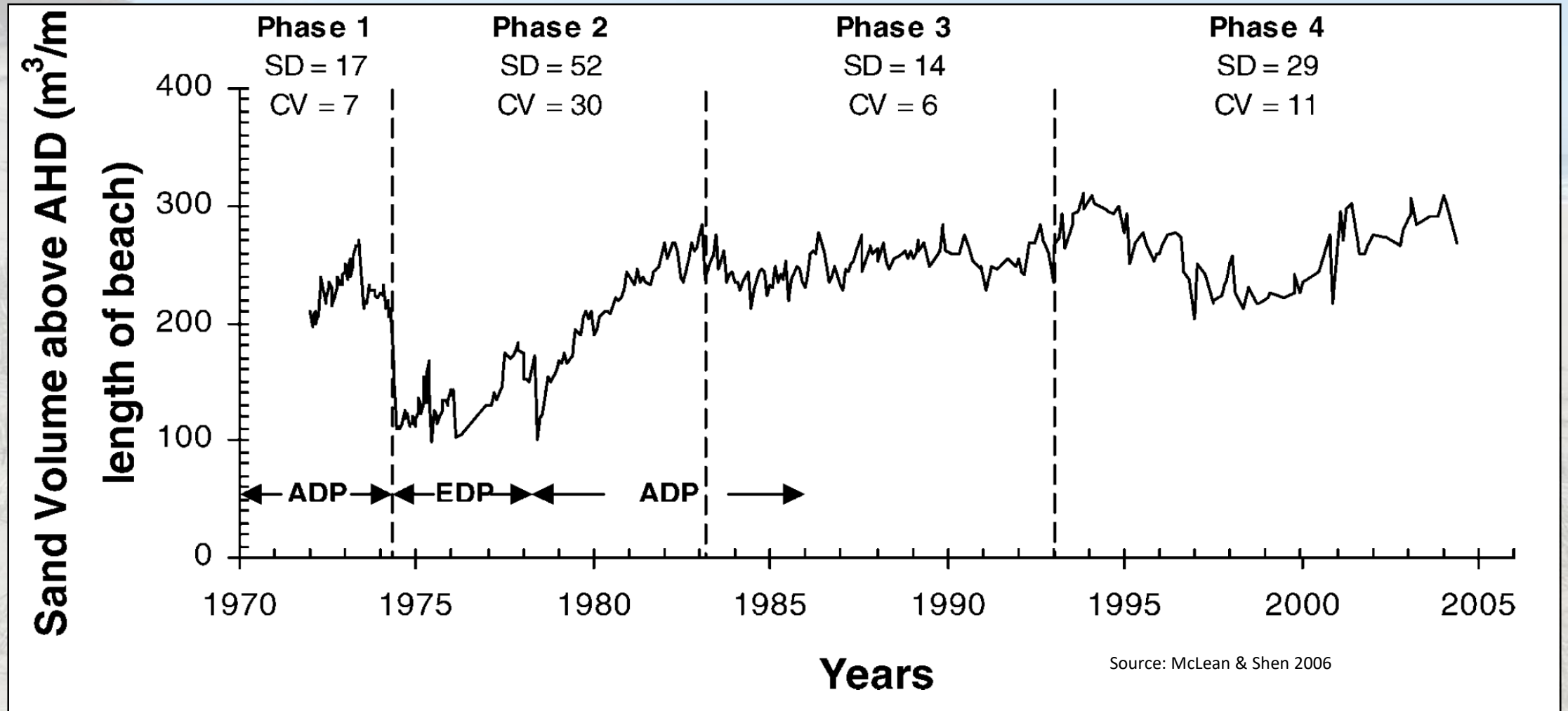
Monitoring Change



What About the Coastline...?



Problem: We don't know how dynamic beaches are...



