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Australian Marine Physical Environmental Data

Descriptions and Metadata

Zhi Huang, Brendan Brooke, Nathan Whitta, Anna Potter, Mike Fuller, Jeff Dunn and Roland Pitcher

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2010/32

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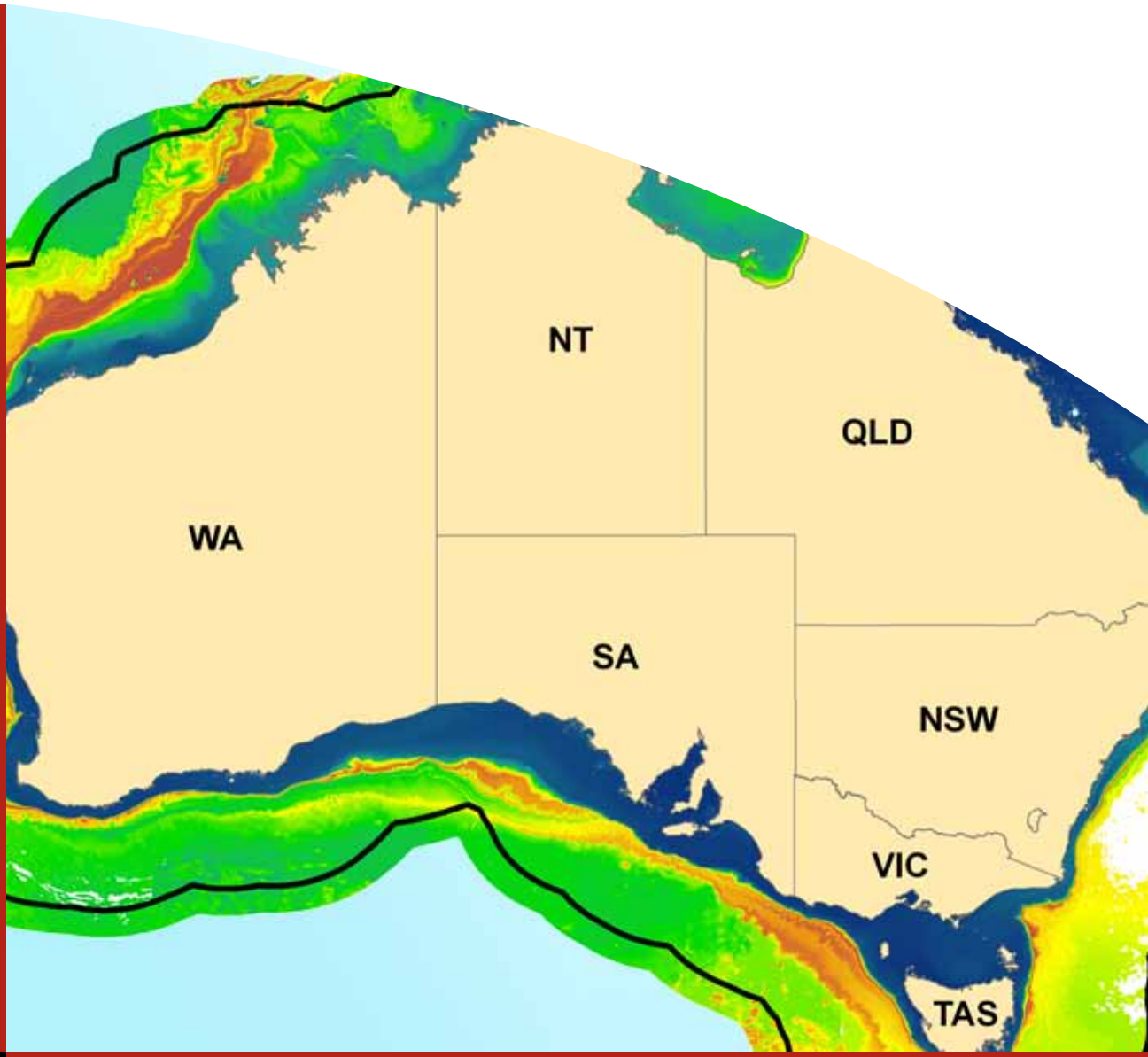

Australian Marine Physical Environmental Data - Descriptions and Metadata

GEOSCIENCE AUSTRALIA
RECORD 2010/32

by

Zhi Huang[1], Brendan Brooke[1], Nathan Whitta[1], Anna Potter[1], Mike Fuller[2], Jeff Dunn[2] and Roland Pitcher[2]

Australian Government
Geoscience Australia

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ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

The objective of this report is to provide a detailed description of the marine environmental data that have been collated by the Marine Biodiversity Hub. The Marine Biodiversity Hub is part of the Australian Government's Commonwealth Environment Research Facilities Program (CERF). The report includes metadata and distribution maps for 37 marine physical environmental variables that make up the dataset as at November 2009. The data were provided by Geoscience Australia and CSIRO Marine and Atmospheric Research and have been employed in the Marine Biodiversity Hub's surrogacy and predictive modelling research programs.

Bathymetry, geomorphology, seabed sediment and seabed exposure parameters were produced by Geoscience Australia. Bottom-water and surface-water parameters were produced by the CSIRO. Some data are restricted to the continental shelf (<200m) while others span the more extensive Australian Exclusive Economic Zone adjacent to the mainland. All data were transformed to a common datum, WGS84, and converted to a common grid with a cell size of 0.01 degrees. The metadata reports conform to ANZLIC standards. As the goal was to use these data in national-scale predictions of seabed biodiversity, only data with national coverage were included.

The data fall into five categories:
1. Bathymetry and geomorphology, derived from the 250 m resolution National Bathymetry Grid at Geoscience Australia. This set of data comprises:
- Bathymetry
- Topographic aspect of the seabed
- Averaged topographic relief of the seabed
- Predicted rocky substrate
- Topographic slope of the seabed
- Euclidean distance to the Australian coastline
- Geomorphic features of the seabed

2. Seabed sediment, derived from the MARS database at Geoscience Australia, includes:
- Carbonate percentage
- Gravel percentage
- Mud percentage
- Sand percentage

3. Seabed exposure, produced using a seabed shear-stress model, GEOMACS, at Geoscience Australia. The model outputs included are:
- GEOMACS 25th quartile, 50th quartile and 75th quartile
- Interquartile range of the GEOMACS output
- GEOMACS trimmed mean
- GEOMACS geometric mean
- GEOMACS ratio: stress in excess of 0.4 Pa as a proportion of total stress
- GEOMACS percentage exceedance 0.4 Pa

4. Bottom-water nutrients and physical chemistry, extracted from the CSIRO Atlas of Regional Seas (CARS) database at CSIRO, which comprise:
- Bottom water nitrate mean, and standard deviation
- Bottom water oxygen mean, and standard deviation
- Bottom water salinity mean, and standard deviation
- Bottom water silicate mean, and standard deviation
- Bottom water phosphate mean, and standard deviation
- Bottom water temperature mean, and standard deviation

5. Surface-water parameters, derived from NASA standard monthly satellite products by CSIRO. This set of data include:

- MODIS Sea Surface Temperature mean, and standard deviation
- SeaWIFS Chlorophyll mean, and standard deviation
- SeaWIFS K490 mean, and standard deviation

The dataset represents a comprehensive, unique collection of marine environmental variables that capture key aspects of the Australian seabed and surface water environments. Importantly, the data will be available to be applied to a range of research questions beyond the Marine Biodiversity Hub. The data do have limitations, however, to varying degrees. As with most marine spatial data, the density of the data points underlying the data grids is often highly variable and uncertainty metrics are currently available only for the CARS data. The Marine Biodiversity Hub plans to address these issues in the near future in terms of identifying significant gaps in the data coverage and in the development of uncertainty metrics. A priority will be given to variables found by the Hub to be important in driving patterns of biodiversity and therefore most useful for biodiversity prediction.

1. INTRODUCTION

The objective of this report is to describe the marine environmental data that have been generated and collated by the CERF Marine Biodiversity Hub as a foundation for its Prediction and Surrogates research programs. The Marine Biodiversity Hub is part of the Commonwealth Environment Research Facilities (CERF) Program run by the Australian Government's Department of Environment, Water, Heritage and the Arts (DEWHA). The Hub partners are University of Tasmania, CSIRO Marine & Atmospheric Research (CMAR), Geoscience Australia (GA), the Australian Institute of Marine Science and the Museum of Victoria.

This report includes detailed metadata and a distribution map for each of the 37 environmental variables that make up the set of national marine environmental data. Bathymetry, seabed geomorphology, seabed sediment and seabed exposure data layers were collated by Geoscience Australia. Bottom water and surface water property data layers were collated by CSIRO Marine and Atmospheric Research. The extent of the data ranges from the Australian continental shelf (<200 m depth; e.g. seabed exposure), the Exclusive Economic Zone adjacent to the mainland and Tasmania (e.g. sediments; bottom-water properties) or the EEZ and beyond (e.g. bathymetry; satellite-derived water properties).

1.1. BACKGROUND

Sediment data were initially compiled by Geoscience Australia for the National Marine Sediments Database (Passlow et al., 2005). The sediment data along with seabed geomorphic features, seabed exposure parameters and the CARS water column attributes were included in the Commonwealth Government's National Marine Bioregionalisation of Australia (Hayes et al., 2005; Heap et al., 2005). In the intervening period, additional sediment data were acquired and included in profiles of the Australian Marine Bioregions (Baker et al., 2008; Keene et al., 2008; Potter et al., 2008; Mathews et al., 2007; Richardson et al., 2005) to inform the development of Marine Bioregional Plans by the Commonwealth Government (http://www.environment.gov.au/coasts/mbp/index.html), while water column attributes data from scientific surveys were added to the CARS database as they became available. For the Marine Biodiversity Hub, new data were included and new variables were derived from existing data. For example, new seabed exposure parameters were developed at Geoscience Australia and standard deviation layers were produced for the water column attributes by CSIRO. All data were transformed to a common datum, WGS84, and converted to a common grid with a cell size of 0.01 degrees (approx. 1.1 km). Metadata reports for each parameter conform to ANZLIC standards.

Marine Biodiversity

Australia's Exclusive Economic Zone is the third largest, approximately 8.2 M km^2, after the USA and France (Flanders Marine Institute, 2009) and one of the most biologically diverse (Butler et al., 2010) in the world. For much of it we have very limited knowledge of the physical environment and major marine ecosystems processes, let alone patterns of biological diversity. The collation of data on marine physical environmental variables that are known or suspected of being linked to ecological processes that influence the distribution of species, communities and habitats is an essential early step towards better understanding our marine environment. The Marine Biodiversity Hub's research into the prediction and management of patterns of biodiversity in the Australian marine estate therefore is dependant on the establishment of datasets that accurately represent a range of marine biophysical variables.

The Marine Biodiversity Hub has utilised the marine environmental parameters described in this report in models that predict the distribution of benthic biodiversity. This approach is essential because predictions can extend into areas that lack biological data, which is the case for extensive areas of the marine estate. Maps of the potential distribution of seabed biodiversity generated from the outputs of the predictive models have been used by DEWHA to support the

sustainable management of the marine environment including the development of the National Representative System of Marine Protected Areas.

Report Purpose & Structure

The report provides a comprehensive description of the 37 marine environmental variables that form the new dataset. Metadata are provided for all variables so that each listing forms a stand-alone reference for each variable – this leads to some repetition in the metadata of variables within data groups (bathymetry, geomorphology, seabed sediment, seabed exposure, bottom-water and surface-water). Also, relevant references are provided in the metadata for each variable and a complete reference list is provided at the end of the report as a broader marine environmental information resource.

1.2. STRENGTHS AND LIMITATIONS OF THE NEW DATASET

The new set of data represents a comprehensive, unique collection of the best available data that captures key aspects of Australia's seabed and surface water environments. Importantly, the data grids provide a national coverage that spans the continental shelf or the Australian Exclusive Economic Zone (Figure 1.1) with a common projection and datum. It is unique globally for a nation to have a national coverage of such data layers all together in one dataset and this has enabled the Marine Biodiversity Hub to undertake world-leading biodiversity research. The dataset also represents an important national information asset that can be applied to a range of research applications that extend beyond the Marine Biodiversity Hub.

Important information on the spatial resolution and analysis methods employed for each environmental variable is provided in the metadata under the Data Quality entries. The data have common limitations, however, to varying degrees. As with most marine spatial data, the density of the point data that underlies the data grids is often highly variable and sparse over large areas. Various interpolation methods were used to produce the grids from the original data points, and uncertainty metrics are currently available only for the CARS predictions. The Marine Biodiversity Hub plans to address these issues in the near future, in terms of identifying significant gaps in the coverages of the various data and in the development of uncertainty measures for more of the variables. Identification of data gaps or areas with low data density will enable new data to be strategically collected to enhance the national dataset, particularly for those attributes demonstrated by the Hub to be important for driving patterns of biodiversity. Importantly, uncertainty metrics for the environmental data can enable better confidence measures to be developed for biological prediction.

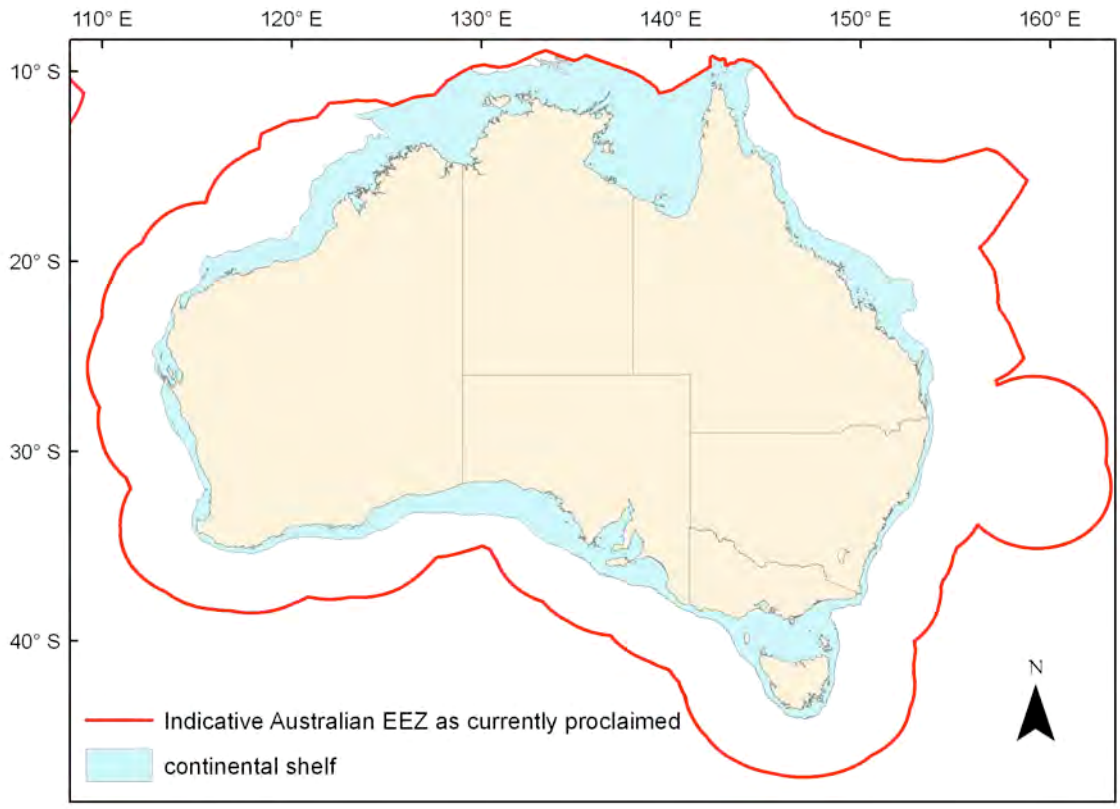

Figure 1.1. Australian continental shelf and Exclusive Economic Zone (EEZ).

2. METADATA AND DISTRIBUTION MAPS FOR NATIONAL MARINE PHYSICAL ENVIRONMENTAL DATA

2.1. BATHYMETRY AND GEOMORPHOLOGY

These data were derived from the Australian Bathymetry database held at Geoscience Australia, with the exception of the Euclidean Distance to Coastline parameter. The dataset comprises depth, seabed morphometric parameters and geomorphic features.

2.1.1. Australian Bathymetry and Topography

The bathymetry dataset provides a comprehensive coverage of the seafloor of the Australian Exclusive Economic Zone and beyond (Figure 2.1.1). The bathymetry data were compiled by Geoscience Australia from multibeam and single beam data (derived from multiple sources), RAN Laser Airborne Depth Sounding (LADS) data, Australian Hydrographic Service (RAN) fairsheets, and the General Bathymetric Chart of the Oceans (GEBCO) bathymetric model. For a full description of how the Australian Bathymetry and Topography database was compiled see Webster and Petkovic (2005). The bathymetry data were essential to produce the morphometric and geomorphic data described below.

The depth of the ocean at any particular point is a key factor in a number of ecological and oceanographic processes that are important to benthic marine life. In particular, depth has a controlling influence on the amount of light available to organisms in the benthic zone. Depth also controls pressure on the seabed and is a strong influence on water temperature. The influence of waves on the seafloor is also controlled by the depth of the water. Current regimes are influenced by a number of variables, some of which are directly related to depth.

Dataset TITLE
Australian Bathymetry and Topography, June 2005
Dataset ALTERNATE TITLE (i.e. Dataset Name)
bathy_01_flt
Dataset AUTHOR(S)
Webster, M.A., and Petkovic, P.
Dataset CUSTODIAN
Geoscience Australia
Dataset JURISDICTION
Australia
Description ABSTRACT
Geoscience Australia and the National Oceans Office carried out a joint venture project to produce a consistent, high-quality 9 arc second (0.0025° or ~250 m at the equator) bathymetric data grid of those parts of the Australian water column jurisdiction lying between 92E & 172E and 8S & 60S. As well as the waters adjacent to the continent of Australia and Tasmania, the area selected also covers the area of water column jurisdiction surrounding Macquarie Island, and the Australian Territories of Norfolk Island, Christmas Island, and Cocos (Keeling) Islands. The area selected does not include Australia's marine jurisdiction off of the Territory of Heard and McDonald Islands and the Australian Antarctic Territory. The underlying data from which this grid is derived can only support this resolution in areas where direct bathymetric observations are sufficiently dense (e.g. where swath bathymetry data or digitised chart data exist). In areas where only track-line data exist, the grid resolution is high along-line but low perpendicular to lines. In areas where no sounding data are available, the grid is based on interpolated or indirectly observed bathymetry, and these data can only support a resolution of 2 arc minutes (2 nautical miles or ~3.7 km). The grid covers an area of approximately 41 million square kilometres. Its dimensions are 32003 x 20803 cells resulting in a file size slightly in excess of 1.3 Gb of 2-bytes integer numbers representing the bathymetric values. The grid

synthesises approximately 1.7 billion observed data points. **This grid is not suitable for use as an aid to navigation, or to replace any products produced by the Australian Hydrographic Service.**

Description Data Category
Oceans
Description ANZLIC Keyword
GEOSCIENCES
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT POLYGON(S)
N_LAT: -8
S_LAT: -60
E_LONG: 172
W_LONG: 92
COORDINATE SYSTEM DESCRIPTION
Projection: Geographic
Datum: WGS84
Units: DD
Description NOMINAL SCALE
Resolution: 0.01 Decimal Degrees
Data Currency BEGINNING DATE
20-APR-05
Data Currency ENDING DATE
28-JUL-05
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
Not Planned
Access STORED FORMATS Digital/Non-Digital Description
DIGITAL ArcInfo grid
DIGITAL ASCII text
DIGITAL ERMapper dataset file
DIGITAL bil Band interleaved by line (BIL) image
Access AVAILABLE FORMATS Digital/Non-Digital Description
DIGITAL ArcInfo grid
DIGITAL ASCII text
DIGITAL ERMapper dataset file
DIGITAL bil Band interleaved by line (BIL) image
Access ACCESS CONSTRAINT
No restrictions
Data Quality LINEAGE
The data came from a variety of systems with differing data densities and levels of accuracy. In the geographic extents 34°N - 79°S, 90°E - 180°E, GA holds approximately 1400 surveys that collected bathymetric data. For ship-track data the typical spacing of point data along track is 25-200m, and the two-dimensional spacing of points covered by swath surveys is of similar order. The coverage of ship-track surveys is widely variable, such that some points covered by grid lines are many tens of kilometres apart, whereas for swath bathymetry surveys, the areas of coverage are at relatively high density, but of very limited coverage. The input data were derived from a number of sources, were of variable vintages and quality. A number of approaches were required to process, check and edit the data. The availability of data also varied considerably throughout the region, effectively restricting the maximum useful resolution of the grid in areas where no soundings exist, to that of the satellite predicted bathymetry that was used as infill.
These data, together with predicted bathymetry from satellite altimetry, were brought together into a single dataset and processing system to allow the routine creation of grids (and images) with a range of specifications.

