3D-GBR: A high-resolution depth model for the Great Barrier Reef and Coral Sea

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Acknowledgments

- Australian Hydrographic Service
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- CSIRO MAR
- RRRC
- AIMS
Seminar outline

- Spatial coverage
- Background to GBR DEMs
- Uses for GBR DEMs
- Source data for the project
- Outputs and timeline
Spatial coverage

10° – 26°S latitude, 142° – 158°E longitude, ~3,000,000 km²
Horizontal datum – WGS84  
Vertical datum – AHD (elevation), LAT (depth)

Grid pixel size – 100m (full coverage), 50m (local coverage in places)
Background to GBR DEMs

Example AUS 373 - Clark 1858 datum, hand drawn polygons
Example AUS 831 - AGD66 datum, CAD drawn polygons, contours
Australian depth contour data sent to IOC/IHO since 1903
GEBCO Digital Atlas - WGS84 datum, ~2000m grid pixel
AusBathyTopo 2002 - WGS84 datum, ~1000m grid pixel
AusBathyTopo 2005 - GDA94 datum, ~ 250m grid pixel
Test DEM 2007 - WGS84 datum, ~100m grid pixel
New depth model uses

- Improved hydrodynamic modeling
- Sea-level inundation modeling
- Future zoning planning
- Education and outreach
Hydrodynamic modeling

2Apr07 Solomon Is. tsunami travel time
Inundation modeling

Sea-level 19-6.5 ka
Sea-level 19-6.5 ka

Inundation modeling

Sea-level 19-6.5 ka

(C) 60 m (12 ka)
Sea-level 19-6.5 ka

Inundation modeling

(D) 30 m (9.5 ka)
Inundation modeling

Sea-level 19-6.5 ka

(E) 0 m (6.5 ka)
Future zoning planning

MPZ11 - Hydrographers Passage

New DEM - Hydrographers Passage
Example AUV imagery and grab sampling – Hydrographers Passage

dense *Ophiopsila pantherina* beds

brittlestar beds

mesophotic coral ecosystems

dunes

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Education and outreach

Example Google Earth/Ocean layer – Gloria Knolls, Coral Sea
Example 3D flythrough – Osprey Reef, Coral Sea

3D view of Osprey Reef
Coral Sea, Australia

Depths 0 to 40 metres
Source data for the project

- Multibeam swath surveys
- Lidar aerial surveys
- Satellite bathymetry
- Satellite elevation
Multibeam swath surveys

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Example multibeam data - Great Barrier Reef margin and canyons

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Lidar aerial surveys
Example lidar data - Great Barrier Reef shelf and Ribbon Reefs

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Satellite bathymetry

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Example satellite bathymetry – northern Great Barrier Reef shelf

Hyperion data

7 km

Lidar data
Satellite elevation
Example SRTM 1sec data - Hinchinbrook Island and Channel

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3 km
## Outputs and timeline

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<th>Year 1 milestones</th>
<th>Year 1 performance indicators</th>
<th>Completion date</th>
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| PHASE 1 DATA COLLECTION  
- To identify all potential data sources and arrange for any data-sharing agreements between supplying agencies. | PHASE 1 DATA COLLECTION  
- All sources of elevation data are identified.  
- All supplying agencies are briefed and any authorisation requirements obtained. | Six months after commencement date |
| PHASE 1 DATA COLLECTION AND GRID DEVELOPMENT  
- To obtain all the elevation datasets required for the project.  
- To develop an initial high-resolution depth model. | PHASE 1 DATA COLLECTION AND GRID DEVELOPMENT  
- All elevation datasets are obtained for pre-gridding preparation.  
- Initial high-resolution depth model is completed. | 12 months after commencement date |
| **Year 2 milestones** | **Year 2 performance indicators** | **Completion date** |
| PHASE 2 DATA PREPARATION AND GRID DEVELOPMENT  
- To prepare all the new elevation data required for the project.  
- To develop the final high-resolution depth model. | PHASE 2 DATA PREPARATION AND GRID DEVELOPMENT  
- The pre-gridding preparation is completed.  
- The final high-resolution depth model is completed. | 24 months after commencement date |
| **Year 3 milestones** | **Year 3 performance indicators** | **Completion date** |
| PHASE 3 HYPOTHESIS TESTING  
- To develop a detailed geomorphic map of seabed habitats in the GBRWHA.  
- To determine the extent to which key physiographic features are protected in the existing network of zones. | PHASE 3 HYPOTHESIS TESTING  
- The geomorphic map and habitat classifications are completed.  
- An analysis between key physiographic features and the existing zonation is completed. | 36 months after commencement date |
Contact

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