Data Collection Methods

Satellite

Bridge gap between traditional remote sensing and field observations

Plane



GAP



Field

Global

100km

100m

10m

1m

cm

Data Collection Methods

Satellite

Bridge gap between traditional remote sensing and field observations

Plane



GAP



Field

Global

100km

100m

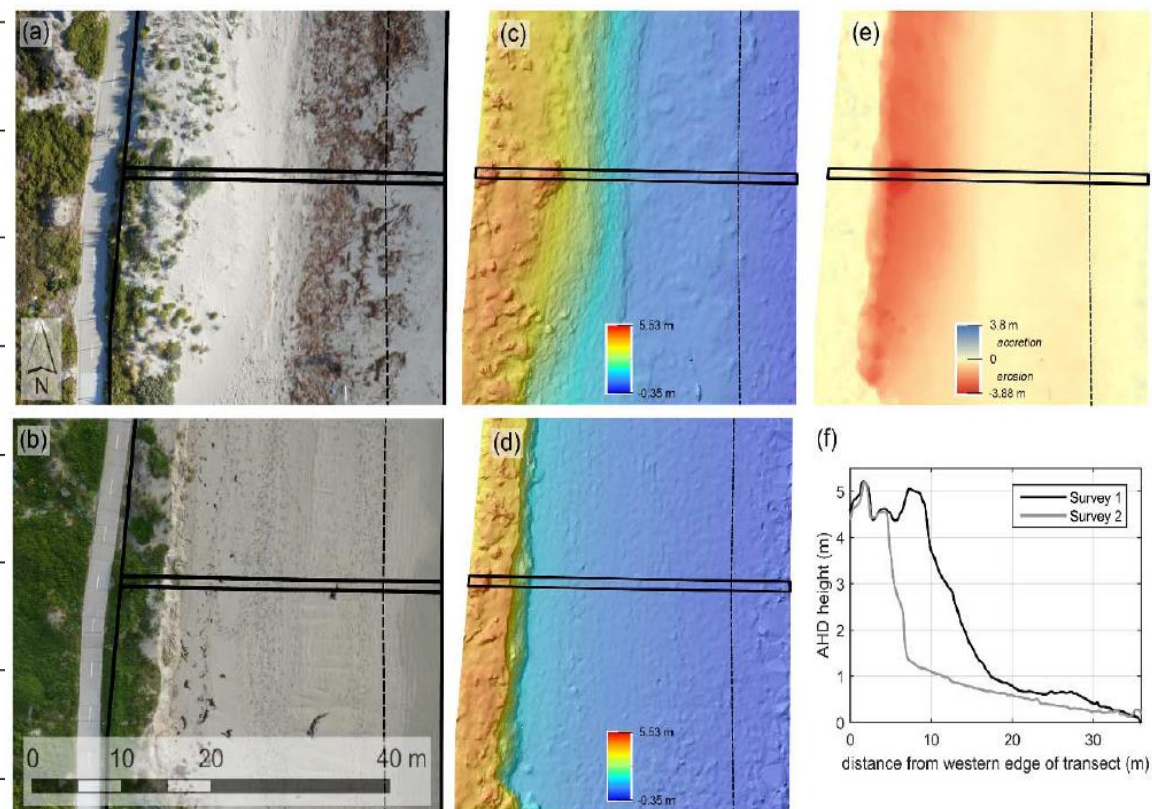
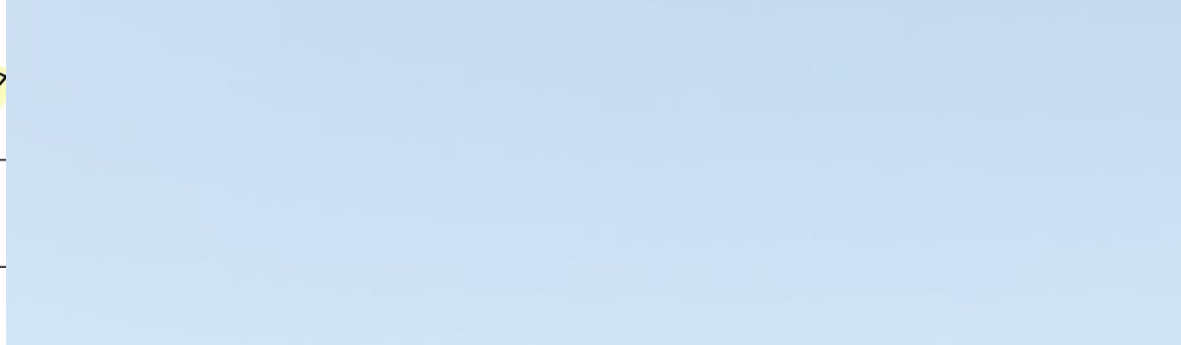
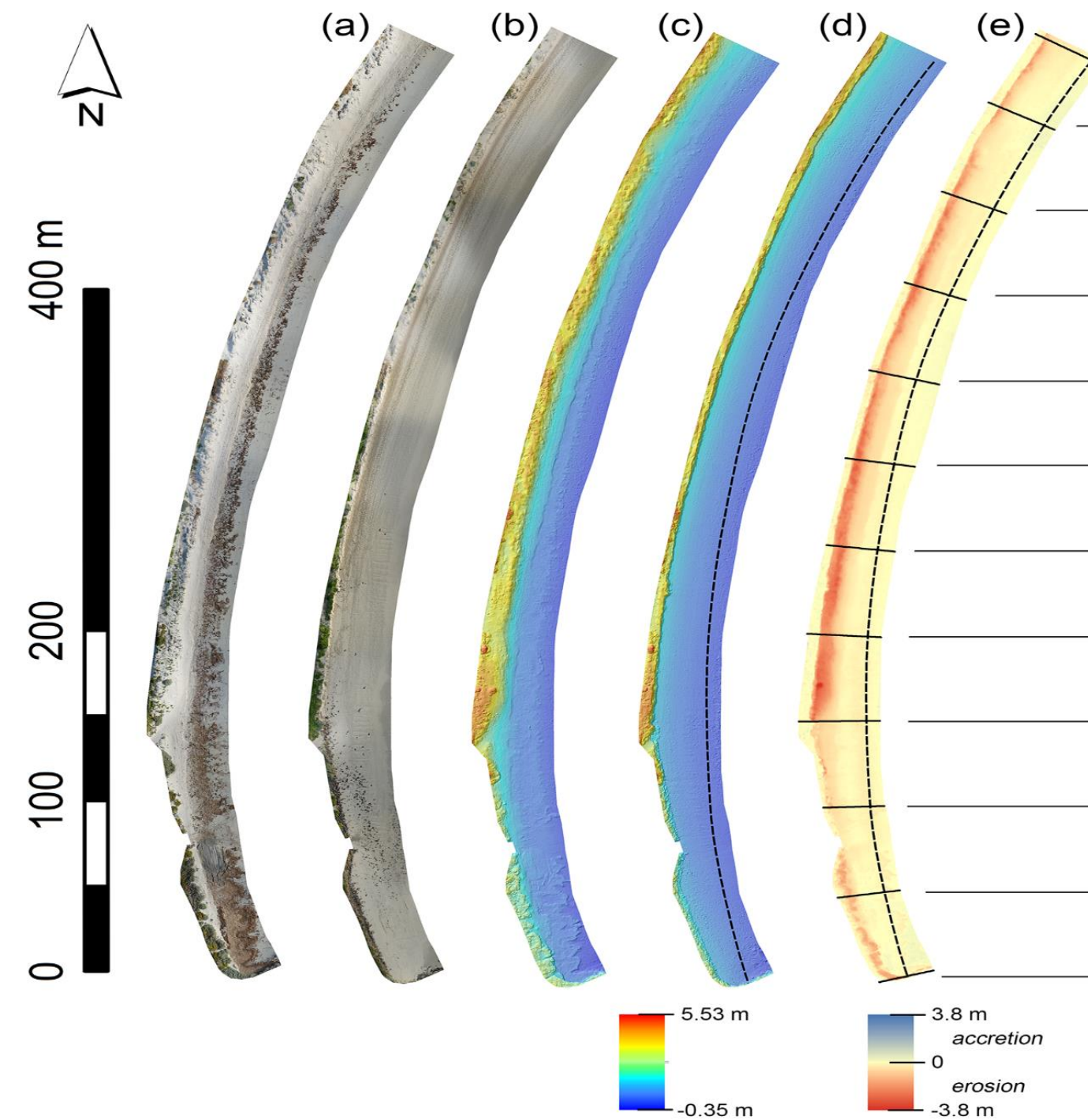
10m