Data Quality POSITIONAL ACCURACY
The grid incorporates data from surveys acquired since 1963. Modern surveys which used GPS have a positional accuracy of 5 - 30 m depending on several factors, while earlier surveys which used dead reckoning and Transit satellite fixes had positions accurate to 50-2000 m depending upon the water depth and strength of currents. These surveys overlap in an irregular distribution. The grid cell size is 0.0025 deg (close to 250m), and it is estimated that 90% of cells give depths within 1 cell of their measured position. Nominal scale: 1:10,000,000 when imaged at 300 dpi.
Data Quality ATTRIBUTE ACCURACY
The data is in gridded format without attribute
Data Quality LOGICAL CONSISTENCY
All the grids are checked at scale to verify that no data is incorrect, that there were no extraneous point segments, and that all points have the estimated bathymetric values.
Data Quality COMPLETENESS
This dataset is completed.
Contact Information CONTACT ORGANISATION
Geoscience Australia
Contact Information CONTACT POSITION
Director, Sales and Distribution, CIMA
Contact Information MAIL ADDRESS 1
GPO Box 378
Contact Information SUBURB/PLACE/LOCALITY
Canberra
Contact Information STATE/LOCALITY 2
ACT
Contact Information COUNTRY
Australia
Contact Information POSTCODE
2601
Contact Information TELEPHONE
+61 2 6249 9966
Contact Information FACSIMILE
+61 2 6249 9960
Contact Information ELECTRONIC MAIL ADDRESS
sales@ga.gov.au
Metadata Date METADATA DATE
20JUL2005
Additional Metadata ADDITIONAL METADATA
GeoMET No. 8022
GeoCAT No. 63539
Additional Metadata REFERENCES
Webster, M., and Petkovic, P., 2005, Australian Bathymetry and Topography Grid. Geoscience Australia Record 2005/12. Geoscience Australia, Canberra. 2 DVD.

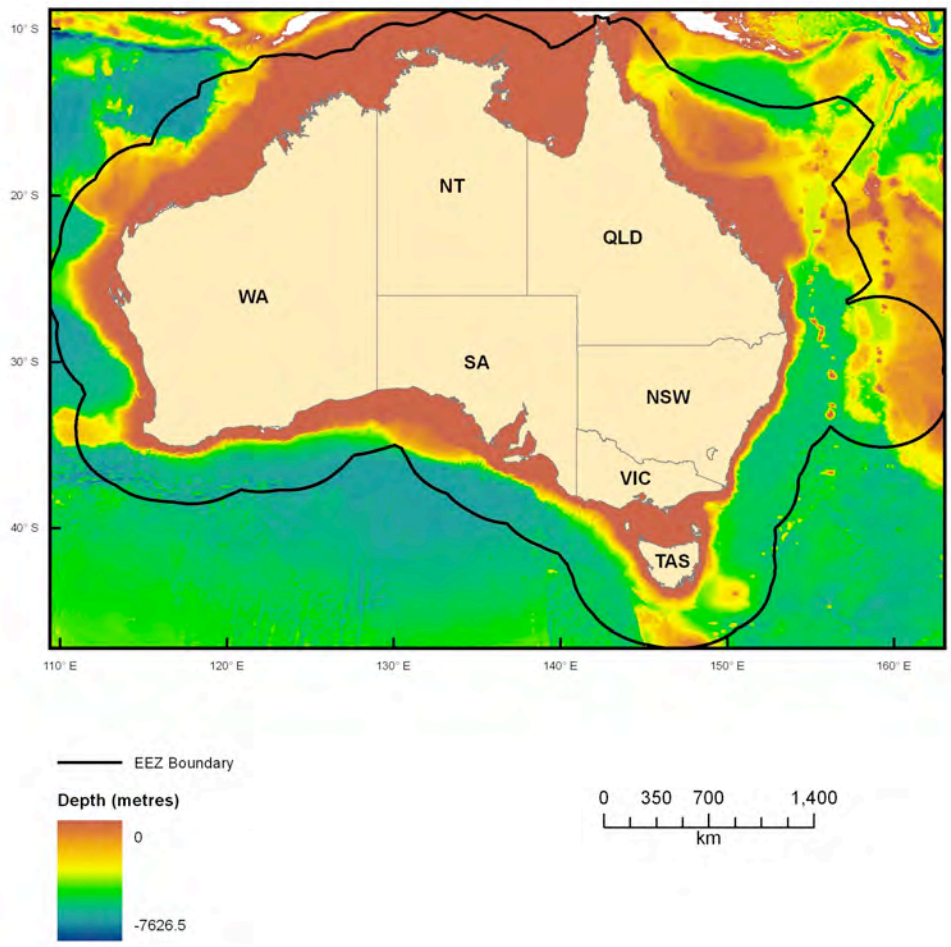

Figure 2.1.1. Australian Bathymetry Map

2.1.2. Topographic Aspect

A grid (Figure 2.1.2) was created to represent the angle of aspect of the seabed in the Australian region utilising the national bathymetry dataset (2.1.1.) in ArcGIS.

The aspect of an area of seabed influences its degree of exposure to the prevailing waves and currents. In the euphotic zone, aspect is also a governing factor in the amount of light available for photosynthesis.

Dataset TITLE
Topographic Aspect
Dataset ALTERNATE TITLE (i.e. Dataset Name)
aspect
Dataset AUTHORS
Geoscience Australia (GA)
Dataset CUSTODIAN (i.e. Name and Contact Details)
Geoscience Australia (GA)
Dataset JURISDICTION (i.e. Region Name)
Australia
Description ABSTRACT
The ArcInfo grid was created from the bathymetry data and represents the degree of aspect of a slope surface.
Description Data Category
Elevation
Description ANZLIC Keyword
GEOSCIENCES
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
North: -7.90
South: -48.20
East: 169.60
West: 106.40
COORDINATE SYSTEM DESCRIPTION
Projection: Geographic
Datum: WGS84
Units: DD
Description SPATIAL SCALE or RESOLUTION
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE (yyyy-mm-dd)
2008-08-01
Dataset Currency ENDING DATE (yyyy-mm-dd)
2008-08-01
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As Necessary
Access STORED DATA FORMAT
DIGITAL - ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL - ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Use ACKNOWLEDGEMENTS (ie Data Source, Contributing Authors, etc)
Webster, M.A., Petkovic, P., and Huang, Z. (dataset author)

Data Quality LINEAGE
The dataset was created using the 250 m bathymetry grid. The bathymetry grid was first subset into 10 grids, each of which covers an UTM zone (from 49s to 58s). They were then projected into UTM grids. The aspect was calculated for these UTM grids separately using ArcGIS. The resultant grids were projected back to WGS84 and merged. The merged grid was finally resampled to 0.01 DD.
Data Quality POSITIONAL ACCURACY
The grid was a derived product of the 250 metre bathymetry grid and thus inherited the positional accuracy of the bathymetry grid. The bathymetry grid incorporates data from surveys acquired since 1963. Modern surveys which used GPS have a positional accuracy of 5 - 30 m depending on several factors, while earlier surveys which used dead reckoning and Transit satellite fixes had positions accurate to 50-2000 m depending upon the water depth and strength of currents. These surveys overlap in an irregular distribution. The grid cell size is 0.0025 deg (close to 250m), and it is estimated that 90% of cells give depths within 1 cell of their measured position. Nominal scale: 1:10,000,000 when imaged at 300 dpi.
Data Quality ATTRIBUTE ACCURACY
Not applicable, as there is not any attribute associated with the raster data.
Data Quality LOGICAL CONSISTENCY
Unknown
Data Quality COMPLETENESS
Completed
Contact Information CONTACT ORGANISATION
Geoscience Australia (GA)
Contact Information CONTACT POSITION
Director, Sales and Distribution, ISB
Contact Information MAIL ADDRESS 1
GPO Box 378
Contact Information SUBURB OR PLACE OR LOCALITY
Canberra
Contact Information STATE
ACT
Contact Information COUNTRY
Australia
Contact Information POSTCODE
2601
Contact Information TELEPHONE
+61 2 6249 9966
Contact Information FACSIMILE
+61 2 6249 9960
Contact Information ELECTRONIC MAIL ADDRESS
sales@ga.gov.au
Metadata Date METADATA DATE (yyyy-mm-dd)
2009-12-09
ADDITIONAL METADATA
None

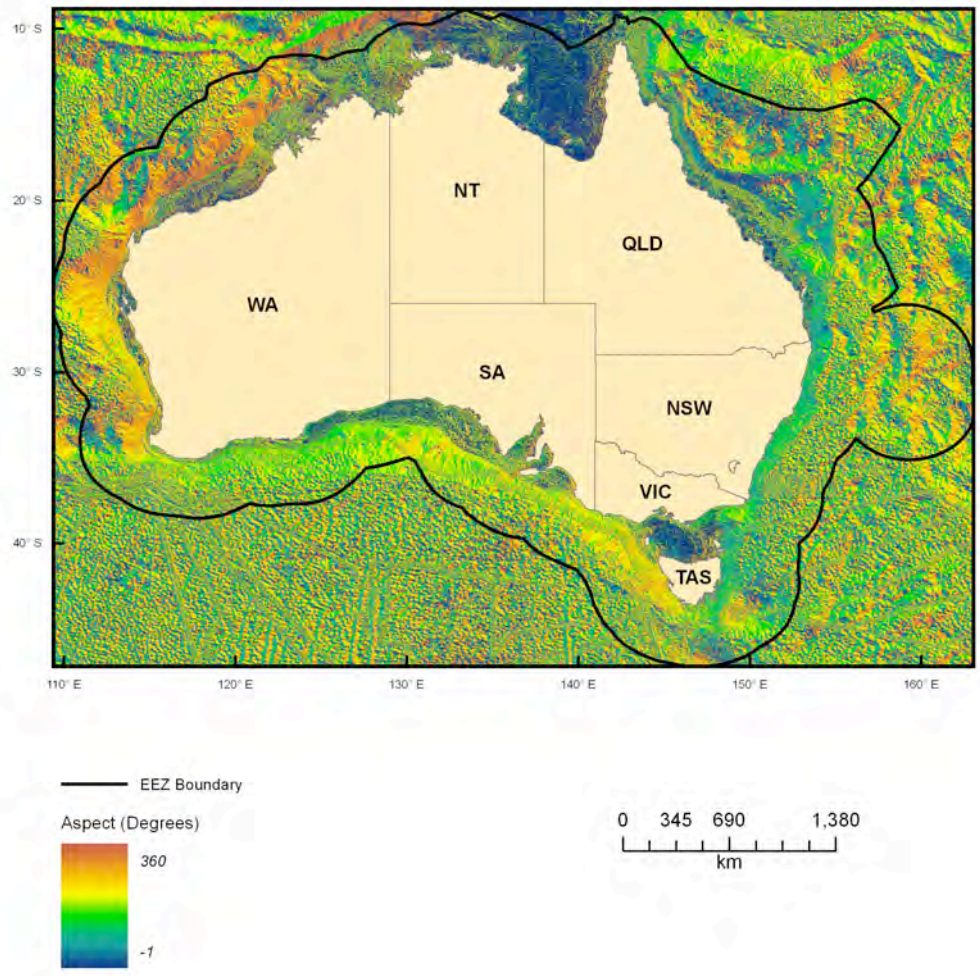

Figure 2.1.2. Topographic Aspect Map

2.1.3. Averaged Topographic Relief

A grid (Figure 2.1.3) was created in ArcGIS from the national bathymetry dataset (2.1.1) to represent the amount of relief over the Australian continental shelf and continental slope.

Topographic relief is the difference in elevation between the highest and lowest point within a specified area. The amount of relief may indicate specific seabed conditions in terms of sediments and currents.

Dataset TITLE
Averaged Topographic Relief
Dataset ALTERNATE TITLE (i.e. Dataset Name)
relief_ave
Dataset AUTHORS
Geoscience Australia (GA)
Dataset CUSTODIAN (i.e. Name and Contact Details)
Geoscience Australia (GA)
Dataset JURISDICTION (i.e. Region Name)
Australia
Description ABSTRACT
This data represents the averaged topographic relief for the Australian continent, the Australian continental shelf, and the Australian continental slope.
Description Data Category
Elevation
Description ANZLIC Keyword
GEOSCIENCES
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
North: -8.88
South: -47.19
East: 109.23
West: 163.19
COORDINATE SYSTEM DESCRIPTION
Projection: Geographic WGS84
Datum: WGS84
Units: DD
Description SPATIAL SCALE or RESOLUTION
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE (yyyy-mm-dd)
2009-03-01
Dataset Currency ENDING DATE (yyyy-mm-dd)
2009-03-01
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required
Access STORED DATA FORMAT
DIGITAL – ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL – ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Use ACKNOWLEDGEMENTS (ie Data Source, Contributing Authors, etc)
Webster, M.A., Petkovic, P., and Huang, Z. (dataset author)
Data Quality LINEAGE

Firstly, layers of local relief were created using windows made up of 3 by 3, 5 by 5, 7 by 7, 9 by 9, 11 by 11, and 13 by 13 pixels, using the "focal range" ArcInfo function. Then the mean value of these six layers was calculated to represent the local relief value for each cell in the grid.

Data Quality POSITIONAL ACCURACY

The grid was a derived product of the 250 metre bathymetry grid and thus inherited the positional accuracy of the bathymetry grid. The bathymetry grid incorporates data from surveys acquired since 1963. Modern surveys which used GPS have a positional accuracy of 5 - 30 m depending on several factors, while earlier surveys which used dead reckoning and Transit satellite fixes had positions accurate to 50-2000 m depending upon the water depth and strength of currents. These surveys overlap in an irregular distribution. The grid cell size is 0.0025 deg (close to 250m), and it is estimated that 90% of cells give depths within 1 cell of their measured position. Nominal scale: 1:10,000,000 when imaged at 300 dpi.

Data Quality ATTRIBUTE ACCURACY

Not applicable, as there is not any attribute associated with the raster data.

Data Quality LOGICAL CONSISTENCY

Unknown

Data Quality COMPLETENESS

Completed

Contact Information CONTACT ORGANISATION

Geoscience Australia (GA)

Contact Information CONTACT POSITION

Director, Sales and Distribution, ISB

Contact Information MAIL ADDRESS 1

GPO Box 378

Contact Information SUBURB OR PLACE OR LOCALITY

Canberra

Contact Information STATE

ACT

Contact Information COUNTRY

Australia

Contact Information POSTCODE

2601

Contact Information TELEPHONE

+61 2 6249 9966

Contact Information FACSIMILE

+61 2 6249 9960

Contact Information ELECTRONIC MAIL ADDRESS

sales@ga.gov.au

Metadata Date METADATA DATE (yyyy-mm-dd)

2009-12-09

ADDITIONAL METADATA

None

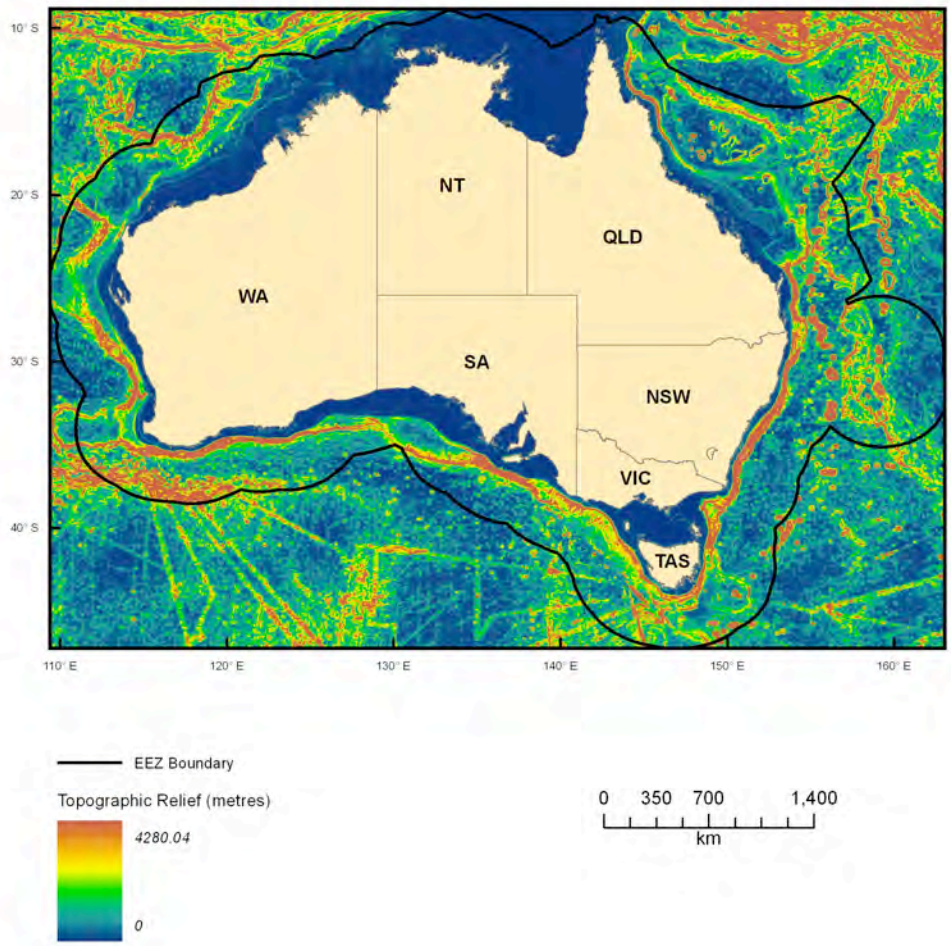

Figure 2.1.3. Averaged Topographic Relief Map

2.1.4. Predicted Rocky Substrate

The rocky substrate dataset (Figure 2.1.4) was produced in ArcGIS for the Marine Biodiversity Hub by Geoscience Australia. These data represent a prediction of the likelihood that the seabed is rocky. Rocky seabed is often characterised by a distincitve assemblage of benthic organisms such as attaching filter feeders (e.g. sponges). The data range from 0 (least likely to be rocky) to 100 (most likely to be rocky) (Huang et al., 2010). Relief was used as the predictive variable. In order to predict the substrate type, the amount of local relief was used to determine a relief index value. The rocky substrate prediction remains at zero until seabed relief reaches a threshold value of 200; the likelihood of the seabed being rocky then increases with greater seabed relief until a maximum likelihood of the seabed being rocky (100) is reached when the relief value is 500.

Dataset TITLE
Predicted Rocky Substrate
Dataset ALTERNATE TITLE (i.e. Dataset Name)
rocky
Dataset AUTHORS
Geoscience Australia (GA)
Dataset CUSTODIAN (i.e. Name and Contact Details)
Geoscience Australia (GA)
Dataset JURISDICTION (i.e. Region Name)
Australia
Description ABSTRACT
The data represents the possibility that the substrate is rocky. It was created from the averaged topographic relief layer. The data values range from 0 to 100.
Description Data Category
Oceans
Description ANZLIC Keyword
GEOSCIENCES
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
North: -8.88
South: -47.19
East: 109.23
West: 163.19
COORDINATE SYSTEM DESCRIPTION
Projection: Geographic
Datum: WGS84
Units: DD
Description SPATIAL SCALE or RESOLUTION
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE (yyyy-mm-dd)
2009-03-01
Dataset Currency ENDING DATE (yyyy-mm-dd)
2009-03-01
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required
Access STORED DATA FORMAT
DIGITAL – ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL – ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian

Use ACKNOWLEDGEMENTS (ie Data Source, Contributing Authors, etc)
Webster, M.A., Petkovic, P., and Huang, Z. (dataset author)
Data Quality LINEAGE
Firstly, layers of local relief were created using 3 by 3, 5 by 5, 7 by 7, 9 by 9, 11 by 11, and 13 by 13 pixel-windows. Then a local relief average layer was created from the above layers. Finally, the rocky layer was created from the averaged local relief layer, which was calculated using the following functions: y = 100 when x > 500; y = (x-200)/3 when 500 >= x >= 200; y = 0 when x < 200; where x is relief_ave layer and y is the resultant rocky value (between 0 and 100).
Data Quality POSITIONAL ACCURACY
The grid was a derived product of the 250 metre bathymetry grid and thus inherited the positional accuracy of the bathymetry grid. The bathymetry grid incorporates data from surveys acquired since 1963. Modern surveys which used GPS have a positional accuracy of 5 - 30 m depending on several factors, while earlier surveys which used dead reckoning and Transit satellite fixes had positions accurate to 50-2000 m depending upon the water depth and strength of currents. These surveys overlap in an irregular distribution. The grid cell size is 0.0025 deg (close to 250m), and it is estimated that 90% of cells give depths within 1 cell of their measured position. Nominal scale: 1:10,000,000 when imaged at 300 dpi.
Data Quality ATTRIBUTE ACCURACY
Not applicable, as there is not any attribute associated with the raster data.
Data Quality LOGICAL CONSISTENCY
Unknown
Data Quality COMPLETENESS
Completed
Contact Information CONTACT ORGANISATION
Geoscience Australia (GA)
Contact Information CONTACT POSITION
Director, Sales and Distribution, ISB
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Contact Information COUNTRY
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Contact Information ELECTRONIC MAIL ADDRESS
sales@ga.gov.au
Metadata Date METADATA DATE (yyyy-mm-dd)
2009-12-09
ADDITIONAL METADATA REFERENCES
Huang, Z., Brooke, B.P., and Harris, P.T., 2010. A new approach to mapping marine benthic habitats using physical environmental data. Continental Shelf Research, doi:10.1016/j.csr.2010.03.012.

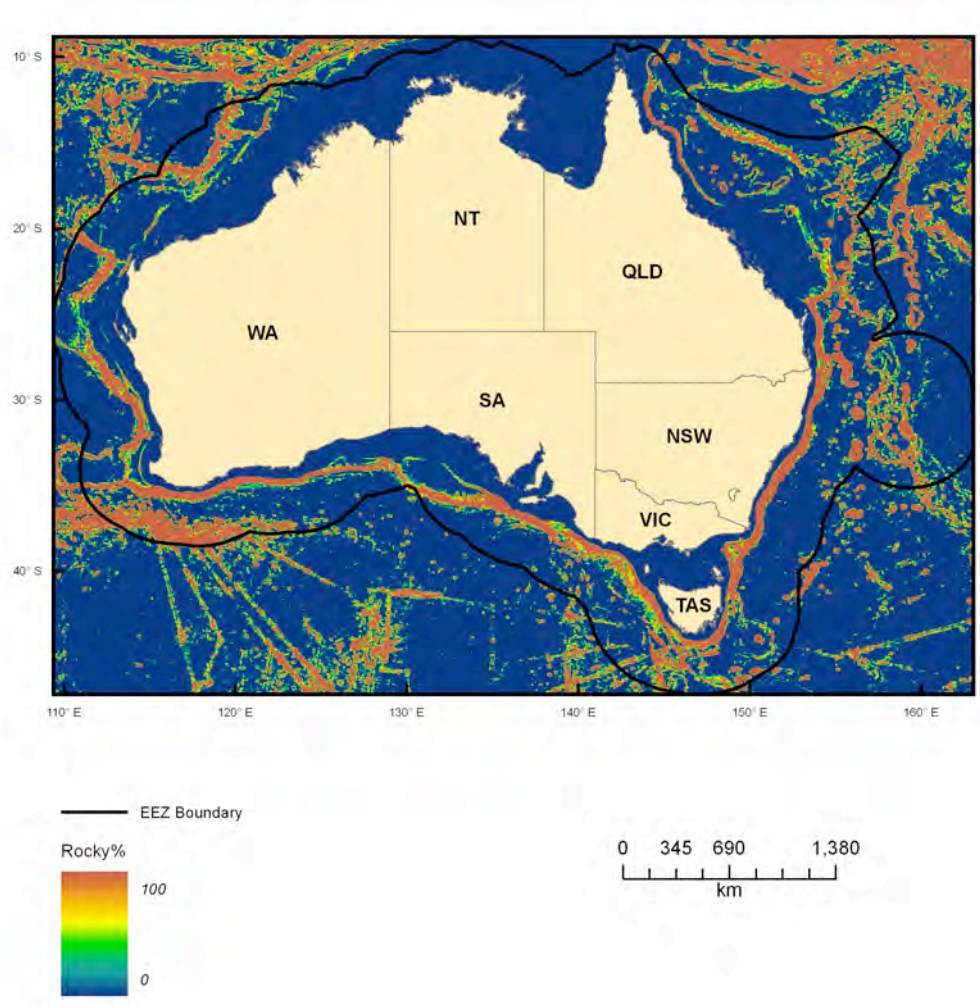

Figure 2.1.4. Predicted Rocky Substrate Map

2.1.5. Topographic Slope

A grid (Figure 2.1.5) was created in ArcGIS from the national bathymetry dataset (2.1.1.) to represent the slope angle of an area of seabed. The degree of slope may provide insights into seabed sedimentological and oceanographic conditions.

Dataset TITLE
Topographic Slope (degree)
Dataset ALTERNATE TITLE (i.e. Dataset Name)
slope_2
Dataset AUTHORS
Geoscience Australia (GA)
Dataset CUSTODIAN (i.e. Name and Contact Details)
Geoscience Australia (GA)
Dataset JURISDICTION (i.e. Region Name)
Australia
Description ABSTRACT
The ArcInfo grid was created from the bathymetry data and represents the degree of slope of an area of seabed.
Description Data Category
Elevation
Description ANZLIC Keyword
GEOSCIENCES
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
North: -7.90
South: -48.20
East: 169.60
West: 106.40
COORDINATE SYSTEM DESCRIPTION
Projection: Geographic
Datum: WGS84
Units: DD
Description SPATIAL SCALE or RESOLUTION
Resolution: 0.01
Dataset Currency BEGINNING DATE (yyyy-mm-dd)
2008-09-15
Dataset Currency ENDING DATE (yyyy-mm-dd)
2008-09-15
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
Not planned
Access STORED DATA FORMAT
DIGITAL - ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL - ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Use ACKNOWLEDGEMENTS (ie Data Source, Contributing Authors, etc)
Webster, M.A., Petkovic, P., and Huang, Z. (dataset author)
Data Quality LINEAGE
The dataset was created using the 250 m bathymetry grid. The bathymetry grid was first subset into 10 ArcInfo grids, each of which covers an UTM zone (from 49s to 58s). They were then projected into UTM grids. The slope (degree) was calculated for these UTM grids separately

using ArcGIS desktop. The resultant grids were projected back to WGS84 and merged. The merged grid was finally re-sampled to 0.01 DD.

Data Quality POSITIONAL ACCURACY

The grid was a derived product of the 250 metre bathymetry grid and thus inherited the positional accuracy of the bathymetry grid. The bathymetry grid incorporates data from surveys acquired since 1963. Modern surveys which used GPS have a positional accuracy of 5 - 30 m depending on several factors, while earlier surveys which used dead reckoning and Transit satellite fixes had positions accurate to 50-2000 m depending upon the water depth and strength of currents. These surveys overlap in an irregular distribution. The grid cell size is 0.0025 deg (close to 250m), and it is estimated that 90% of cells give depths within 1 cell of their measured position. Nominal scale: 1:10,000,000 when imaged at 300 dpi.

Data Quality ATTRIBUTE ACCURACY

Not applicable, as there is not any attribute associated with the raster data.

Data Quality LOGICAL CONSISTENCY

Unknown

Data Quality COMPLETENESS

Completed

Contact Information CONTACT ORGANISATION

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Metadata Date METADATA DATE (yyyy-mm-dd)

2009-12-09

ADDITIONAL METADATA

None

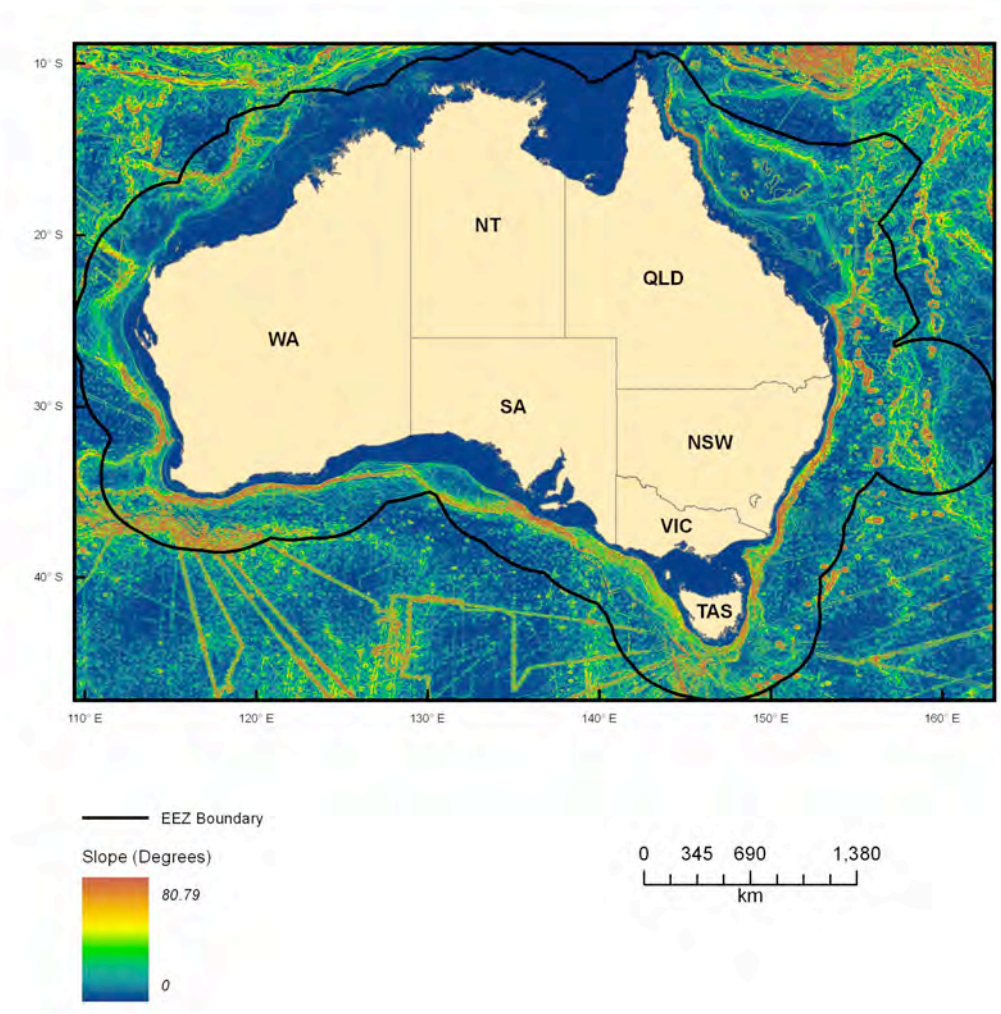

Figure 2.1.5. Topographic Slope Map

2.1.6. Euclidean Distance to the Australian Coastline

This dataset (Figure 2.1.6) was created in ArcGIS and provides the direct distance from all grid cell points in a 0.01 degree grid of the Australian Exclusive Economic Zone (adjacent to the mainland) to the Australian coastline. The distance measured is in decimal degrees.

The distance to the coastline is likely to reflect some degree of exposure to a wave/current regime. The proximity to land is also likely to reflect the potential influence of river discharge (sediment and fresh water), wind blown dust, and anthropogenic pollutants.

Dataset TITLE
Euclidean Distance to the Australian Coastline
Dataset ALTERNATE TITLE (i.e. Dataset Name)
dist_coast
Dataset AUTHORS
Zhi Huang
Dataset CUSTODIAN
Geoscience Australia
Dataset JURISDICTION
Australia
Description ABSTRACT
The dataset represents the direct distance from any location to the nearest part of the Australian coast line. The distance unit is decimal degree.
Description Data Category
Oceans
Description ANZLIC Keyword
GEOSCIENCES
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
N_LAT: -7.941667
S_LAT: -48.151667
E_LONG: 164.221667
W_LONG: 108.221667
COORDINATE SYSTEM DESCRIPTION
Projection: GEOGRAPHIC
Datum: WGS84
Units: DD
Description NOMINAL SCALE
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE
2008-08-01
Dataset Currency ENDING DATE
2008-08-01
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required
Access STORED DATA FORMAT
DIGITAL - ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL – ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Use ACKNOWLEDGEMENTS (ie Data Source, Contributing Authors, etc)
Huang, Z
Data Quality LINEAGE

The data were created in ArcGIS Desktop using the following procedure. 1. Converted the coast 250k polygon feature class into a line feature class; 2. Selected Australian mainland coast lines, Tasmania, and several major offshore islands: Bathurst Island, Melville Island, Croker Island, Groote Island, Mornington Island, Fraser Island, Moreton Island, North Stradbroke Island, Flinders Island, Cape Barren Island, King Island, Kangaroo Island, Dirk Hartog Island, and Barrow Island; 3. Simplified the selected features using a 30 km tolerance; 4. Calculated Euclidean distance from selected features to obtain the ArcInfo grid.

Data Quality POSITIONAL ACCURACY
Given that the Australian coastline has been simplified using a 30 km tolerance, the positional accuracy is about 30 km.

Data Quality ATTRIBUTE ACCURACY
Not applicable, as there is not any attribute associated with the raster data.

Data Quality LOGICAL CONSISTENCY
Visual assessment on the raster data indicates that its logical consistency is good.

Data Quality COMPLETENESS
Completed

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Contact Information ELECTRONIC MAIL ADDRESS
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Metadata Date METADATA DATE
2010-01-01

ADDITIONAL METADATA
None

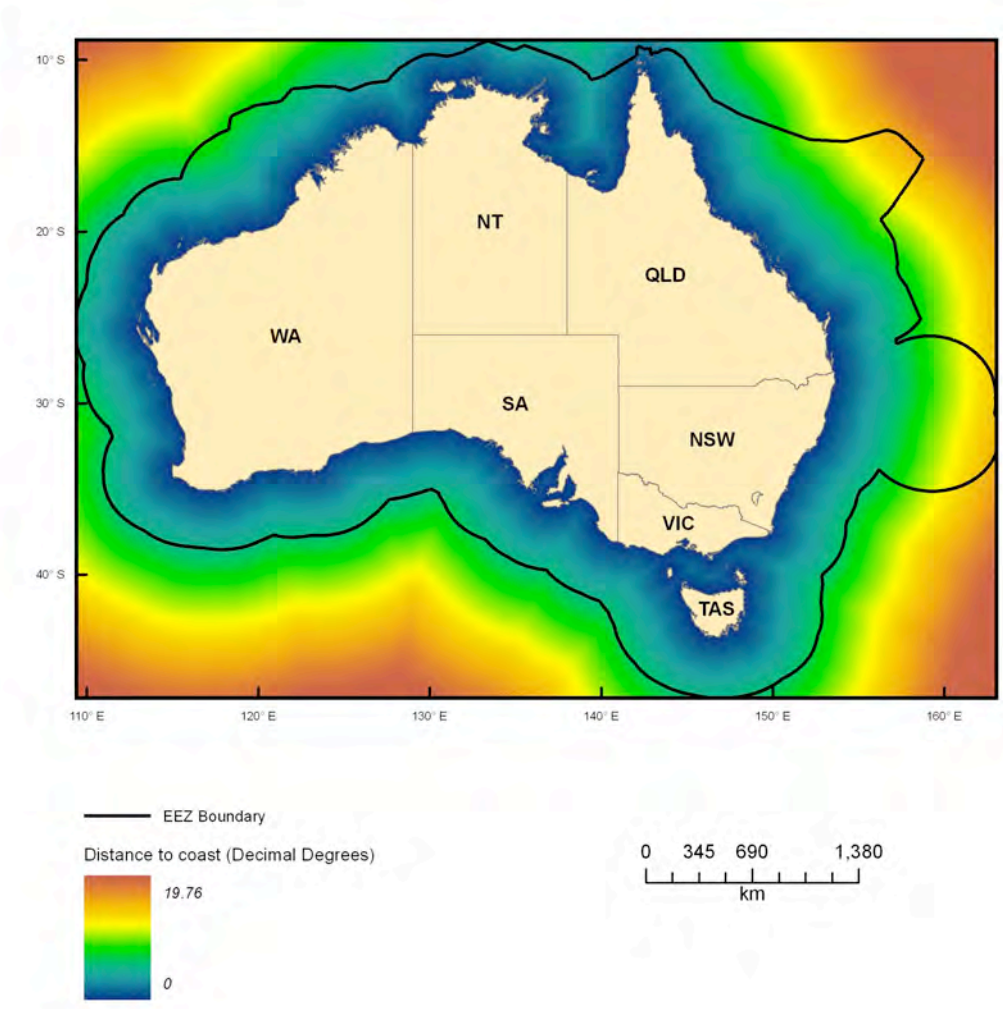

Figure 2.1.6. Euclidean Distance to the Australian Coast Map

2.1.7. Geomorphic Features of the Australian Margin

This dataset (Figure 2.1.7) covers the entire Australian Marine Jurisdiction. The geomorphic features (or seabed morphology) were identified from analysis of a relief model of the seabed produced with the bathymetry dataset (Heap & Harris 2008).

Some examples of these geomorphic features include; abyssal plains, trenches, canyons, and seamounts. These features influence the exposure of the seabed to light, wave/current regimes, and depth; as well as influencing the likelihood of occurrence of specific types of substrate and seabed complexity.

Dataset TITLE
Geomorphology of the Australian Margin and adjacent seafloor (National Geoscience Dataset)
Dataset ALTERNATE TITLE (i.e. Dataset Name)
geo_feature
Dataset AUTHORS
A. Heap, P. Harris
Dataset CUSTODIAN (i.e. Name and Contact Details)
Geoscience Australia
Dataset JURISDICTION (i.e. Region Name)
Australia
Description ABSTRACT
The geomorphic features of the seafloor in the Australian Marine Jurisdiction were identified using the Australian Bathymetry and Topography dataset (Webster & Petkovic 2005). Twenty one feature types were identified and mapped for an area including the seafloor surrounding the Australian mainland and island territories of Christmas, Cocos (Keeling), Macquarie, and Norfolk Islands (Heap & Harris 2008). Some examples of these geomorphic features include: abyssal plains, trenches, canyons, and seamounts.
Description Data Category
Geoscientific Information
Description ANZLIC Keyword
MARINE
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
North: -8.00
South: -60.00
East: 172.00
West: 92
COORDINATE SYSTEM DESCRIPTION
Projection: Geographic
Datum: WGS84
Units: DD
Description SPATIAL SCALE or RESOLUTION
Scale: 1:5000000
Dataset Currency BEGINNING DATE (yyyy-mm-dd)
2005-05-31
Dataset Currency ENDING DATE (yyyy-mm-dd)
2005-05-31
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As necessary
Access STORED DATA FORMAT
DIGITAL - ArcINFO Grid

Access AVAILABLE FORMAT TYPE(S)

DIGITAL - ArcINFO Grid

Access ACCESS CONSTRAINT

No restrictions

Use ACKNOWLEDGEMENTS (ie Data Source, Contributing Authors, etc)

A. Heap, P. Harris, L. Sbaffi, V. Passlow, M. Fellows, J. Daniell, C. Buchanan

Data Quality LINEAGE

Initially, the geomorphic features were captured in 2002 as part of a program run by Geoscience Australia and the National Oceans office to create a spatial inventory of benthic habitats for Australia's marine jurisdiction. The original bathymetry database contained more than 200 million data points from 931 marine surveys (Petkovic & Buchanan 2002). A further 87.5 million data points were added for a later study by Heap & Harris (2008). These additional data points were extracted from the new bathymetry model of the Australian margin and adjacent seafloor (Webster & Petkovic 2005). The geomorphic features are defined by the International Hydrographic Office (IHO, 2001), with one additional feature identified as type 21 – Sandwave/Sand bank (Heap & Harris 2008). The geomorphic features were identified using a 250 m spatial resolution bathymetry model with reference to previously published geological studies. In most cases, the feature boundaries corresponded to already published boundaries or were defined based on obvious bathymetric features, supplemented by high-resolution seismic reflection and sedimentary data. Where appropriate, the feature boundaries and classifications are consistent with United Nations Law of the Sea boundaries. The identification of shelf valleys and submarine canyons on the continental slope was aided by the use of predicted drainage maps. All the features were identified on the contour and false colour maps and drawn by hand onto transparent compilation maps. When completed, the compilation maps were scanned, georeferenced and the separate polygons were digitised and stored as an ARC/GIS shape file. Care was taken where separate maps sheets joined to ensure that features were correctly identified and retained their identity across the boundaries.

Data Quality POSITIONAL ACCURACY

Positional accuracy of individual geomorphic features boundaries varies depending on the source data. Due to the scale of the map, and quality of the source, the smallest feature that could be reliably resolved was approximately 10 km in length.

Data Quality ATTRIBUTE ACCURACY

No attribute for data quality exists at this stage. This attribute will be updated once a reliability map for the source bathymetric data has been generated. The reliability map will be based on the spatial distribution of soundings.

Data Quality LOGICAL CONSISTENCY

All bathymetric datasets once reduced to 9 x 250 m grids for the Australia EEZ were examined visually for data consistency. In some circumstances individual datasets were identified as inconsistent within the grid and either left out of the final grid or were corrected.

Terms and nomenclature used to describe geomorphic features of the seabed are based on definitions endorsed by the International Hydrographic Organisation (IHO, 2001), with the addition of one extra feature type; type 21 – Sandwave/Sand bank. Adopting ISO terms ensures a standard nomenclature that is widely recognised. Regional data sets were then compiled as a single national coverage. Tests were also carried out on the data for completeness, correct spatial representation, attribute accuracy, and logical consistency and correctness.

Data Quality COMPLETENESS

Coverage: The geomorphic units cover 100% of the Australia Exclusive Economic Zone. The raw data that makes up the bathymetry grid is derived from numerous sources and has been obtained opportunistically hence the actual data coverage is generally patchy and irregular. A data density map for the bathymetry grids has not yet been produced.

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Contact Information CONTACT POSITION

Petroleum and Marine Division Project Data Officer

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Contact Information POSTCODE
2601
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Contact Information FACSIMILE
612 6249 9999
Contact Information ELECTRONIC MAIL ADDRESS
sales@ga.gov.au
Metadata Date METADATA DATE (yyyy-mm-dd)
2005-05-31
ADDITIONAL METADATA – REFERENCES
Heap, A. D. and Harris, P. T. 2008. Geomorphology of the Australian margin and adjacent seafloor. Australian Journal of Earth Sciences, Vol. 55 Issue 4, pp 555-585.