1m

cm

Warrnambool Harbour Before and After an Major Storm Event





Citizen Science Monitoring

- Monitoring priority foreshore areas
- Using small UAVs
- Changes in the volume, topography and extent of beach sands and foreshore morphology
- Mapping every 4-6 weeks for 3 years

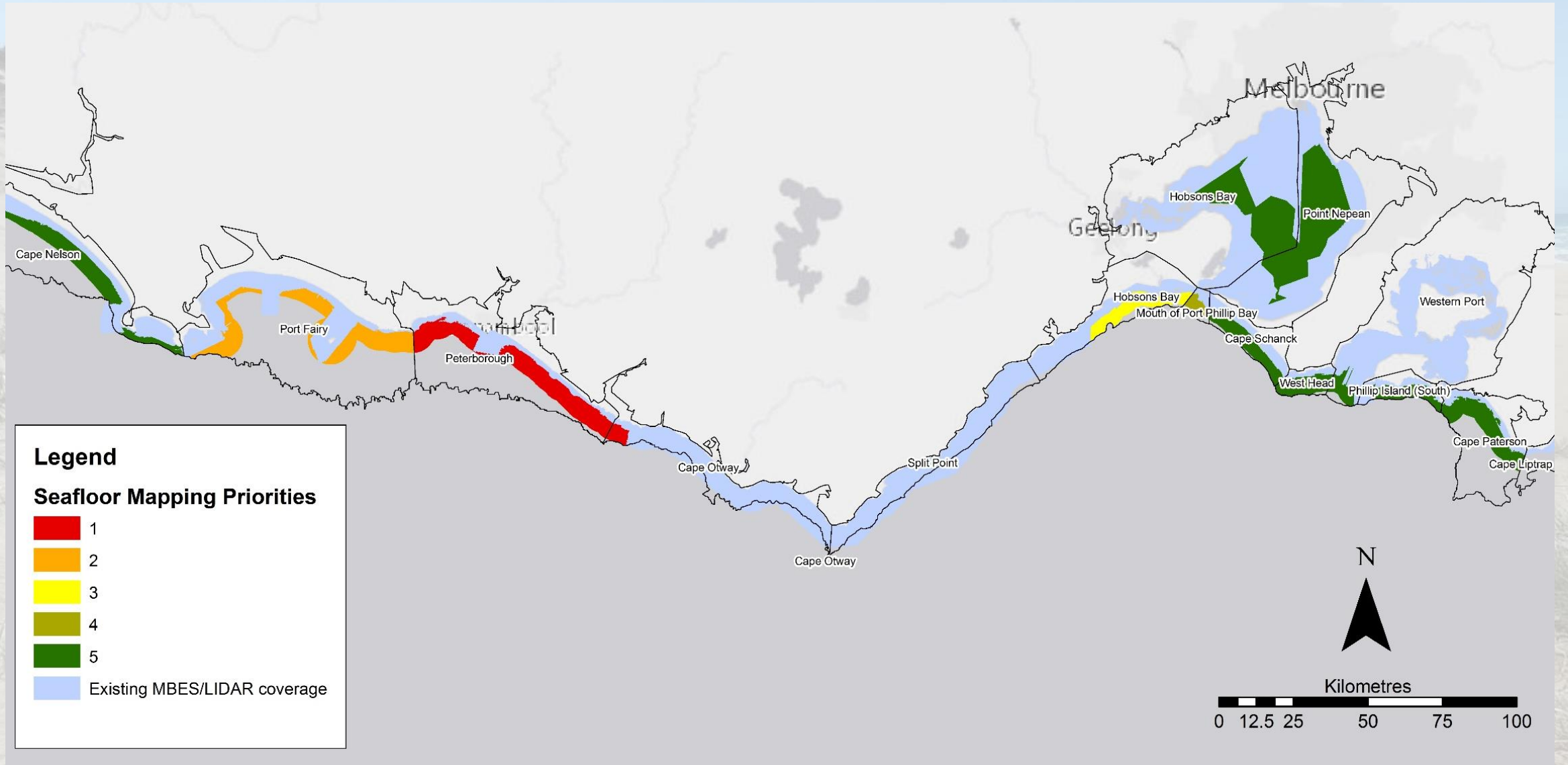


 **propeller**

A wide-angle photograph of a coastal landscape. In the foreground, there is a sandy beach with sparse, low-lying green and brown vegetation. The middle ground features a large, gently sloping sand dune that stretches across the frame. The dune's surface is mostly smooth sand with some small tufts of grass. To the right, the ocean is visible with white-capped waves breaking onto the shore. The sky is a clear, pale blue with a few very small, distant clouds. The overall lighting is bright and even, suggesting a sunny day.