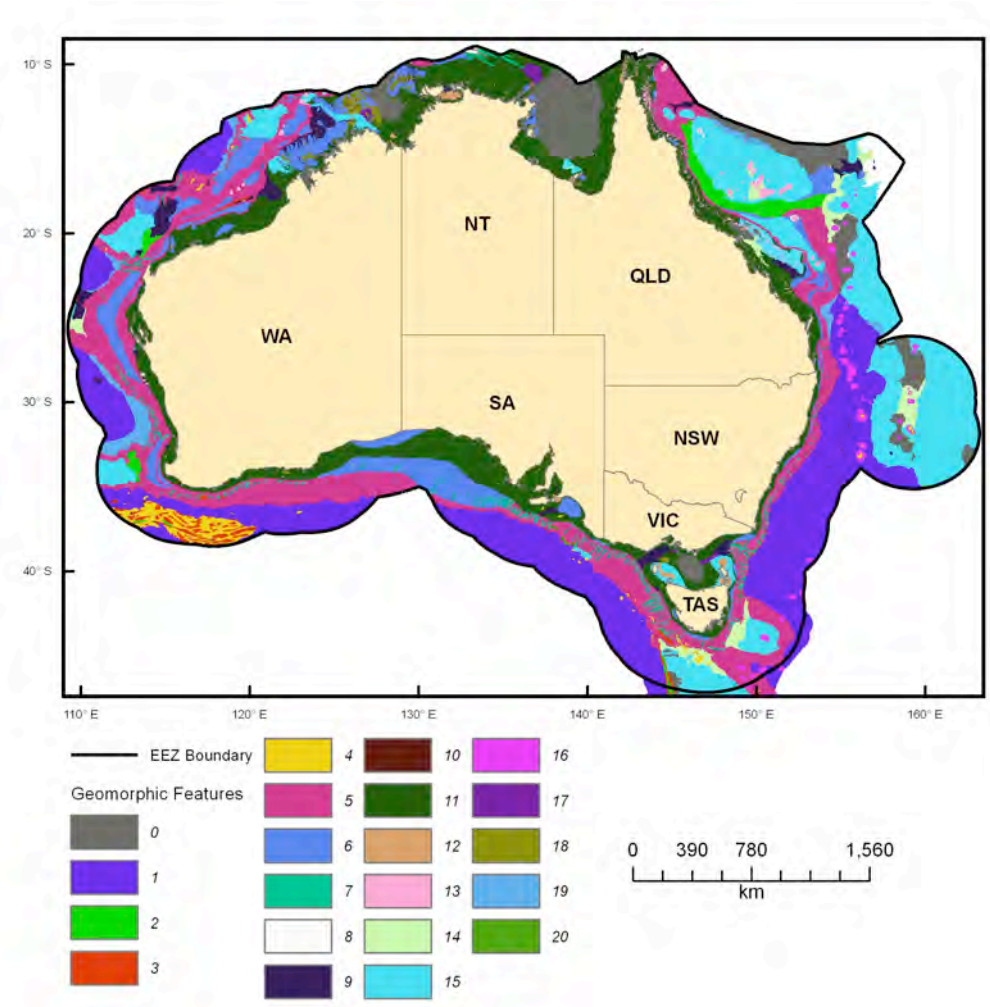

Figure 2.1.7. Geomorphic Features of the Australian Margin Map

2.2. SEDIMENTARY PARAMETERS

Seabed sediment data were extracted from Geoscience Australia's MARine Sediment database (MARS - http://www.ga.gov.au/oracle/mars/). They include the percentage of calcium carbonate in the sediment, and the percentage of mud, sand, or gravel size material found in seabed sediment samples, throughout the Australian Exclusive Economic Zone. The data grids were created using ArcGIS Inverse Distance Squared Weighted methodology.

2.2.1. Calcium Carbonate Percentage

This dataset (Figure 2.2.1) describes the percentage of calcium carbonate material found in seabed sediments in the Australian region. Calcium carbonate producing organisms (e.g. corals, bryozoans, foraminifera) may provide habitat for a variety of biota. A significant level of carbonate sediment may indicate the presence in the sample area of carbonate producing organisms; or represent a relict deposit. Additionally, shelf areas with a significant amount of carbonate sediment often have a relatively high proportion of coarse material, which is itself a potential influence on local biodiversity (McArthur *et al.* 2009).

Dataset TITLE
Sedimentary Features (carbonate percentage) of the Australian EEZ (National Geoscience Dataset)
Dataset ALTERNATE TITLE (i.e. Dataset Name)
bulk_carb1
Dataset AUTHORS
M. Tran, C. Baker, A. Potter and S. Burq
Dataset CUSTODIAN
Geoscience Australia
Dataset JURISDICTION
Australia
Description ABSTRACT
The map provides a visual representation of the carbonate content of seabed sediments expressed as a weight percentage. The data are represented from 0 to 100%. The data on which this map is based were compiled from marine sediment database (MARS - http://www.ga.gov.au/oracle/mars/) of Geoscience Australia.
Description Data Category
Oceans
Description ANZLIC Keyword
GEOSCIENCES
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
N_LAT: -8.88
S_LAT: -47.19
E_LONG: 163.19
W_LONG: 109.23
COORDINATE SYSTEM DESCRIPTION
Projection: GEOGRAPHIC
Datum: WGS84
Units: DD
Description NOMINAL SCALE
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE
2007-10-01
Dataset Currency ENDING DATE
2007-10-01

Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required
Access STORED DATA FORMAT
DIGITAL - ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL - ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Use ACKNOWLEDGEMENTS (ie Data Source, Contributing Authors, etc)
Geoscience Australia's MARine Sediment (MARS) Database - http://www.ga.gov.au/oracle/mars/
Data Quality LINEAGE
Marine sediment sample information within the Australian Maritime Jurisdiction was sourced by Geoscience Australia from Australian and international research groups, Government bodies, private corporate entities, and published/unpublished reports. This information was then used to populate a National Marine Sediments Database (MARS - http://www.ga.gov.au/oracle/mars/). MARS is an Oracle database that has been developed by Geoscience Australia in line with ANZLIC data standards. The point data is from seabed samples where the calcium carbonate content for the entire sample has been measured or determined through standard laboratory analysis methods, and was exported from MARS to ARC/GIS for the generation of maps. The point data was then interpolated using the "inverse distance squared weighted" algorithm to create the raster data presented here.
Data Quality POSITIONAL ACCURACY
Positional accuracy of individual points varies depending on the source data. Some data is from old records, external records and the methods used to ascertain position accuracy is unknown. Due to the scale of the map, and quality of the source, the accuracy is assumed to be within 5 km.
Data Quality ATTRIBUTE ACCURACY
No information for attribute accuracy exists at this stage. All the attribute data has been entered in by Geoscience Australia staff from a range of reports. The accuracy depends on human error or that of the report.
Data Quality LOGICAL CONSISTENCY
All vector data has been visually checked for extraneous points and value-added data. In some circumstances individual datasets were identified as inconsistent within the grid and either left out of the final grid or were corrected. Regional data sets were then compiled as a single national coverage. Tests were also carried out on the data for completeness, correct spatial representation, attribute accuracy, and logical consistency and correctness.
Data Quality COMPLETENESS
All vector data and details are complete and verified.
Contact Information CONTACT ORGANISATION
Geoscience Australia
Contact Information CONTACT POSITION
MARS Database Administrator
Contact Information MAIL ADDRESS 1
GPO Box 378
Contact Information SUBURB OR PLACE OR LOCALITY
Canberra City
Contact Information STATE
ACT
Contact Information COUNTRY
Australia
Contact Information POSTCODE
2601
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Contact Information FACSIMILE
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Contact Information ELECTRONIC MAIL ADDRESS
marine@ga.gov.au
Metadata Date METADATA DATE
2007-10-01
Additional Metadata REFERENCES
MARS (MARine Sediment) Database, Geoscience Australia, Geoscience Australia (vendor), updated as required.

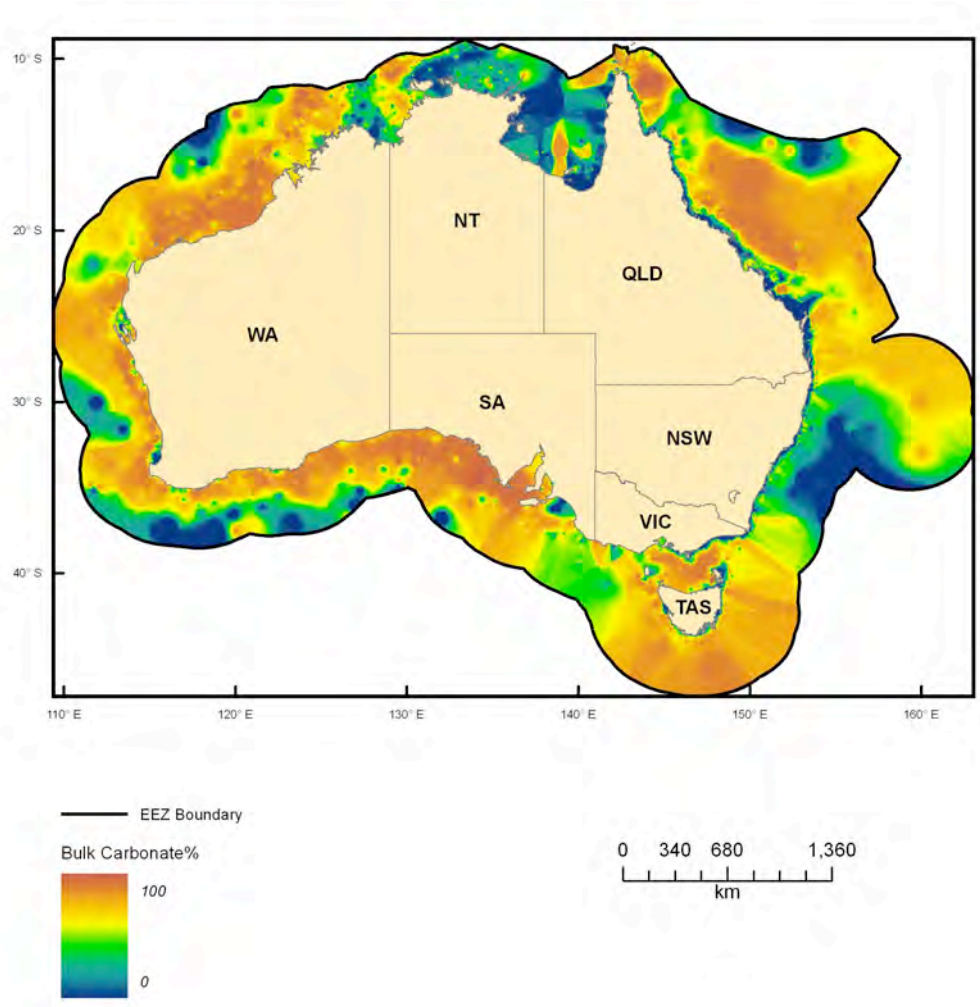

Figure 2.2.1. Calcium Carbonate Percentage Map

2.2.2. Gravel Percentage

This data (Figure 2.2.2) indicates the percentage of a seabed sediment sample that is larger than 2 mm diameter. The proportion of gravel in seabed sediment may reflect specific seabed energy levels and the input of calcium carbonate producing biota such as corals and bryozoans. Gravel may also form habitats for attaching or cryptic species (McArthur et al., 2009). Overall, the proportion of gravel is influenced by a number of factors, including wave/tide/current regime, available source material, depth, slope and proximity to the coast.

Dataset TITLE
Sedimentary Features (gravel percentage) of the Australian EEZ (National Geoscience Dataset)
Dataset ALTERNATE TITLE (i.e. Dataset Name)
gravel
Dataset AUTHORS
M. Tran, C. Baker, A. Potter and S. Burq
Dataset CUSTODIAN
Geoscience Australia
Dataset JURISDICTION
Australia
Description ABSTRACT
The map provides a visual representation of the gravel content of seabed sediments expressed as a weight percentage. The data are represented from 0 to 100%. The data on which this map is based were compiled from Geoscience Australia's marine sediment database (MARS - http://www.ga.gov.au/oracle/mars/).
Description Data Category
Oceans
Description ANZLIC Keyword
GEOSCIENCES
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
N_LAT: -8.88
S_LAT: -47.19
E_LONG: 163.19
W_LONG: 109.23
COORDINATE SYSTEM DESCRIPTION
Projection: GEOGRAPHIC
Datum: WGS84
Units: DD
Description NOMINAL SCALE
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE
2007-10-01
Dataset Currency ENDING DATE
2007-10-01
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required
Access STORED DATA FORMAT
DIGITAL - ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL - ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Use ACKNOWLEDGEMENTS (ie Data Source, Contributing Authors, etc)

Geoscience Australia's MARine Sediment (MARS) Database - http://www.ga.gov.au/oracle/mars/

Data Quality LINEAGE

Marine sediment sample information within the Australian Maritime Jurisdiction was sourced by Geoscience Australia from Australian and international research groups, Government bodies, private corporate entities, and published/unpublished reports. This information was then used to populate a National Marine Sediments Database (MARS - http://www.ga.gov.au/oracle/mars/). MARS is an Oracle database that has been developed by Geoscience Australia in line with ANZLIC data standards. The point data is from seabed samples where gravel content for the entire sample has been measured or determined through standard laboratory analysis methods, and was exported from MARS to ARC/GIS for the generation of maps. The point data was then interpolated using the "inverse distance squared weighted" algorithm to create the raster data presented here.

Data Quality POSITIONAL ACCURACY

Positional accuracy of individual points varies depending on the source data. Some data is from old records, external records and the methods used to ascertain position accuracy is unknown. Due to the scale of the map, and quality of the source, the accuracy is assumed to be within 5 km.

Data Quality ATTRIBUTE ACCURACY

No attribute for data quality exists at this stage. All the attribute data has been entered in by Geoscience Australia staff from a range of reports. The accuracy depends on human error or that of the report.

Data Quality LOGICAL CONSISTENCY

All vector data has been visually checked for extraneous points and value added data. In some circumstances individual datasets were identified as inconsistent within the grid and either left out of the final grid or were corrected. Regional data sets were then compiled as a single national coverage. Tests were also carried out on the data for completeness, correct spatial representation, attribute accuracy, and logical consistency and correctness.

Data Quality COMPLETENESS

All vector data and details are complete and verified.

Contact Information CONTACT ORGANISATION

Geoscience Australia

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MARS Database Administrator

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marine@ga.gov.au

Metadata Date METADATA DATE

2007-10-01

Additional Metadata REFERENCES

MARS (MARine Sediment) Database, Geoscience Australia, Geoscience Australia (vendor), update as required.

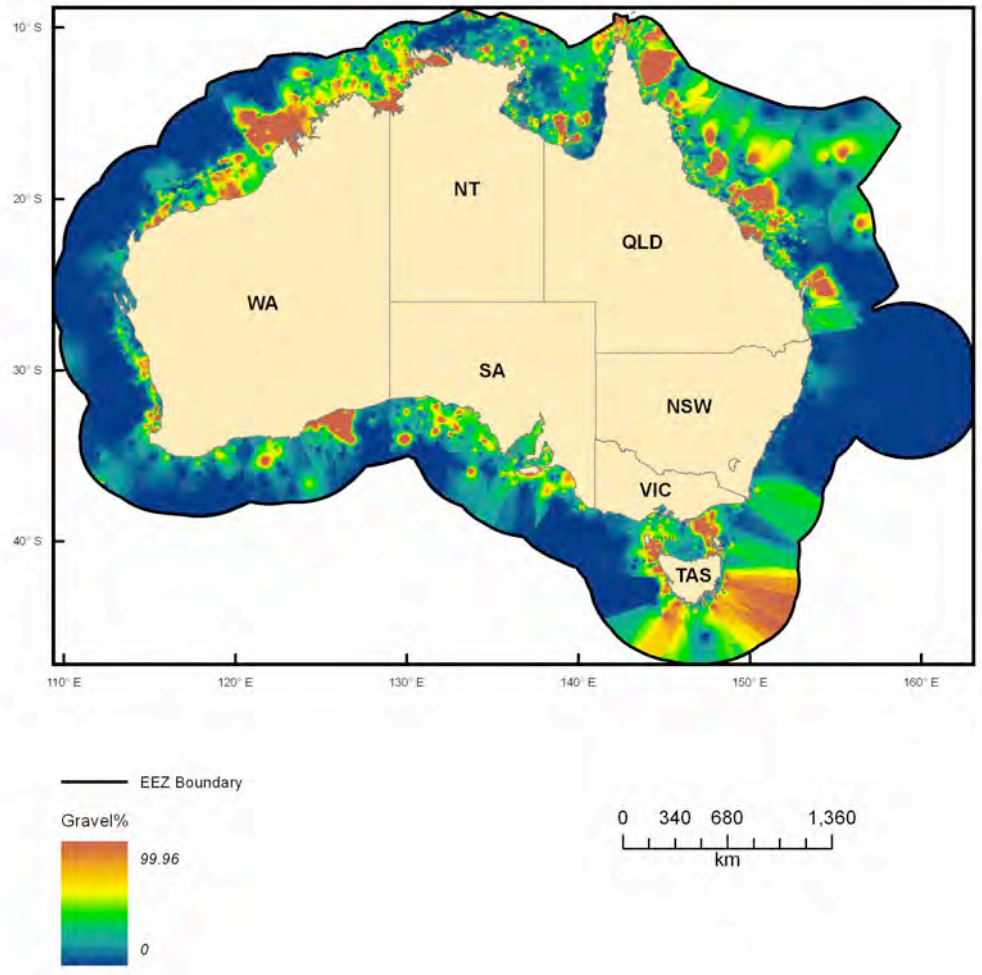

Figure 2.2.2. Gravel Percentage Map

2.2.3. Mud Percentage

This dataset (Figure 2.2.3) indicates the percentage of a seabed sediment sample that is smaller than 63 µm in diameter. Mud provides both habitat and food for a wide range of infauna (McArthur et al., 2009). The proportion of mud is related to a number of influences including wave/tide/current regime, available source material, depth, slope and proximity to the coast.

Dataset TITLE
Sedimentary Features (mud percentage) of the Australian EEZ (National Geoscience Dataset)
Dataset ALTERNATE TITLE (ie Dataset Name)
mud
Dataset AUTHORS
M. Tran, C. Baker, A. Potter and S. Burq
Dataset CUSTODIAN
Geoscience Australia
Dataset JURISDICTION
Australia
Description ABSTRACT
The map provides a visual representation of the mud content of seabed sediments expressed as a weight percentage. The data are represented from 0 to 100%. The data on which this map is based were compiled from Geoscience Australia's marine sediment database (MARS - http://www.ga.gov.au/oracle/mars/).
Description Data Category
Oceans
Description ANZLIC Keyword
GEOSCIENCES
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
N_LAT: -8.88
S_LAT: -47.19
E_LONG: 163.19
W_LONG: 109.23
COORDINATE SYSTEM DESCRIPTION
Projection: GEOGRAPHIC
Datum: WGS84
Units: DD
Description NOMINAL SCALE
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE
2007-10-01
Dataset Currency ENDING DATE
2007-10-01
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required
Access STORED DATA FORMAT
DIGITAL – ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL – ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Use ACKNOWLEDGEMENTS (ie Data Source, Contributing Authors, etc)
Geoscience Australia's MARine Sediment (MARS) Database - http://www.ga.gov.au/oracle/mars/
Data Quality LINEAGE

Marine sediment sample information within the Australian Maritime Jurisdiction was sourced by Geoscience Australia from Australian and International research groups, Government bodies, private corporate entities, and published/unpublished reports. This information was then used to populate a National Marine Sediments Database (MARS - http://www.ga.gov.au/oracle/mars/). MARS is an Oracle database that has been developed by Geoscience Australia in line with ANZLIC data standards. The point data is from seabed samples where mud content for the entire sample has been measured or determined through standard laboratory analysis methods, and was exported from MARS to ARC/GIS for the generation of maps. The point data was then interpolated using the "inverse distance squared weighted" algorithm to create the raster data presented here.

Data Quality POSITIONAL ACCURACY

Positional accuracy of individual points varies depending on the source data. Some data is from old records, external records and the methods used to ascertain position accuracy is unknown. Due to the scale of the map, and quality of the source, the accuracy is assumed to be within 5 km.

Data Quality ATTRIBUTE ACCURACY

No attribute for data quality exists at this stage. All the attribute data has been entered in by Geoscience Australia staff from a range of reports. The accuracy depends on human error or that of the report.

Data Quality LOGICAL CONSISTENCY

All vector data has been visually checked for extraneous points and value added data. In some circumstances individual datasets were identified as inconsistent within the grid and either left out of the final grid or were corrected. Regional data sets were then compiled as a single national coverage. Tests were also carried out on the data for completeness, correct spatial representation, attribute accuracy, and logical consistency and correctness.

Data Quality COMPLETENESS

All vector data and details are complete and verified.