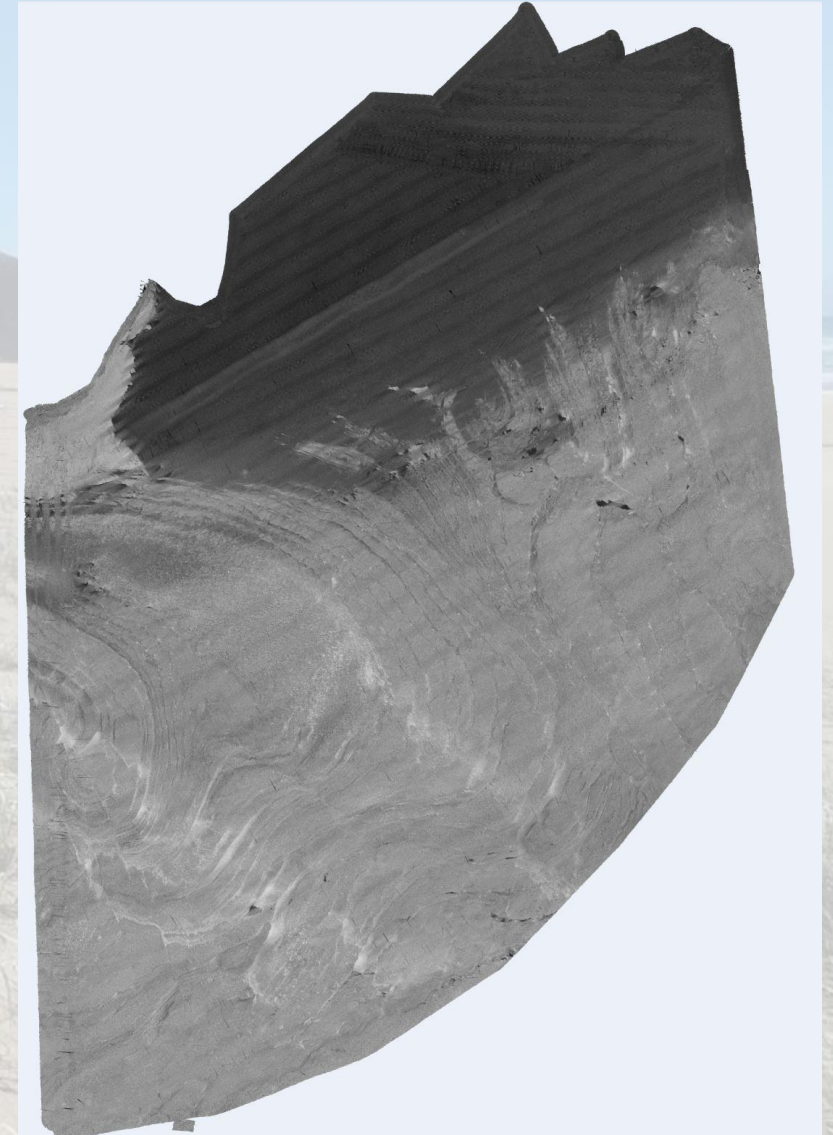
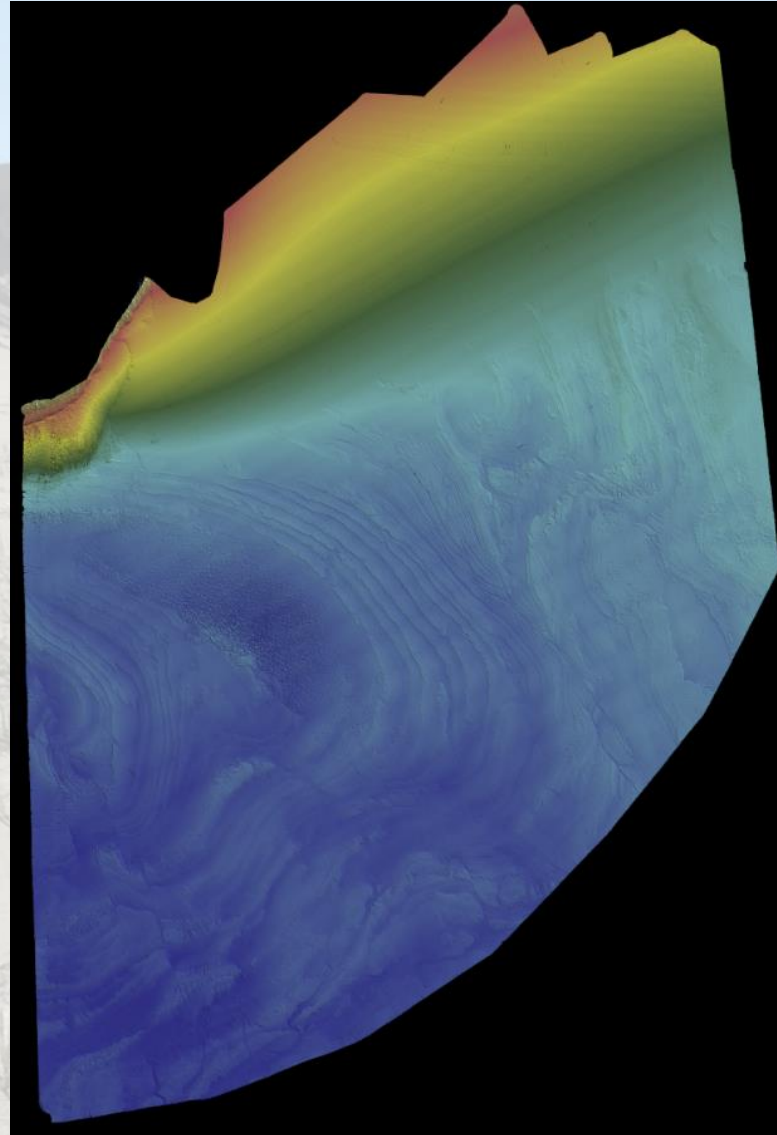
Outcome Objectives