Contact Information CONTACT ORGANISATION

Geoscience Australia

Contact Information CONTACT POSITION

MARS Database Administrator

Contact Information MAIL ADDRESS 1

GPO Box 378

Contact Information SUBURB OR PLACE OR LOCALITY

Canberra City

Contact Information STATE

ACT

Contact Information COUNTRY

Australia

Contact Information POSTCODE

2601

Contact Information TELEPHONE

+612 6249 9111

Contact Information FACSIMILE

+612 6249 9999

Contact Information ELECTRONIC MAIL ADDRESS

marine@ga.gov.au

Metadata Date METADATA DATE

2007-10-01

Additional Metadata REFERENCES

MARS (MARine Sediment) Database, Geoscience Australia, Geoscience Australia (vendor), update as required.

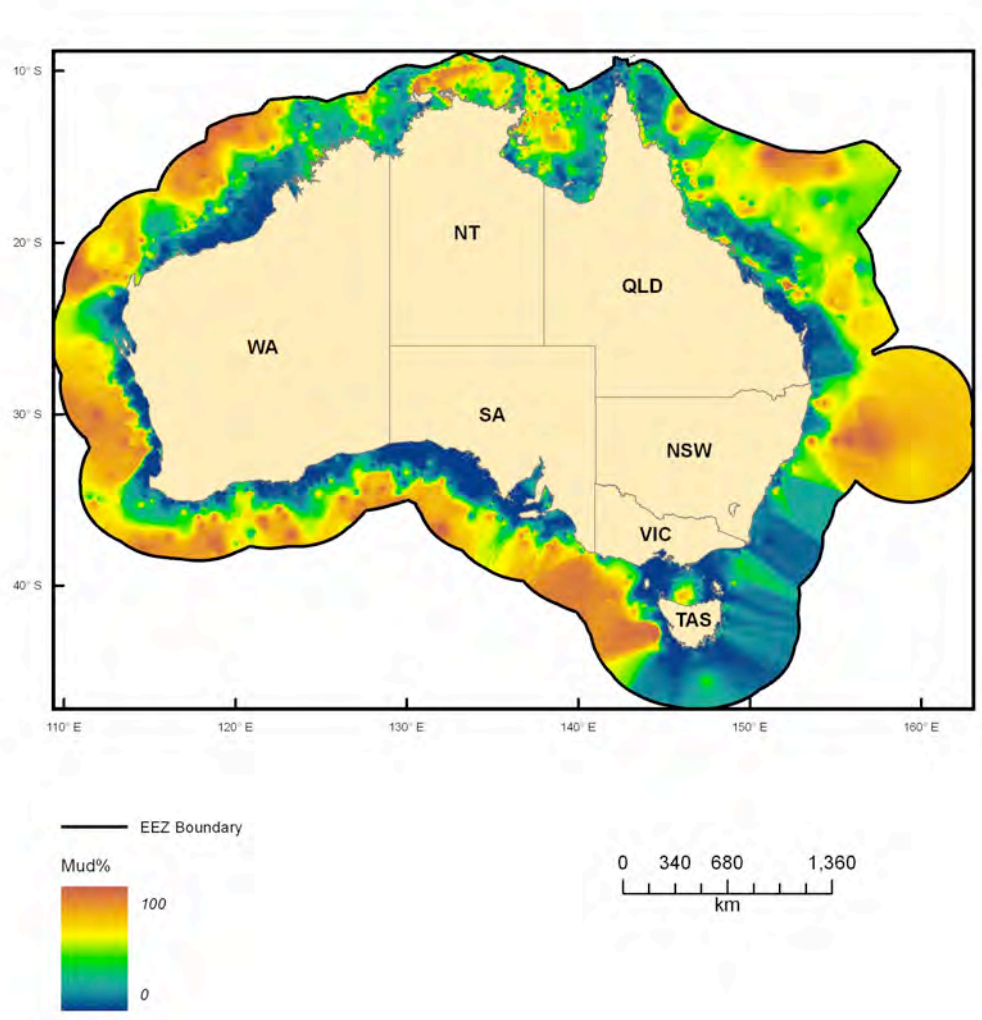

Figure 2.2.3. Mud Percentage Map

2.2.4. Sand Percentage

This dataset (Figure 2.2.4) indicates the percentage of a seabed sediment sample that is between 63 µm and 2 mm diameter. Sany seabeds are easily mobilised by currents and provide habitat for burrowing organisms (McArthur et al., 2009). The proportion of sand is influenced by a number of factors including wave/tide/current regime, available source material, depth, slope and proximity to the coast.

Dataset TITLE
Sedimentary Features (sand percentage) of the Australian EEZ (National Geoscience Dataset)
Dataset ALTERNATE TITLE (i.e. Dataset Name)
sand2
Dataset AUTHORS
M. Tran, C. Baker, A. Potter and S. Burq
Dataset CUSTODIAN
Geoscience Australia
Dataset JURISDICTION
Australia
Description ABSTRACT
The map provides a visual representation of the sand content of seabed sediments expressed as a weight percentage. The data are represented from 0 to 100%. The data on which this map is based were compiled from Geoscience Australia's MARine Sediment database (MARS - http://www.ga.gov.au/oracle/mars/).
Description Data Category
Oceans
Description ANZLIC Keyword
GEOSCIENCES
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
N_LAT: -8.88
S_LAT: -47.19
E_LONG: 163.19
W_LONG: 109.23
COORDINATE SYSTEM DESCRIPTION
Projection: GEOGRAPHIC
Datum: WGS84
Units: DD
Description NOMINAL SCALE
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE
2007-10-01
Dataset Currency ENDING DATE
2007-10-01
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required
Access STORED DATA FORMAT
DIGITAL - ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL - ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Use ACKNOWLEDGEMENTS (ie Data Source, Contributing Authors, etc)
Geoscience Australia's MARine Sediment (MARS) Database - http://www.ga.gov.au/oracle/mars/

Data Quality LINEAGE
Marine sediment sample information within the Australian Maritime Jurisdiction was sourced by Geoscience Australia from Australian and International research groups, Government bodies, private corporate entities, and published/unpublished reports. This information was then used to populate a National Marine Sediments Database (MARS - http://www.ga.gov.au/oracle/mars/). MARS is an Oracle database that has been developed by Geoscience Australia in line with ANZLIC data standards. The point data is from seabed samples where sand content for the entire sample has been measured or determined through standard laboratory analysis methods, and was exported from MARS to ARC/GIS for the generation of maps. The point data was then interpolated using the "inverse distance squared weighted" algorithm to create the raster data presented here.
Data Quality POSITIONAL ACCURACY
Positional accuracy of individual points varies depending on the source data. Some data is from old records, external records and the methods used to ascertain position accuracy is unknown. Due to the scale of the map, and quality of the source, the accuracy is assumed to be within 5 km.
Data Quality ATTRIBUTE ACCURACY
No attribute for data quality exists at this stage. All the attribute data has been entered in by Geoscience Australia staff from a range of reports. The accuracy depends on human error or that of the report.
Data Quality LOGICAL CONSISTENCY
All vector data has been visually checked for extraneous points and value added data. In some circumstances individual datasets were identified as inconsistent within the grid and either left out of the final grid or were corrected. Regional data sets were then compiled as a single national coverage. Tests were also carried out on the data for completeness, correct spatial representation, attribute accuracy, and logical consistency and correctness.
Data Quality COMPLETENESS
All vector data and details are complete and verified.
Contact Information CONTACT ORGANISATION
Geoscience Australia
Contact Information CONTACT POSITION
MARS Database Administrator
Contact Information MAIL ADDRESS 1
GPO Box 378
Contact Information SUBURB OR PLACE OR LOCALITY
Canberra City
Contact Information STATE
ACT
Contact Information COUNTRY
Australia
Contact Information POSTCODE
2601
Contact Information TELEPHONE
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Contact Information FACSIMILE
+612 6249 9999
Contact Information ELECTRONIC MAIL ADDRESS
marine@ga.gov.au
Metadata Date METADATA DATE
2007-10-01
Additional Metadata REFERENCES
MARS (MARine Sediment) Database, Geoscience Australia, Geoscience Australia (vendor), update as required.

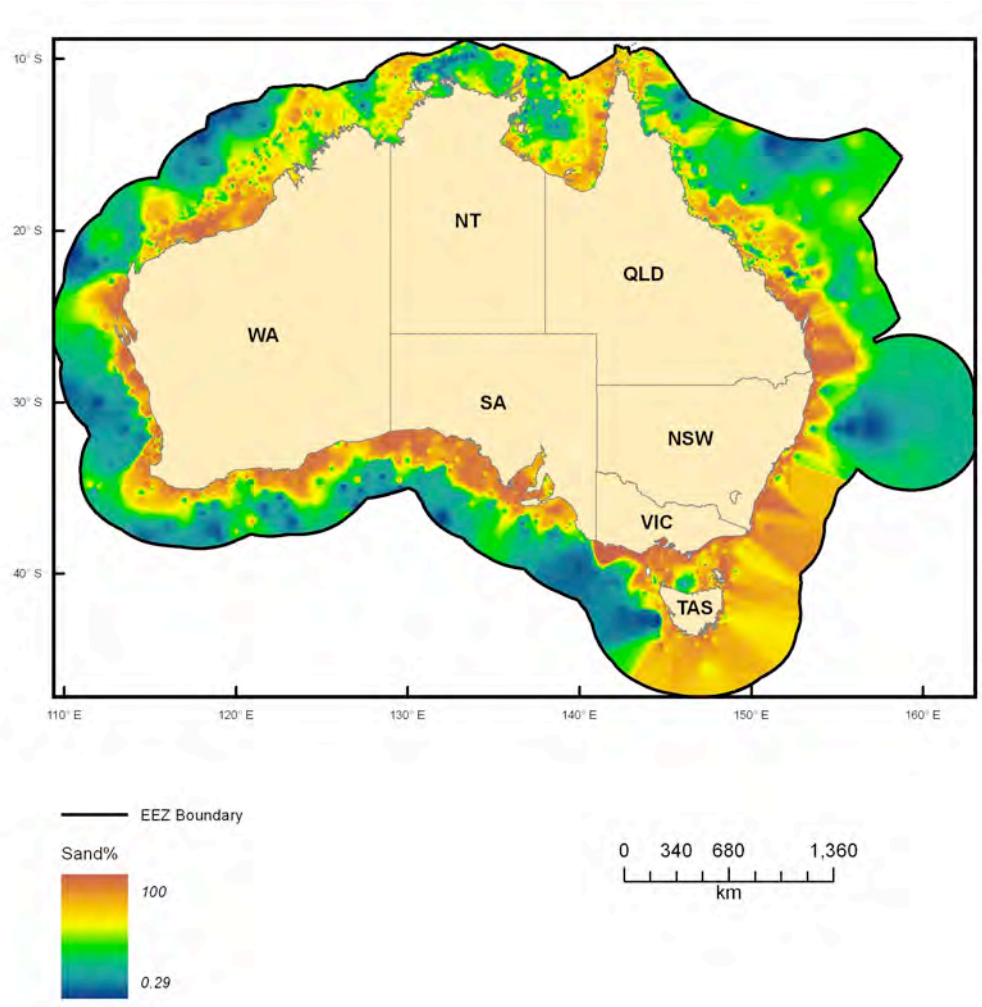

Figure 2.2.4. Sand Percentage Map

2.3. GEOLOGICAL AND OCEANOGRAPHIC MODEL OF AUSTRALIA'S CONTINENTAL SHELF (GEOMACS)

Geoscience Australia's GEOMACS model was utilised to produce hindcast hourly time series of bed shear stress on the Australian continental shelf on a 0.1 degree grid covering the period March 1997 to February 2008 (inclusive). The effective depth range of the model output is approximately 20 - 300 m (see 'Data Quality Attribute Accuracy' below). The hindcast data represent the combined contribution to the bed shear stress by waves, tides, wind and density-driven circulation. The stability of the seabed sediment surface, which is controlled by seabed shear stress, is likely to influence benthic community structure and species diversity (Hughes et al., *in press*).

2.3.1. GEOMACS Q25

Q25 is the first quartile of the time series distribution (i.e. 25% of the observations are below this value). The Q25 output of the GEOMACS model (Figure 2.3.1) is not guided by ecological theory or observations but is a generic statistical observation. In company with a number of other GEOMACS outputs the Q25 may be used to test associations between biodiversity and bed shear stress.

Dataset TITLE
GEOMACS (Geological and Oceanographic Model of Australia's Continental Shelf) Q25
Dataset Alternate Title (i.e. Dataset Name)
geomacs_qua25
Dataset AUTHORS
Hughes, M.G. Harris, P.T.
Dataset CUSTODIAN
Geoscience Australia
Dataset JURISDICTION
Australia
Description ABSTRACT
Geoscience Australia's GEOMACS model was utilised to produce hindcast hourly time series of continental shelf (~20 – 300 m depth) bed shear stress (unit of measure: Pascal, Pa) on a 0.1 degree grid covering the period March 1997 to February 2008 (inclusive). The hindcast data represents the combined contribution to the bed shear stress by waves, tides, wind and density-driven circulation.
Included in the parameters that represent the magnitude of the bulk of the data are the quartiles of the distribution; Q25, Q50 and Q75 (i.e. the values for which 25, 50 and 75 percent of the observations fall below). Q25, or the 0.25 Quartile of the Geomacs output, represents the values for which 25% of the observations fall below (Hughes & Harris 2008).
Description Data Category
Oceans
Description ANZLIC Keyword
GEOSCIENCES
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
N_LAT: -7
S_LAT: -44
E_LONG: 156
W_LONG: 110
COORDINATE SYSTEM DESCRIPTION
Projection: GEOGRAPHIC
Datum: WGS84
Units: DD
Description NOMINAL SCALE
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE

2008-07-24
Dataset Currency ENDING DATE
2008-07-24
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required
Access STORED DATA FORMAT
DIGITAL - ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL - ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Data Quality LINEAGE
The Geological and Oceanographic Model of Australia's Territory (GEOMAT- Harris et al., 2000) developed at Geoscience Australia provides maps indicative of seabed exposure on the Australian continental shelf in depths between approximately 20 m and 300 m. GEOMAT v.1 proposed a classification of the Australian underwater territory based on sediment mobility induced by distinct processes such as tidal currents and gravity waves (Porter-Smith et al., 2004). GEOMAT v.2 (GEOMACS) proposed an improved classification of the continental shelf area based on a seabed exposure index (Hemer, 2006). The seabed exposure index was derived from the statistical distribution of the sediment transport rate, which reflected the strength and frequency of the combined wave-current bed shear stress. The bed shear stress was derived from a bottom boundary layer model (SEDTRANS - Li and Amos, 2001), which integrated the combined action of tidal currents (Egbert et al., 1994), oceanic currents (OCCAM; Webb et al., 1998), and gravity waves (AUSWAM - Greenslade, 2001) over a given mean sediment fraction (MARS; Geoscience Australia, 2006).
Data Quality POSITIONAL ACCURACY
The dataset is estimated on a 0.1deg grid resolution.
Data Quality ATTRIBUTE ACCURACY
Output is from a mathematical model – there are no direct field observations. The GEOMACS model does not include the effects of wave breaking and refraction/diffraction or non-linear shallow-water effects on the tide, therefore the model is not considered useful in <10 m water depth, and in many regions in <30 m water depth; depending on the dominant wave period, tidal range and bathymetric complexity (Hughes & Harris 2008). Conversely, seabed disturbance produced by the wave, tide and current input variables appears not to extend beyond 300 m depth. The temporal domain includes 11 years and therefore contains limited information on events with long return intervals at specific locations, e.g. tropical cyclones (Hughes & Harris 2008).
Data Quality LOGICAL CONSISTENCY
All model outputs data have been visually checked for artefacts and spurious data. Tests conducted to ensure data are reliable and valid.
Data Quality COMPLETENESS
Completed
Contact Information CONTACT ORGANISATION
Geoscience Australia
Contact Information CONTACT POSITION
Director, Sales and Distribution, ISB
Contact Information MAIL ADDRESS 1
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Contact Information SUBURB OR PLACE OR LOCALITY
Canberra City
Contact Information STATE
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Contact Information COUNTRY
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Contact Information FACSIMILE
+612 6249 9999
Contact Information ELECTRONIC MAIL ADDRESS
marine@ga.gov.au
Metadata Date METADATA DATE
2010-01-01
Additional Metadata REFERENCES

Egbert, G.D., Bennett, A.F., and Foreman, M.G.G., 1994. TOPEX/POSEIDON tides estimated using a global inverse mode. *Journal of Geophysical Research* 99, 24821-24852.

Greenslade, D.J.M., 2001. The Assimilation of ERS-2 Significant Wave Height Data in the Australian region. *Journal of Marine Systems* 28, 141-160.

Harris, P. T., Smith, R., Anderson, O., Coleman, R., and Greenslade, D., 2000. *GEOMAT – modelling of continental shelf sediment mobility in support of Australia's regional marine planning process.* Australian Geological Survey Organisation Record 2000/41. Geoscience Australia, Canberra. 53pp.

Hemer, M.A., 2006. The magnitude and frequency of combined flow bed shear stress as a measure of exposure on the Australian continental shelf. *Continental Shelf Research* 26, 1258-1280.

Hughes, M., Harris, P. T., 2008. Progress Report on Disturbance Task C1, Surrogates Program, Marine Biodiversity Hub. Geoscience Australia, Canberra.

Hughes, M., Harris, P. T., and Brooke, B. P. (In press). Seabed exposure and ecological disturbance on Australia's continental shelf: Potential surrogates for marine biodiversity. Geoscience Australia Record 2010/XX. Geoscience Australia, Canberra.

Li, M.Z., and Amos, C.L., 2001. SEDTRANS96: the upgraded and better calibrated sediment transport model for continental shelves. *Computers and Geosciences* 27, 619-645.

Porter_Smith, R., Harris, P.T., Anderson, O., Coleman, R., Greenslade, D.J.M., and Jenkins, C.J., 2004. Classification of the Australian continental shelf based on predicted sediment threshold exceedance from tidal currents and swell waves. *Marine Geology* 211, 1-20.

Webb, D.J., Cuevas, B.A., and Coward, A.C., 1998. *The first main run of the OCCAM global ocean model.* Internal Report of James Rennell Division, Southampton Oceanography Centre, UK. 50pp. See also:http://www.noc.soton.ac.uk/JRD/OCCAM.

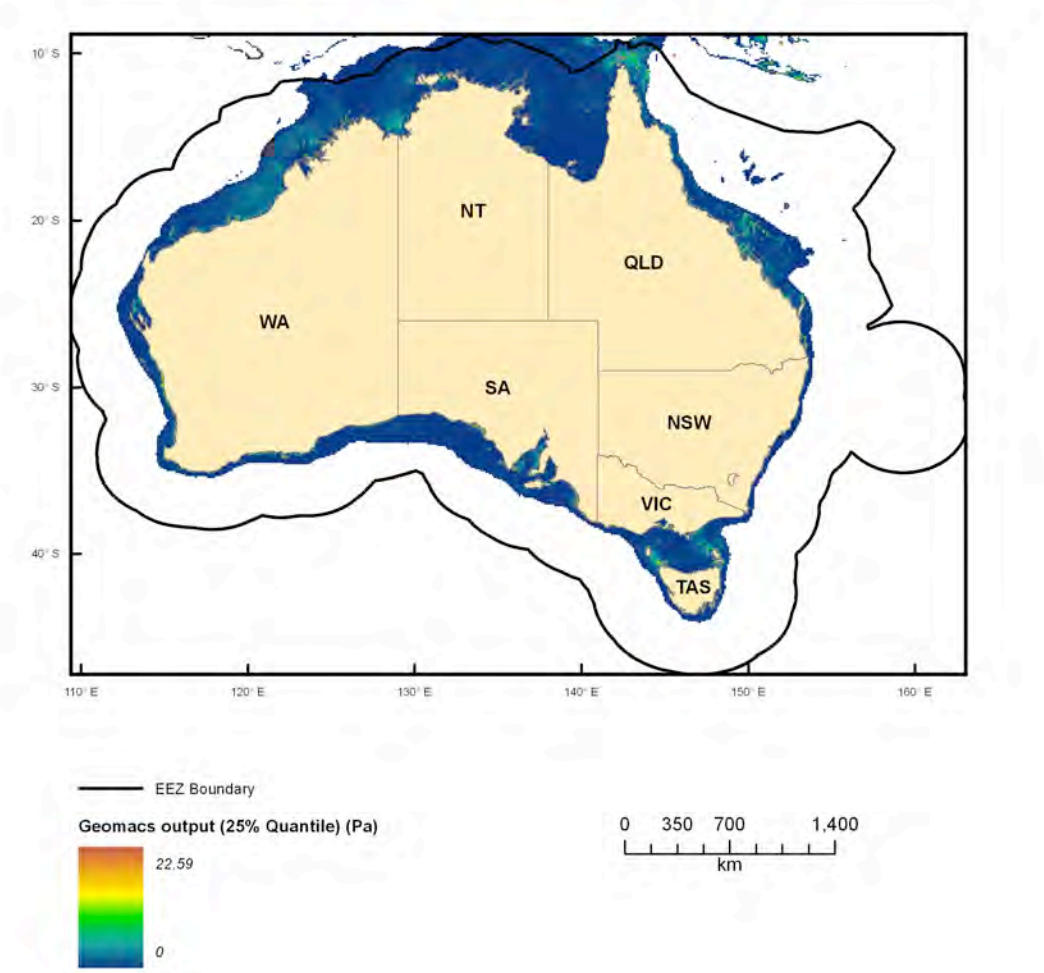

Figure 2.3.1. GEOMACS Q25 Map

2.3.2. GEOMACS Q50

Q50 is the second quartile of the time series distribution (i.e., 50% of the observations are below this value). The Q50 output of the GEOMACS model (Figure 2.3.2) is not guided by ecological theory or observations but is a generic statistical observation. In company with a number of other GEOMACS outputs the Q50 may be used to test associations between biodiversity and bed shear stress.