Proposed Site Priority



Multibeam and backscatter

- Linear Distance Surveyed to date: 1,491 km
- Area covered: 117 km²
- Peterborough Compartment

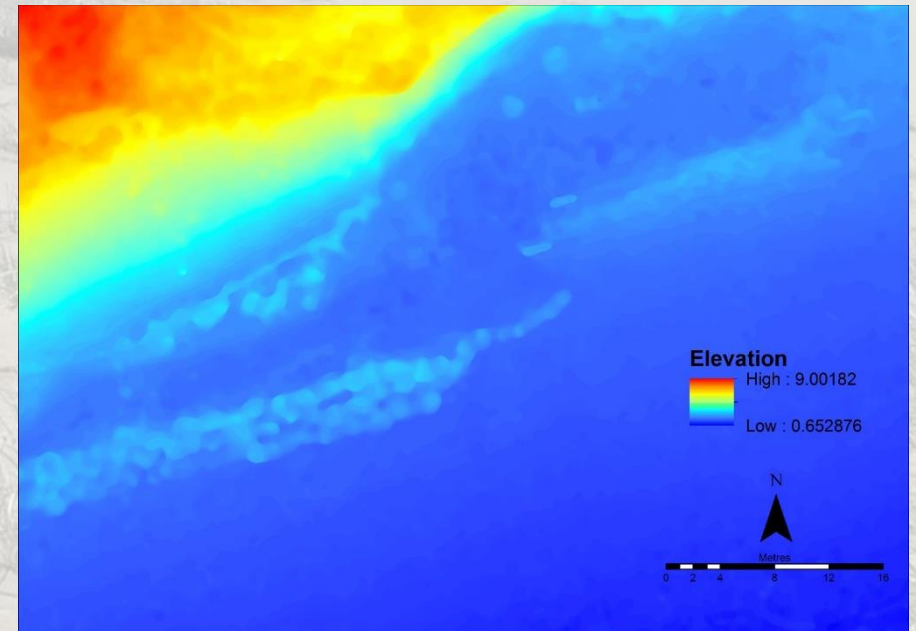


Multibeam and backscatter data uses

- Identify the sediment areas
- Identify areas for sub-bottom profiling and sediment grabs
- Baseline bathymetry data for Victoria's coast

UAV data uses

- Baseline data for coastal areas
- Monitor change
- Measure erosion and accretion
- Monitor cliffs
- Generate reports using PropellerAero



A wide-angle photograph of a coastal landscape. In the foreground, there is a sandy beach with sparse, low-lying green and brown vegetation. In the middle ground, a large, gently sloping sand dune rises, covered with similar sparse vegetation. The dune's crest is visible against a clear, light blue sky. To the right, the ocean is visible with small waves breaking on the shore. The overall scene is bright and sunny.