Dataset TITLE
GEOMACS (Geological and Oceanographic Model of Australia's Continental Shelf) Q50
Dataset Alternate Title (i.e. Dataset Name)
geomacs_qua50
Dataset AUTHORS
Hughes, M.G. Harris, P.T.
Dataset CUSTODIAN
Geoscience Australia
Dataset JURISDICTION
Australia
Description ABSTRACT
Geoscience Australia's GEOMACS model was utilised to produce hindcast hourly time series of continental shelf (~20 - 300 m depth) bed shear stress (unit of measure: Pascal, Pa) on a 0.1 degree grid covering the period March 1997 to February 2008 (inclusive). The hindcast data represents the combined contribution to the bed shear stress by waves, tides, wind and density-driven circulation.
Included in the parameters that represent the magnitude of the bulk of the data are the quartiles of the distribution; Q25, Q50 and Q75 (i.e. the values for which 25, 50 and 75 percent of the observations fall below). Q50, or the 0.50 Quartile of the Geomacs output, represents the values for which 50% of the observations fall below (Hughes & Harris 2008).
Description Data Category
Oceans
Description ANZLIC Keyword
GEOSCIENCES
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
N_LAT: -7
S_LAT: -44
E_LONG: 156
W_LONG: 110
COORDINATE SYSTEM DESCRIPTION
Projection: GEOGRAPHIC
Datum: WGS84
Units: DD
Description NOMINAL SCALE
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE
2008-07-24
Dataset Currency ENDING DATE
2008-07-24
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required
Access STORED DATA FORMAT
DIGITAL - ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL - ArcINFO Grid

Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Data Quality LINEAGE
The Geological and Oceanographic Model of Australia's Territory (GEOMAT- Harris et al., 2000) developed at Geoscience Australia provides maps indicative of the Australian seabed exposure. GEOMAT v.1 proposed a classification of the Australian under water territory based on sediment mobility induced by distinct processes such as tidal currents and gravity waves (Porter-Smith et al., 2004). GEOMAT v.2 (GEOMACS) proposed an improved classification of the continental shelf area based on a seabed exposure index (Hemer, 2006). The seabed exposure index was derived from the statistical distribution of the sediment transport rate, which reflected the strength and frequency of the combined wave-current bed shear stress. The bed shear stress was derived from a bottom boundary layer model (SEDTRANS - Li and Amos, 2001), which integrated the combined action of tidal currents (Egbert et al., 1994), oceanic currents (OCCAM; Webb et al., 1998), and gravity waves (AUSWAM - Greenslade, 2001) over a given mean sediment fraction (MARS; Geoscience Australia, 2006).
Data Quality POSITIONAL ACCURACY
The dataset is estimated on a 0.1deg grid resolution.
Data Quality ATTRIBUTE ACCURACY
Output from mathematical model. No direct field observations. The GEOMACS model does not include the effects of wave breaking and refraction/diffraction or non-linear shallow-water effects on the tide, therefore the model is not considered useful in <10 m water depth, and in many regions in <30 m water depth; depending on the dominant wave period, tidal range and bathymetric complexity (Hughes & Harris 2008). Conversely, seabed disturbance produced by the wave, tide and current input variables appears not to extend beyond 300 m depth. The temporal domain includes 11 years and therefore contains limited information on events with long return intervals at specific locations, e.g. tropical cyclones (Hughes & Harris 2008).
Data Quality LOGICAL CONSISTENCY
All model outputs data have been visually checked for artefacts and spurious data. Tests conducted to ensure data are reliable and valid.
Data Quality COMPLETENESS
Completed
Contact Information CONTACT ORGANISATION
Geoscience Australia
Contact Information CONTACT POSITION
Director, Sales and Distribution, ISB
Contact Information MAIL ADDRESS 1
GPO Box 378
Contact Information SUBURB OR PLACE OR LOCALITY
Canberra City
Contact Information STATE
ACT
Contact Information COUNTRY
Australia
Contact Information POSTCODE
2601
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+612 6249 9111
Contact Information FACSIMILE
+612 6249 9999
Contact Information ELECTRONIC MAIL ADDRESS
marine@ga.gov.au
Metadata Date METADATA DATE
2010-01-01
Additional Metadata REFERENCES
Egbert, G.D., Bennett, A.F., and Foreman, M.G.G., 1994. TOPEX/POSEIDON tides estimated using a global inverse mode. *Journal of Geophysical Research* 99, 24821-24852.

Greenslade, D.J.M., 2001. The Assimilation of ERS-2 Significant Wave Height Data in the Australian region. *Journal of Marine Systems* 28, 141-160.

Harris, P. T., Smith, R., Anderson, O., Coleman, R., and Greenslade, D., 2000. *GEOMAT – modelling of continental shelf sediment mobility in support of Australia's regional marine planning process.* Australian Geological Survey Organisation Record 2000/41. Geoscience Australia, Canberra. 53pp.

Hemer, M.A., 2006. The magnitude and frequency of combined flow bed shear stress as a measure of exposure on the Australian continental shelf. *Continental Shelf Research* 26, 1258-1280.

Hughes, M., Harris, P. T., 2008. Progress Report on Disturbance Task C1, Surrogates Program, Marine Biodiversity Hub. Geoscience Australia, Canberra.

Li, M.Z., and Amos, C.L., 2001. SEDTRANS96: the upgraded and better calibrated sediment transport model for continental shelves. *Computers and Geosciences* 27, 619-645.

Porter_Smith, R., Harris, P.T., Anderson, O., Coleman, R., Greenslade, D.J.M., and Jenkins, C.J., 2004. Classification of the Australian continental shelf based on predicted sediment threshold exceedance from tidal currents and swell waves. *Marine Geology* 211, 1-20.

Webb, D.J., Cuevas, B.A., and Coward, A.C., 1998. *The first main run of the OCCAM global ocean model.* Internal Report of James Rennell Division, Southampton Oceanography Centre, UK. 50pp. See also:http://www.noc.soton.ac.uk/JRD/OCCAM.

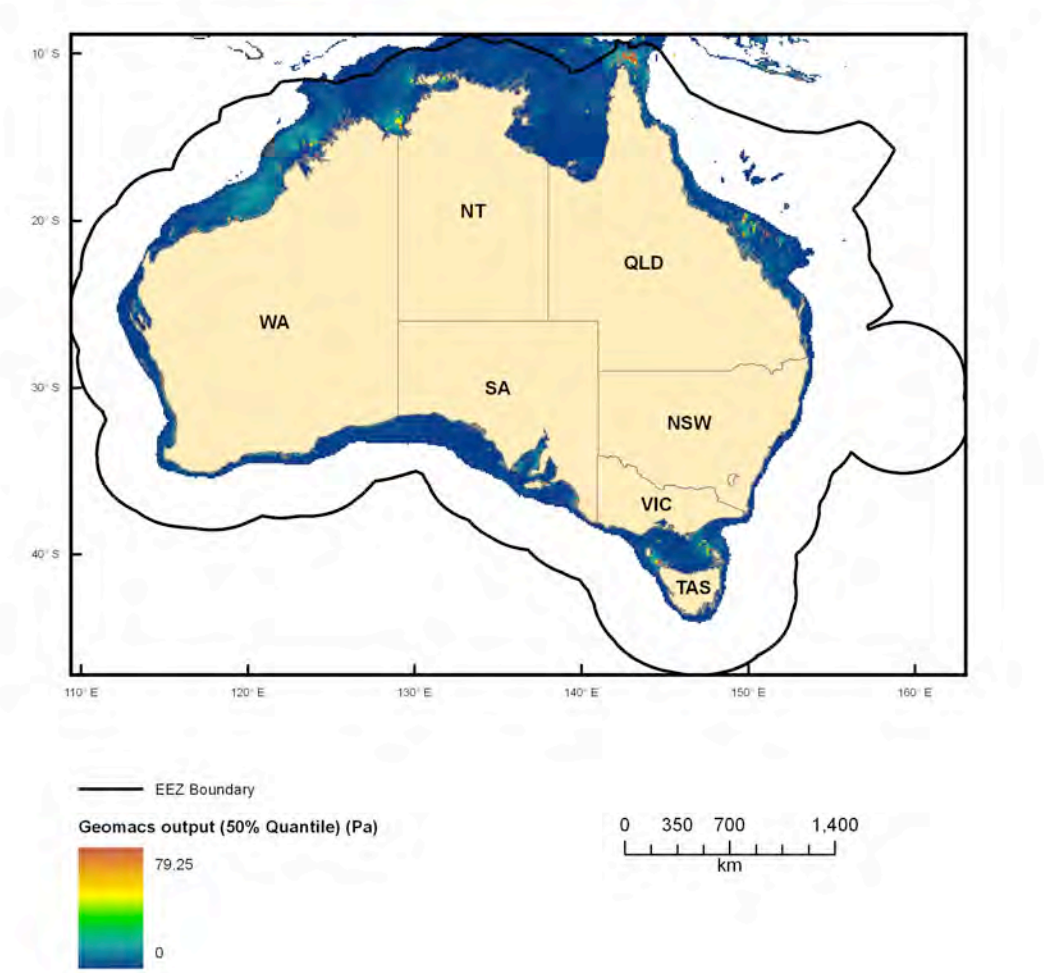

Figure 2.3.2. GEOMACS Q50 Map

2.3.3. GEOMACS Q75

Q75 is the third quartile of the time series distribution (i.e. 75% of the observations are below this value). The Q75 output (Figure 2.3.3) is not guided by ecological theory or observations but is a generic statistical observation. In company with a number of other GEOMACS outputs the Q75 may be used to test associations between biodiversity and bed shear stress.

Dataset TITLE
GEOMACS (Geological and Oceanographic Model of Australia's Continental Shelf) Q75
Dataset Alternate Title (i.e. Dataset Name)
geomacs_qua75
Dataset AUTHORS
Hughes, M.G. Harris, P.T.
Dataset CUSTODIAN
Geoscience Australia
Dataset JURISDICTION
Australia
Description ABSTRACT
Geoscience Australia's GEOMACS model was utilised to produce hindcast hourly time series of continental shelf (~20 - 300 m depth) bed shear stress (unit of measure: Pascal, Pa) on a 0.1 degree grid covering the period March 1997 to February 2008 (inclusive). The hindcast data represents the combined contribution to the bed shear stress by waves, tides, wind and density-driven circulation.
Included in the parameters that were calculated to represent the magnitude of the bulk of the data are the quartiles of the distribution; Q25, Q50 and Q75 (i.e. the values for which 25, 50 and 75 percent of the observations fall below). Q75, or the 0.75 Quartile of the Geomacs output, represents the values for which 75% of the observations fall below (Hughes & Harris 2008).
Description Data Category
Oceans
Description ANZLIC Keyword
GEOSCIENCES
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
N_LAT: -7
S_LAT: -44
E_LONG: 156
W_LONG: 110
COORDINATE SYSTEM DESCRIPTION
Projection: GEOGRAPHIC
Datum: WGS84
Units: DD
Description NOMINAL SCALE
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE
2008-07-24
Dataset Currency ENDING DATE
2008-07-24
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required
Access STORED DATA FORMAT
DIGITAL - ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL - ArcINFO Grid

Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Data Quality LINEAGE
The Geological and Oceanographic Model of Australia's Territory (GEOMAT- Harris et al., 2000) developed at Geoscience Australia provides maps indicative of the Australian seabed exposure. GEOMAT v.1 proposed a classification of the Australian under water territory based on sediment mobility induced by distinct processes such as tidal currents and gravity waves (Porter-Smith et al., 2004). GEOMAT v.2 (GEOMACS) proposed an improved classification of the continental shelf area based on a seabed exposure index (Hemer, 2006). The seabed exposure index was derived from the statistical distribution of the sediment transport rate, which reflected the strength and frequency of the combined wave-current bed shear stress. The bed shear stress was derived from a bottom boundary layer model (SEDTRANS - Li and Amos, 2001), which integrated the combined action of tidal currents (Egbert et al., 1994), oceanic currents (OCCAM; Webb et al., 1998), and gravity waves (AUSWAM - Greenslade, 2001) over a given mean sediment fraction (MARS; Geoscience Australia, 2006).
Data Quality POSITIONAL ACCURACY
The dataset is estimated on a 0.1deg grid resolution.
Data Quality ATTRIBUTE ACCURACY
Output from mathematical model. No direct field observations. The GEOMACS model does not include the effects of wave breaking and refraction/diffraction or non-linear shallow-water effects on the tide, therefore the model is not considered useful in <10 m water depth, and in many regions in <30 m water depth; depending on the dominant wave period, tidal range and bathymetric complexity (Hughes & Harris 2008). Conversely, seabed disturbance produced by the wave, tide and current input variables appears not to extend beyond 300 m depth. The temporal domain includes 11 years and therefore contains limited information on events with long return intervals at specific locations, e.g. tropical cyclones (Hughes & Harris 2008).
Data Quality LOGICAL CONSISTENCY
All model outputs data have been visually checked for artefacts and spurious data. Tests conducted to ensure data are reliable and valid.
Data Quality COMPLETENESS
Completed
Contact Information CONTACT ORGANISATION
Geoscience Australia
Contact Information CONTACT POSITION
Director, Sales and Distribution, ISB
Contact Information MAIL ADDRESS 1
GPO Box 378
Contact Information SUBURB OR PLACE OR LOCALITY
Canberra City
Contact Information STATE
ACT
Contact Information COUNTRY
Australia
Contact Information POSTCODE
2601
Contact Information TELEPHONE
+612 6249 9111
Contact Information FACSIMILE
+612 6249 9999
Contact Information ELECTRONIC MAIL ADDRESS
marine@ga.gov.au
Metadata Date METADATA DATE
2010-01-01
Additional Metadata REFERENCES
Egbert, G.D., Bennett, A.F., and Foreman, M.G.G., 1994. TOPEX/POSEIDON tides estimated using a global inverse mode. *Journal of Geophysical Research* 99, 24821-24852.

Greenslade, D.J.M., 2001. The Assimilation of ERS-2 Significant Wave Height Data in the Australian region. *Journal of Marine Systems* 28, 141-160.

Harris, P. T., Smith, R., Anderson, O., Coleman, R., and Greenslade, D., 2000. *GEOMAT – modelling of continental shelf sediment mobility in support of Australia's regional marine planning process.* Australian Geological Survey Organisation Record 2000/41. Geoscience Australia, Canberra. 53pp.

Hemer, M.A., 2006. The magnitude and frequency of combined flow bed shear stress as a measure of exposure on the Australian continental shelf. *Continental Shelf Research* 26, 1258-1280.

Hughes, M., Harris, P. T., 2008. Progress Report on Disturbance Task C1, Surrogates Program, Marine Biodiversity Hub. Geoscience Australia, Canberra.

Li, M.Z., and Amos, C.L., 2001. SEDTRANS96: the upgraded and better calibrated sediment transport model for continental shelves. *Computers and Geosciences* 27, 619-645.

Porter_Smith, R., Harris, P.T., Anderson, O., Coleman, R., Greenslade, D.J.M., and Jenkins, C.J., 2004. Classification of the Australian continental shelf based on predicted sediment threshold exceedance from tidal currents and swell waves. *Marine Geology* 211, 1-20.

Webb, D.J., Cuevas, B.A., and Coward, A.C., 1998. *The first main run of the OCCAM global ocean model.* Internal Report of James Rennell Division, Southampton Oceanography Centre, UK. 50pp. See also:http://www.noc.soton.ac.uk/JRD/OCCAM.

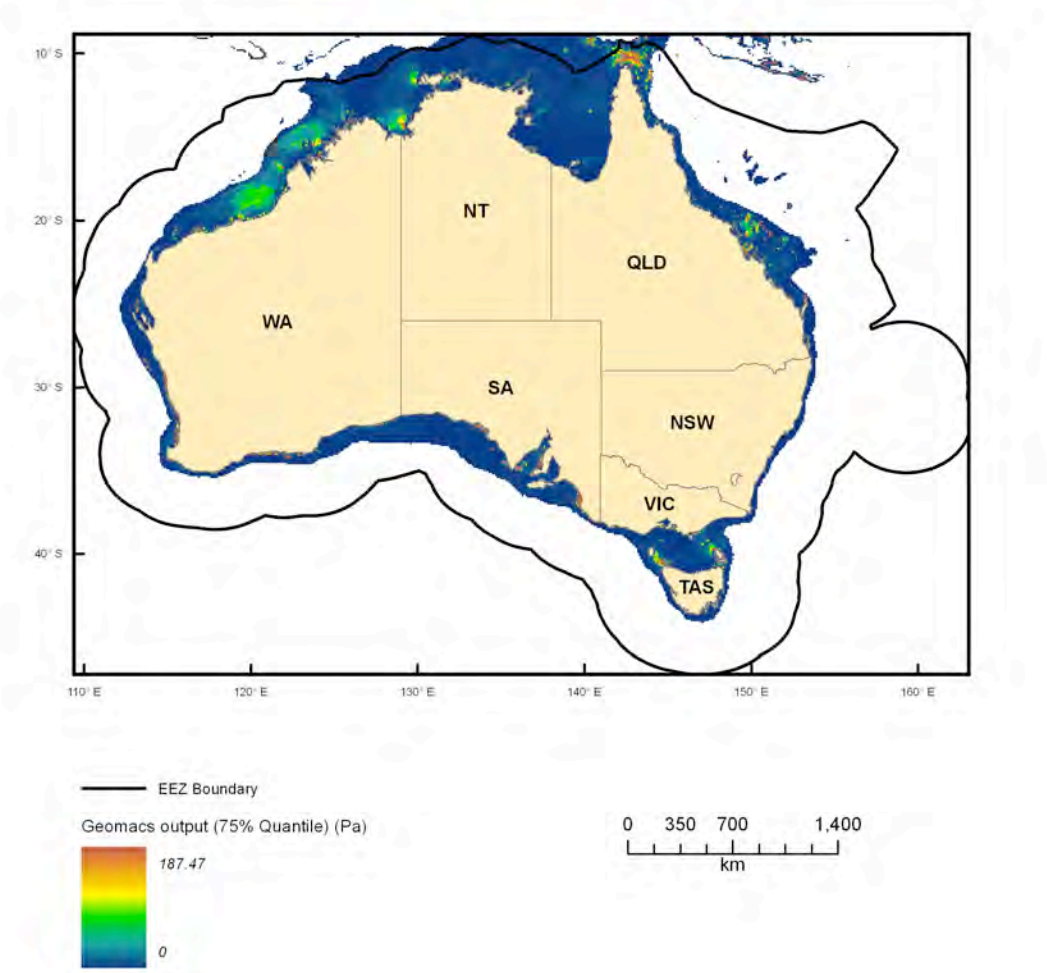

Figure 2.3.3. GEOMACS Q75 Map

2.3.4. Interquartile Range of the GEOMACS Output

Included in the parameters calculated for the GEOMACS output are the quartiles of the time series distribution, Q25, Q50, and Q75. The interquartile range (Figure 2.3.4) is calculated as the difference between the Q25 and Q75 quartiles. The interquartile range is not guided by ecological theory or observations but is a generic statistical observation. In company with a number of other GEOMACS outputs the interquartile range may be used to test associations between biodiversity and bed shear stress.

Dataset TITLE
GEOMACS (Geological and Oceanographic Model of Australia's Continental Shelf) Interquartile range
Dataset Alternate Title (i.e. Dataset Name)
geomacs_range
Dataset AUTHORS
Hughes, M.G. Harris, P.T.
Dataset CUSTODIAN
Geoscience Australia
Dataset JURISDICTION
Australia
Description ABSTRACT
Geoscience Australia's GEOMACS model was utilised to produce hindcast hourly time series of continental shelf (~20 - 300 m depth) bed shear stress (unit of measure: Pascal, Pa) on a 0.1 degree grid covering the period March 1997 to February 2008 (inclusive). The hindcast data represents the combined contribution to the bed shear stress by waves, tides, wind and density-driven circulation.
Included in the parameters that will be calculated to represent the magnitude of the bulk of the data are the quartiles of the distribution; Q25, Q50 and Q75 (i.e. the values for which 25, 50 and 75 percent of the observations fall below). The interquartile range, R_{iq} , of the GEOMACS output takes the observations from between Q25 and Q75 to provide an accurate representation of the spread of observations. The interquartile range was shown to provide a more robust representation of the observations than the standard deviation, which produced highly skewed observations (Hughes & Harris 2008).
Description Data Category
Oceans
Description ANZLIC Keyword
GEOSCIENCES
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
N_LAT: -7
S_LAT: -44
E_LONG: 156
W_LONG: 110
COORDINATE SYSTEM DESCRIPTION
Projection: GEOGRAPHIC
Datum: WGS84
Units: DD
Description NOMINAL SCALE
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE
2008-07-24
Dataset Currency ENDING DATE
2008-07-24
Dataset Status PROGRESS
Completed

Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required
Access STORED DATA FORMAT
DIGITAL - ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL - ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Data Quality LINEAGE
The Geological and Oceanographic Model of Australia's Territory (GEOMAT- Harris et al., 2000) developed at Geoscience Australia provides maps indicative of the Australian seabed exposure. GEOMAT v.1 proposed a classification of the Australian under water territory based on sediment mobility induced by distinct processes such as tidal currents and gravity waves (Porter-Smith et al., 2004). GEOMAT v.2 (GEOMACS) proposed an improved classification of the continental shelf area based on a seabed exposure index (Hemer, 2006). The seabed exposure index was derived from the statistical distribution of the sediment transport rate, which reflected the strength and frequency of the combined wave-current bed shear stress. The bed shear stress was derived from a bottom boundary layer model (SEDTRANS - Li and Amos, 2001), which integrated the combined action of tidal currents (Egbert et al., 1994), oceanic currents (OCCAM; Webb et al., 1998), and gravity waves (AUSWAM - Greenslade, 2001) over a given mean sediment fraction (MARS; Geoscience Australia, 2006).
Data Quality POSITIONAL ACCURACY
The dataset is estimated on a 0.1deg grid resolution.
Data Quality ATTRIBUTE ACCURACY
Output from mathematical model. No direct field observations. The GEOMACS model does not include the effects of wave breaking and refraction/diffraction or non-linear shallow-water effects on the tide, therefore the model is not considered useful in <10 m water depth, and in many regions in <30 m water depth; depending on the dominant wave period, tidal range and bathymetric complexity (Hughes & Harris 2008). Conversely, seabed disturbance produced by the wave, tide and current input variables appears not to extend beyond 300 m depth. The temporal domain includes 11 years and therefore contains limited information on events with long return intervals at specific locations, e.g. tropical cyclones (Hughes & Harris 2008).
Data Quality LOGICAL CONSISTENCY
All model outputs data have been visually checked for artefacts and spurious data. Tests conducted to ensure data are reliable and valid.
Data Quality COMPLETENESS
Completed
Contact Information CONTACT ORGANISATION
Geoscience Australia
Contact Information CONTACT POSITION
Director, Sales and Distribution, ISB
Contact Information MAIL ADDRESS 1
GPO Box 378
Contact Information SUBURB OR PLACE OR LOCALITY
Canberra City
Contact Information STATE
ACT
Contact Information COUNTRY
Australia
Contact Information POSTCODE
2601
Contact Information TELEPHONE
+612 6249 9111
Contact Information FACSIMILE
+612 6249 9999
Contact Information ELECTRONIC MAIL ADDRESS

marine@ga.gov.au

Metadata Date METADATA DATE
2010-01-01
Additional Metadata REFERENCES

Egbert, G.D., Bennett, A.F., and Foreman, M.G.G., 1994. TOPEX/POSEIDON tides estimated using a global inverse mode. *Journal of Geophysical Research* 99, 24821-24852.

Greenslade, D.J.M., 2001. The Assimilation of ERS-2 Significant Wave Height Data in the Australian region. *Journal of Marine Systems* 28, 141-160.

Harris, P. T., Smith, R., Anderson, O., Coleman, R., and Greenslade, D., 2000. *GEOMAT – modelling of continental shelf sediment mobility in support of Australia's regional marine planning process.* Australian Geological Survey Organisation Record 2000/41. Geoscience Australia, Canberra. 53pp.

Hemer, M.A., 2006. The magnitude and frequency of combined flow bed shear stress as a measure of exposure on the Australian continental shelf. *Continental Shelf Research* 26, 1258-1280.

Hughes, M., Harris, P. T., 2008. Progress Report on Disturbance Task C1, Surrogates Program, Marine Biodiversity Hub. Geoscience Australia, Canberra.

Li, M.Z., and Amos, C.L., 2001. SEDTRANS96: the upgraded and better calibrated sediment transport model for continental shelves. *Computers and Geosciences* 27, 619-645.

Porter_Smith, R., Harris, P.T., Anderson, O., Coleman, R., Greenslade, D.J.M., and Jenkins, C.J., 2004. Classification of the Australian continental shelf based on predicted sediment threshold exceedance from tidal currents and swell waves. *Marine Geology* 211, 1-20.

Webb, D.J., Cuevas, B.A., and Coward, A.C., 1998. *The first main run of the OCCAM global ocean model.* Internal Report of James Rennell Division, Southampton Oceanography Centre, UK. 50pp. See also:http://www.noc.soton.ac.uk/JRD/OCCAM.

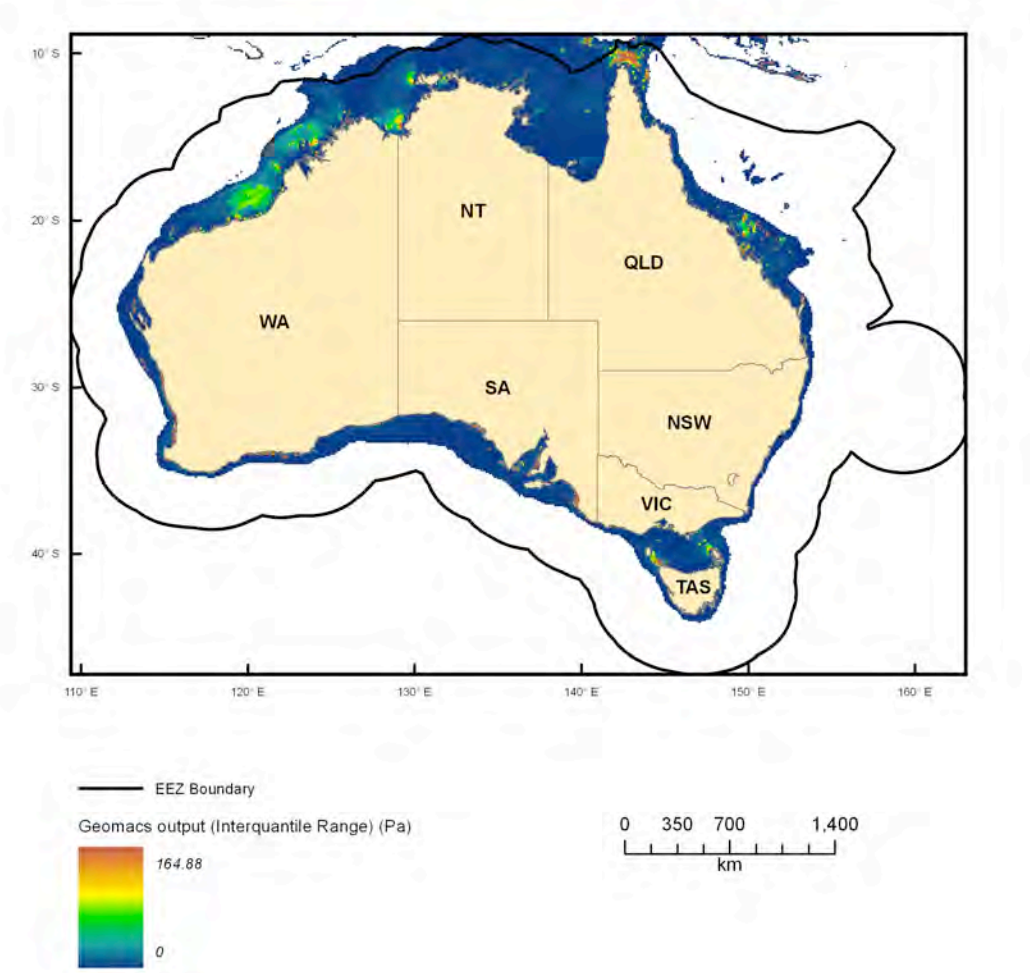

Figure 2.3.4. Interquartile range of the GEOMACS output Map

2.3.5. GEOMACS Trimmed Mean

The trimmed mean is the standard arithmetic mean calculated excluding the highest and lowest 25 percent of the GEOMACS model observations. The trimmed mean output (Figure 2.3.5) is not guided by ecological theory or observations but is a generic statistical observation. In company with a number of other GEOMACS outputs the trimmed mean may be used to test associations between biodiversity and bed shear stress.

Dataset TITLE
GEOMACS (Geological and Oceanographic Model of Australia's Continental Shelf) Trimmed mean
Dataset ALTERNATE TITLE (i.e. Dataset Name)
geomacs_tmean
Dataset AUTHORS
Hughes, M.G. Harris, P.T.
Dataset CUSTODIAN
Geoscience Australia
Dataset JURISDICTION
Australia
Description ABSTRACT
Geoscience Australia's GEOMACS model was utilised to produce hindcast hourly time series of continental shelf (~20 - 300 m depth) bed shear stress (unit of measure: Pascal, Pa) on a 0.1 degree grid covering the period March 1997 to February 2008 (inclusive). The hindcast data represents the combined contribution to the bed shear stress by waves, tides, wind and density-driven circulation.
The trimmed mean is simply the arithmetic mean calculated excluding a percentage of the highest and lowest values in the distribution. On this occasion the highest and lowest 25% of model observations were excluded for the calculation. The geometric mean was used alongside the trimmed mean to provide a more robust representation of the bulk of the values than the arithmetic mean would have provided (Hughes & Harris 2008).
Description Data Category
Oceans
Description ANZLIC Keyword
GEOSCIENCES
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
N_LAT: -7
S_LAT: -44
E_LONG: 156
W_LONG: 110
COORDINATE SYSTEM DESCRIPTION
Projection: GEOGRAPHIC
Datum: WGS84
Units: DD
Description NOMINAL SCALE
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE
2008-07-24
Dataset Currency ENDING DATE
2008-07-24
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required

Access STORED DATA FORMAT

DIGITAL - ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL - ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Data Quality LINEAGE
The Geological and Oceanographic Model of Australia's Territory (GEOMAT- Harris et al., 2000) developed at Geoscience Australia provides maps indicative of the Australian seabed exposure. GEOMAT v.1 proposed a classification of the Australian under water territory based on sediment mobility induced by distinct processes such as tidal currents and gravity waves (Porter-Smith et al., 2004). GEOMAT v.2 (GEOMACS) proposed an improved classification of the continental shelf area based on a seabed exposure index (Hemer, 2006). The seabed exposure index was derived from the statistical distribution of the sediment transport rate, which reflected the strength and frequency of the combined wave-current bed shear stress. The bed shear stress was derived from a bottom boundary layer model (SEDTRANS - Li and Amos, 2001), which integrated the combined action of tidal currents (Egbert et al., 1994), oceanic currents (OCCAM; Webb et al., 1998), and gravity waves (AUSWAM - Greenslade, 2001) over a given mean sediment fraction (MARS; Geoscience Australia, 2006).
Data Quality POSITIONAL ACCURACY
The dataset is estimated on a 0.1deg grid resolution.
Data Quality ATTRIBUTE ACCURACY
Output from mathematical model. No direct field observations. The GEOMACS model does not include the effects of wave breaking and refraction/diffraction or non-linear shallow-water effects on the tide, therefore the model is not considered useful in <10 m water depth, and in many regions in <30 m water depth; depending on the dominant wave period, tidal range and bathymetric complexity (Hughes & Harris 2008). Conversely, seabed disturbance produced by the wave, tide and current input variables appears not to extend beyond 300 m depth. The temporal domain includes 11 years and therefore contains limited information on events with long return intervals at specific locations, e.g. tropical cyclones (Hughes & Harris 2008).
Data Quality LOGICAL CONSISTENCY
All model outputs data have been visually checked for artefacts and spurious data. Tests conducted to ensure data are reliable and valid.
Data Quality COMPLETENESS
Completed
Contact Information CONTACT ORGANISATION
Geoscience Australia
Contact Information CONTACT POSITION
Director, Sales and Distribution, ISB
Contact Information MAIL ADDRESS 1
GPO Box 378
Contact Information SUBURB OR PLACE OR LOCALITY
Canberra City
Contact Information STATE
ACT
Contact Information COUNTRY
Australia
Contact Information POSTCODE
2601
Contact Information TELEPHONE
+612 6249 9111
Contact Information FACSIMILE
+612 6249 9999
Contact Information ELECTRONIC MAIL ADDRESS
marine@ga.gov.au
Metadata Date METADATA DATE
2010-01-01
Additional Metadata REFERENCES

Egbert, G.D., Bennett, A.F., and Foreman, M.G.G., 1994. TOPEX/POSEIDON tides estimated using a global inverse mode. *Journal of Geophysical Research* 99, 24821-24852.

Greenslade, D.J.M., 2001. The Assimilation of ERS-2 Significant Wave Height Data in the Australian region. *Journal of Marine Systems* 28, 141-160.

Harris, P. T., Smith, R., Anderson, O., Coleman, R., and Greenslade, D., 2000. *GEOMAT – modelling of continental shelf sediment mobility in support of Australia's regional marine planning process.* Australian Geological Survey Organisation Record 2000/41. Geoscience Australia, Canberra. 53pp.

Hemer, M.A., 2006. The magnitude and frequency of combined flow bed shear stress as a measure of exposure on the Australian continental shelf. *Continental Shelf Research* 26, 1258-1280.

Hughes, M., Harris, P. T., 2008. Progress Report on Disturbance Task C1, Surrogates Program, Marine Biodiversity Hub. Geoscience Australia, Canberra.

Li, M.Z., and Amos, C.L., 2001. SEDTRANS96: the upgraded and better calibrated sediment transport model for continental shelves. *Computers and Geosciences* 27, 619-645.

Porter_Smith, R., Harris, P.T., Anderson, O., Coleman, R., Greenslade, D.J.M., and Jenkins, C.J., 2004. Classification of the Australian continental shelf based on predicted sediment threshold exceedance from tidal currents and swell waves. *Marine Geology* 211, 1-20.

Webb, D.J., Cuevas, B.A., and Coward, A.C., 1998. *The first main run of the OCCAM global ocean model.* Internal Report of James Rennell Division, Southampton Oceanography Centre, UK. 50pp. See also:http://www.noc.soton.ac.uk/JRD/OCCAM.

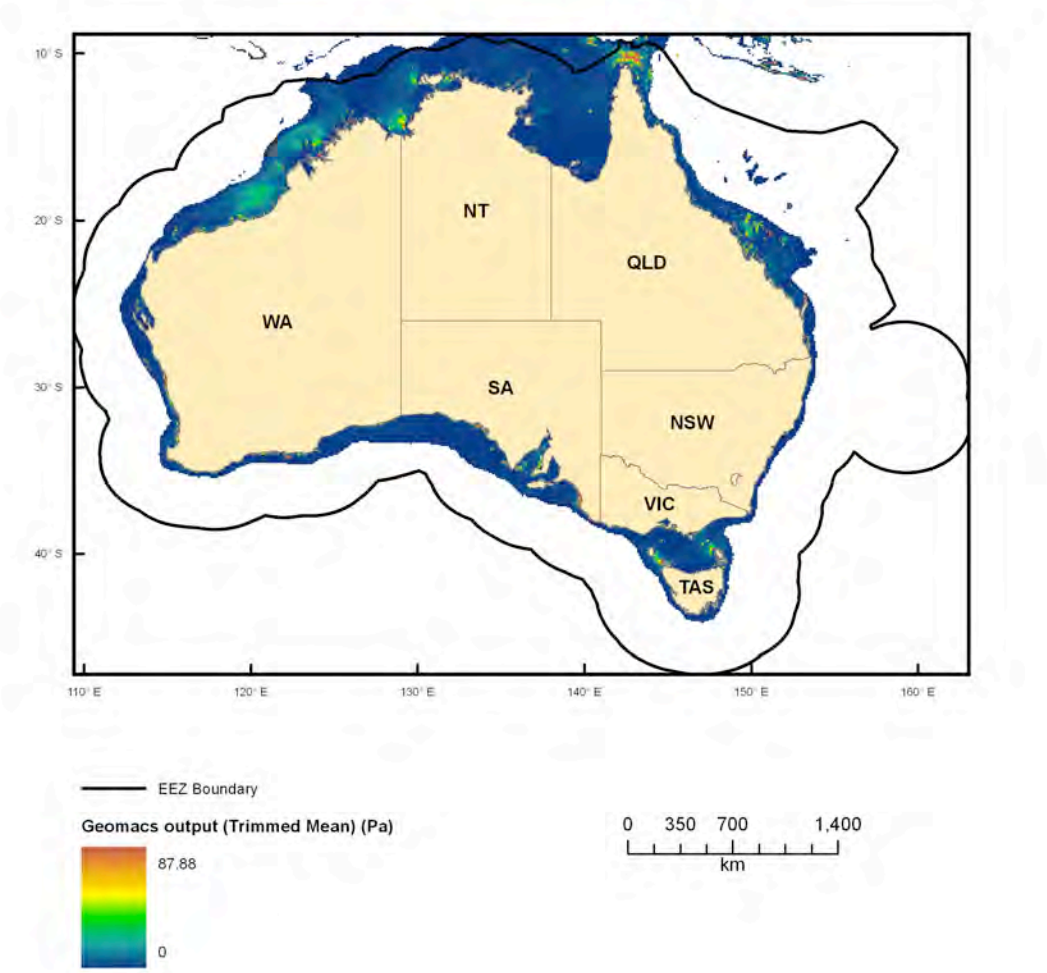

Figure 2.3.5. GEOMACS Trimmed Mean Map

2.3.6. GEOMACS Geometric Mean

The geometric mean is calculated by multiplying the model observations together and then taking the nth root of the resulting product. The geometric mean output (Figure 2.3.6) is not guided by ecological theory or observations but is a generic statistical observation. In company with a number of other GEOMACS outputs the geometric mean may be used to test associations between biodiversity and bed shear stress.

Dataset TITLE
GEOMACS (Geological and Oceanographic Model of Australia's Continental Shelf) Geometric mean
Dataset ALTERNATE TITLE (i.e. Dataset Name)
geomacs_gmean
Dataset AUTHORS
Hughes, M.G. Harris, P.T.
Dataset CUSTODIAN
Geoscience Australia
Dataset JURISDICTION
Australia
Description ABSTRACT
Geoscience Australia's GEOMACS model was utilised to produce hindcast hourly time series of continental shelf (~20 - 300 m depth) bed shear stress (unit of measure: Pascal, Pa) on a 0.1 degree grid covering the period March 1997 to February 2008 (inclusive). The hindcast data represents the combined contribution to the bed shear stress by waves, tides, wind and density-driven circulation.
The geometric mean was calculated using the formula

$$m_g = \left(\prod_{i=1}^{n} \tau_i \right)^{\frac{1}{n}}$$

where n is the total number of model observations of the bed shear stress τ. The geometric mean was used alongside the trimmed mean to provide a more robust representation of the bulk of the values than the arithmetic mean would have provided (Hughes & Harris 2008).
Description Data Category
Oceans
Description ANZLIC Keyword
GEOSCIENCES
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
N_LAT: -7
S_LAT: -44
E_LONG: 156
W_LONG: 110
COORDINATE SYSTEM DESCRIPTION
Projection: GEOGRAPHIC
Datum: WGS84
Units: DD
Description NOMINAL SCALE
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE
2008-07-24

Dataset Currency ENDING DATE
2008-07-24

Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required
Access STORED DATA FORMAT
DIGITAL - ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL - ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Data Quality LINEAGE
The Geological and Oceanographic Model of Australia's Territory (GEOMAT- Harris et al., 2000) developed at Geoscience Australia provides maps indicative of the Australian seabed exposure. GEOMAT v.1 proposed a classification of the Australian under water territory based on sediment mobility induced by distinct processes such as tidal currents and gravity waves (Porter-Smith et al., 2004). GEOMAT v.2 (GEOMACS) proposed an improved classification of the continental shelf area based on a seabed exposure index (Hemer, 2006). The seabed exposure index was derived from the statistical distribution of the sediment transport rate, which reflected the strength and frequency of the combined wave-current bed shear stress. The bed shear stress was derived from a bottom boundary layer model (SEDTRANS - Li and Amos, 2001), which integrated the combined action of tidal currents (Egbert et al., 1994), oceanic currents (OCCAM; Webb et al., 1998), and gravity waves (AUSWAM - Greenslade, 2001) over a given mean sediment fraction (MARS; Geoscience Australia, 2006).
Data Quality POSITIONAL ACCURACY
The dataset is estimated on a 0.1deg grid resolution.
Data Quality ATTRIBUTE ACCURACY
Output from mathematical model. No direct field observations. The GEOMACS model does not include the effects of wave breaking and refraction/diffraction or non-linear shallow-water effects on the tide, therefore the model is not considered useful in <10 m water depth, and in many regions in <30 m water depth; depending on the dominant wave period, tidal range and bathymetric complexity (Hughes & Harris 2008). Conversely, seabed disturbance produced by the wave, tide and current input variables appears not to extend beyond 300 m depth. The temporal domain includes 11 years and therefore contains limited information on events with long return intervals at specific locations, e.g. tropical cyclones (Hughes & Harris 2008).
Data Quality LOGICAL CONSISTENCY
All model outputs data have been visually cheched for artefacts and spurious data. Tests conducted to ensure data are reliable and valid.
Data Quality COMPLETENESS
Completed
Contact Information CONTACT ORGANISATION
Geoscience Australia
Contact Information CONTACT POSITION
Director, Sales and Distribution, ISB
Contact Information MAIL ADDRESS 1
GPO Box 378
Contact Information SUBURB OR PLACE OR LOCALITY
Canberra City
Contact Information STATE
ACT
Contact Information COUNTRY
Australia
Contact Information POSTCODE
2601
Contact Information TELEPHONE
+612 6249 9111
Contact Information FACSIMILE
+612 6249 9999

Contact Information ELECTRONIC MAIL ADDRESS
marine@ga.gov.au
Metadata Date METADATA DATE
2010-01-01
Additional Metadata REFERENCES

Egbert, G.D., Bennett, A.F., and Foreman, M.G.G., 1994. TOPEX/POSEIDON tides estimated using a global inverse mode. *Journal of Geophysical Research* 99, 24821-24852.