Citizen Science UAV Coastal Monitoring

Equipment

- Phantom 4 Pro
- 3 Batteries
- iPad Mini
- AeroPoints



Training

- Theory Training – Regulations pertaining to < 2 kg Operation
 - 30 m from people and property
 - Not near registered aerodromes
 - Line of sight
 - During daylight hours
 - Separation from manned aircraft
 - Below 400 feet (121 m)
 - VMC conditions (weather)

Visual Line of Sight (VLOS)

Training

- Practical Training
 - UAV safety, handling, transport, and storage
 - Assembly/Disassembly
 - Flight controls and flight modes
 - Airframe inspections
 - Flight manoeuvres
 - Emergency procedures
 - Automated mission planning – data collection
 - Camera operation
 - High-precision GPS use



Training Manuals

Victorian Coastal Monitoring
Program

Citizen Science Coastal
Monitoring



Standard Survey & Operational
Procedures for UAV Mapping
Coastal Erosion

Victorian Coastal Monitoring
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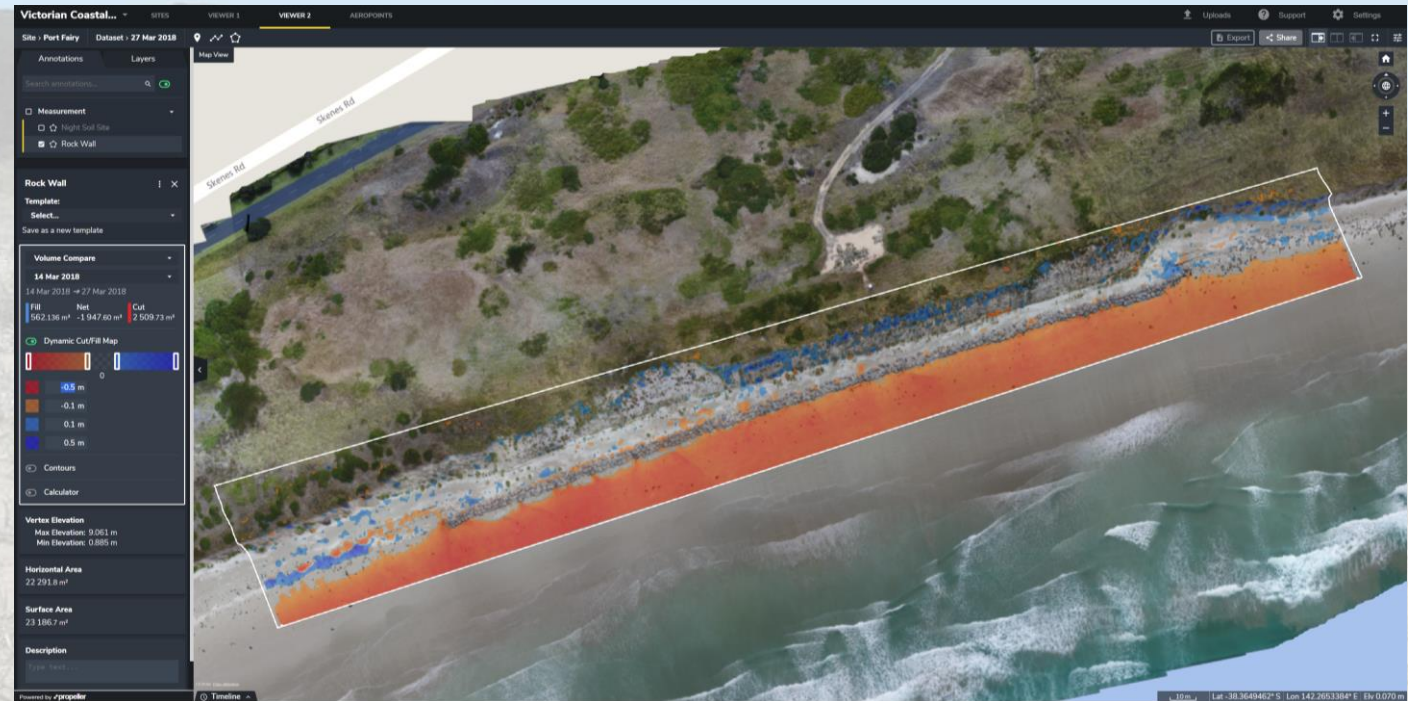


Practical Training Syllabus

Propeller Aero



- Online data portal
- Measurements
- Reports



Search for sites

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Sort by A-Z

Sites in this portal

- Apollo Bay
- Marengo
- Port Fairy
- Portarlington
- St Leonards