Greenslade, D.J.M., 2001. The Assimilation of ERS-2 Significant Wave Height Data in the Australian region. *Journal of Marine Systems* 28, 141-160.

Harris, P. T., Smith, R., Anderson, O., Coleman, R., and Greenslade, D., 2000. *GEOMAT – modelling of continental shelf sediment mobility in support of Australia's regional marine planning process.* Australian Geological Survey Organisation Record 2000/41. Geoscience Australia, Canberra. 53pp.

Hemer, M.A., 2006. The magnitude and frequency of combined flow bed shear stress as a measure of exposure on the Australian continental shelf. *Continental Shelf Research* 26, 1258-1280.

Hughes, M., Harris, P. T., 2008. Progress Report on Disturbance Task C1, Surrogates Program, Marine Biodiversity Hub. Geoscience Australia, Canberra.

Li, M.Z., and Amos, C.L., 2001. SEDTRANS96: the upgraded and better calibrated sediment transport model for continental shelves. *Computers and Geosciences* 27, 619-645.

Porter_Smith, R., Harris, P.T., Anderson, O., Coleman, R., Greenslade, D.J.M., and Jenkins, C.J., 2004. Classification of the Australian continental shelf based on predicted sediment threshold exceedance from tidal currents and swell waves. *Marine Geology* 211, 1-20.

Webb, D.J., Cuevas, B.A., and Coward, A.C., 1998. *The first main run of the OCCAM global ocean model.* Internal Report of James Rennell Division, Southampton Oceanography Centre, UK. 50pp. See also:http://www.noc.soton.ac.uk/JRD/OCCAM.

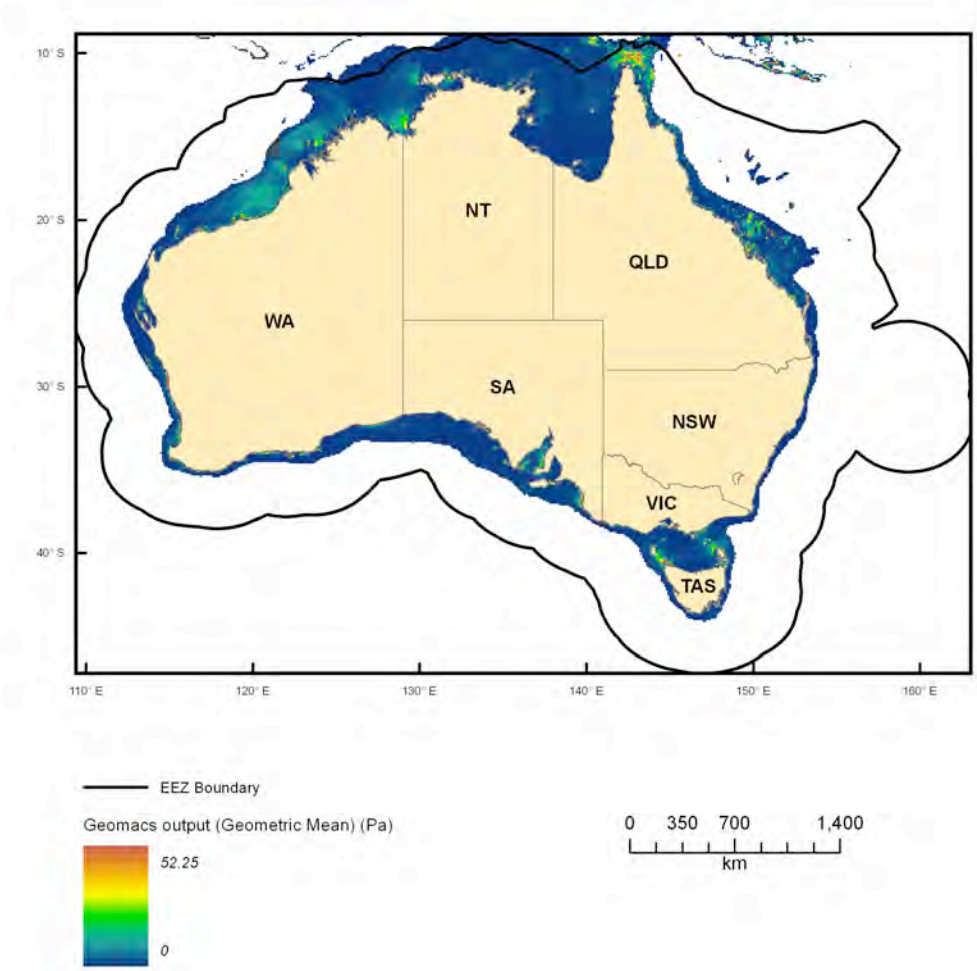

Figure 2.3.6. GEOMACS Geometric Mean Map

2.3.7. Ratio of the GEOMACS Outputs

The GEOMACS ratio parameter is calculated by representing the stress in excess of 0.4 Pa integrated over time as a proportion of the total stress integrated over time, and is intended to represent the proportion of the total integrated stress that has some control on a benthic community. The ratio output (Figure 2.3.7) is guided by ecological data collected from the Torres Strait (Long, Bode, & Pitcher 1997) which suggests that bed shear stresses exceeding 0.4 Pa are important in determining the species present.

Dataset TITLE
GEOMACS (Geological and Oceanographic Model of Australia's Continental Shelf) Ratio
Dataset ALTERNATE TITLE (i.e. Dataset Name)
geomacs_ratio
Dataset AUTHORS
Hughes, M.G. Harris, P.T.
Dataset CUSTODIAN
Geoscience Australia
Dataset JURISDICTION
Australia
Description ABSTRACT
Geoscience Australia's GEOMACS model was utilised to produce hindcast hourly time series of continental shelf (~20 - 300 m depth) bed shear stress (unit of measure: Pascal, Pa) on a 0.1 degree grid covering the period March 1997 to February 2008 (inclusive). The hindcast data represents the combined contribution to the bed shear stress by waves, tides, wind and density-driven circulation.
Ecological data collected from Torres Strait suggests that bed shear stresses exceeding 0.4 Pa are important in determining the species present (Long, Bode, & Pitcher 1997). Although this data may not be representative of other regions or benthic communities, it has been utilised to calculate two parameters for determining the relationship between shear bed stress and the benthic community. One of the parameters, which is denoted by Ψ, and is calculated using;

$$\Psi = \frac{A}{B} \quad \text{where} \quad A = \int_0^L \tau.dt \text{ for } \tau \geq 0.4 \quad \text{and} \quad B = \int_0^L \tau.dt$$

represents the stress in excess of 0.4 Pa integrated over time as a proportion of the total stress integrated over time, and is intended to represent the proportion of the total integrated stress that has some control on the benthic community (Hughes & Harris 2008).
Description Data Category
Oceans
Description ANZLIC Keyword
GEOSCIENCES
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
N_LAT: -7
S_LAT: -44
E_LONG: 156
W_LONG: 110
COORDINATE SYSTEM DESCRIPTION
Projection: GEOGRAPHIC
Datum: WGS84
Units: DD
Description NOMINAL SCALE
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE
2008-07-24
Dataset Currency ENDING DATE
2008-07-24

Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required
Access STORED DATA FORMAT
DIGITAL - ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL - ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Data Quality LINEAGE
The Geological and Oceanographic Model of Australia's Territory (GEOMAT- Harris et al., 2000) developed at Geoscience Australia provides maps indicative of the Australian seabed exposure. GEOMAT v.1 proposed a classification of the Australian under water territory based on sediment mobility induced by distinct processes such as tidal currents and gravity waves (Porter-Smith et al., 2004). GEOMAT v.2 (GEOMACS) proposed an improved classification of the continental shelf area based on a seabed exposure index (Hemer, 2006). The seabed exposure index was derived from the statistical distribution of the sediment transport rate, which reflected the strength and frequency of the combined wave-current bed shear stress. The bed shear stress was derived from a bottom boundary layer model (SEDTRANS - Li and Amos, 2001), which integrated the combined action of tidal currents (Egbert et al., 1994), oceanic currents (OCCAM; Webb et al., 1998), and gravity waves (AUSWAM - Greenslade, 2001) over a given mean sediment fraction (MARS; Geoscience Australia, 2006).
Data Quality POSITIONAL ACCURACY
The dataset is estimated on a 0.1deg grid resolution.
Data Quality ATTRIBUTE ACCURACY
Output from mathematical model. No direct field observations. The GEOMACS model does not include the effects of wave breaking and refraction/diffraction or non-linear shallow-water effects on the tide, therefore the model is not considered useful in <10 m water depth, and in many regions in <30 m water depth; depending on the dominant wave period, tidal range and bathymetric complexity (Hughes & Harris 2008). Conversely, seabed disturbance produced by the wave, tide and current input variables appears not to extend beyond 300 m depth. The temporal domain includes 11 years and therefore contains limited information on events with long return intervals at specific locations, e.g. tropical cyclones (Hughes & Harris 2008).
Data Quality LOGICAL CONSISTENCY
All model outputs data have been visually checked for artefacts and spurious data. Tests conducted to ensure data are reliable and valid.
Data Quality COMPLETENESS
Completed
Contact Information CONTACT ORGANISATION
Geoscience Australia
Contact Information CONTACT POSITION
Director, Sales and Distribution, ISB
Contact Information MAIL ADDRESS 1
GPO Box 378
Contact Information SUBURB OR PLACE OR LOCALITY
Canberra City
Contact Information STATE
ACT
Contact Information COUNTRY
Australia
Contact Information POSTCODE
2601
Contact Information TELEPHONE
+612 6249 9111
Contact Information FACSIMILE

+612 6249 9999

Contact Information ELECTRONIC MAIL ADDRESS
marine@ga.gov.au
Metadata Date METADATA DATE
2010-01-01
Additional Metadata REFERENCES

Egbert, G.D., Bennett, A.F., and Foreman, M.G.G., 1994. TOPEX/POSEIDON tides estimated using a global inverse mode. *Journal of Geophysical Research* 99, 24821-24852.

Greenslade, D.J.M., 2001. The Assimilation of ERS-2 Significant Wave Height Data in the Australian region. *Journal of Marine Systems* 28, 141-160.

Harris, P. T., Smith, R., Anderson, O., Coleman, R., and Greenslade, D., 2000. *GEOMAT – modelling of continental shelf sediment mobility in support of Australia's regional marine planning process.* Australian Geological Survey Organisation Record 2000/41. Geoscience Australia, Canberra. 53pp.

Haywood, M.D.E., Browne, M., Skewes, T., Rochester, W., McLeod, I., Pitcher, C.R., Dennis, D., Dunn, J., Cheers, S., & Wassenberg, T. 2007. *Improved Knowledge of Torres Strait Seabed Biota and Reef Habitats.* Tech. Rept. to the Marine and Tropical Sciences Research Facility. Reef and Rainforest Research Centre Limited, Cairns.

Hemer, M.A., 2006. The magnitude and frequency of combined flow bed shear stress as a measure of exposure on the Australian continental shelf. *Continental Shelf Research* 26, 1258-1280.

Hughes, M., Harris, P. T., 2008. Progress Report on Disturbance Task C1, Surrogates Program, Marine Biodiversity Hub. Geoscience Australia, Canberra.

Li, M.Z., and Amos, C.L., 2001. SEDTRANS96: the upgraded and better calibrated sediment transport model for continental shelves. *Computers and Geosciences* 27, 619-645.

Long, B.Z., Bode, L., and Pitcher, R., 1997. Seabed Current Stress as a Predictor of the Distribution and Abundance of Epibenthos in Torres Strait. Torres Strait GIS: Maintenance, Modelling and Reef Resource Inventory. Final Report 1993-1996 to Australian Fisheries Management Authority.

Porter_Smith, R., Harris, P.T., Anderson, O., Coleman, R., Greenslade, D.J.M., and Jenkins, C.J., 2004. Classification of the Australian continental shelf based on predicted sediment threshold exceedance from tidal currents and swell waves. *Marine Geology* 211, 1-20.

Webb, D.J., Cuevas, B.A., and Coward, A.C., 1998. *The first main run of the OCCAM global ocean model.* Internal Report of James Rennell Division, Southampton Oceanography Centre, UK. 50pp. See also:http://www.noc.soton.ac.uk/JRD/OCCAM.

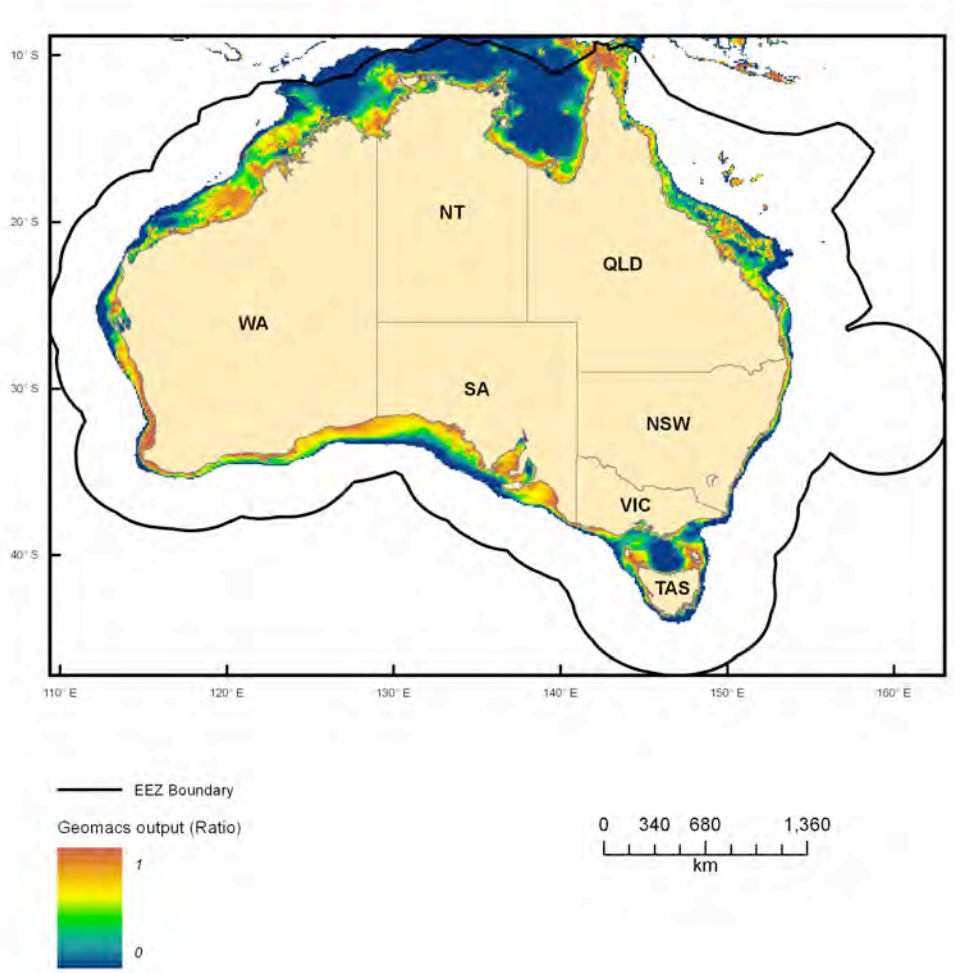

Figure 2.3.7. Ratio of the GEOMACS output Map

2.3.8. Percentage Exceedance of the GEOMACS Output

This GEOMACS parameter is simply the total percentage of time the bed shear stress exceeds 0.4 Pa. The percentage exceedance (Figure 2.3.8) is guided by ecological data collected from the Torres Strait (Long, Bode, & Pitcher 1997) which suggests that bed shear stresses exceeding 0.4 Pa are important in determining the species present.

Dataset TITLE
GEOMACS (Geological and Oceanographic Model of Australia's Continental Shelf) Percentage exceedance
Dataset ALTERNATE TITLE (i.e. Dataset Name)
geomacs_excee
Dataset AUTHORS
Hughes, M.G. Harris, P.T.
Dataset CUSTODIAN
Geoscience Australia
Dataset JURISDICTION
Australia
Description ABSTRACT
Geoscience Australia's GEOMACS model was utilised to produce hindcast hourly time series of continental shelf (~20 - 300 m depth) bed shear stress (unit of measure: Pascal, Pa) on a 0.1 degree grid covering the period March 1997 to February 2008 (inclusive). The hindcast data represents the combined contribution to the bed shear stress by waves, tides, wind and density-driven circulation.
Ecological data collected from Torres Strait suggests that bed shear stresses exceeding 0.4 Pa are important in determining the species present (Long, Bode, & Pitcher 1997). Although this data may not be representative of other regions or benthic communities, it has been utilised to calculate two parameters for determining the relationship between shear bed stress and the benthic community. One of the parameters is the total percentage of time the bed shear stress exceeds 0.4 Pa, and this is denoted $T_{0.4}$ (Hughes & Harris 2008).
Description Data Category
Oceans
Description ANZLIC Keyword
GEOSCIENCES
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
N_LAT: -7
S_LAT: -44
E_LONG: 156
W_LONG: 110
COORDINATE SYSTEM DESCRIPTION
Projection: GEOGRAPHIC
Datum: WGS84
Units: DD
Description NOMINAL SCALE
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE
2008-07-24
Dataset Currency ENDING DATE
2008-07-24
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required
Access STORED DATA FORMAT

DIGITAL - ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL - ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Data Quality LINEAGE
The Geological and Oceanographic Model of Australia's Territory (GEOMAT- Harris et al., 2000) developed at Geoscience Australia provides maps indicative of the Australian seabed exposure. GEOMAT v.1 proposed a classification of the Australian under water territory based on sediment mobility induced by distinct processes such as tidal currents and gravity waves (Porter-Smith et al., 2004). GEOMAT v.2 (GEOMACS) proposed an improved classification of the continental shelf area based on a seabed exposure index (Hemer, 2006). The seabed exposure index was derived from the statistical distribution of the sediment transport rate, which reflected the strength and frequency of the combined wave-current bed shear stress. The bed shear stress was derived from a bottom boundary layer model (SEDTRANS - Li and Amos, 2001), which integrated the combined action of tidal currents (Egbert et al., 1994), oceanic currents (OCCAM; Webb et al., 1998), and gravity waves (AUSWAM - Greenslade, 2001) over a given mean sediment fraction (MARS; Geoscience Australia, 2006).
Data Quality POSITIONAL ACCURACY
The dataset is estimated on a 0.1deg grid resolution.
Data Quality ATTRIBUTE ACCURACY
Output from mathematical model. No direct field observations. The GEOMACS model does not include the effects of wave breaking and refraction/diffraction or non-linear shallow-water effects on the tide, therefore the model is not considered useful in <10 m water depth, and in many regions in <30 m water depth; depending on the dominant wave period, tidal range and bathymetric complexity (Hughes & Harris 2008). Conversely, seabed disturbance produced by the wave, tide and current input variables appears not to extend beyond 300 m depth. The temporal domain includes 11 years and therefore contains limited information on events with long return intervals at specific locations, e.g. tropical cyclones (Hughes & Harris 2008).
Data Quality LOGICAL CONSISTENCY
All model outputs data have been visually checked for artefacts and spurious data. Tests conducted to ensure data are reliable and valid.
Data Quality COMPLETENESS
Completed
Contact Information CONTACT ORGANISATION
Geoscience Australia
Contact Information CONTACT POSITION
Director, Sales and Distribution, ISB
Contact Information MAIL ADDRESS 1
GPO Box 378
Contact Information SUBURB OR PLACE OR LOCALITY
Canberra City
Contact Information STATE
ACT
Contact Information COUNTRY
Australia
Contact Information POSTCODE
2601
Contact Information TELEPHONE
+612 6249 9111
Contact Information FACSIMILE
+612 6249 9999
Contact Information ELECTRONIC MAIL ADDRESS
marine@ga.gov.au
Metadata Date METADATA DATE
2010-01-01
Additional Metadata REFERENCES

Egbert, G.D., Bennett, A.F., and Foreman, M.G.G., 1994. TOPEX/POSEIDON tides estimated using a global inverse mode. *Journal of Geophysical Research* 99, 24821-24852.

Greenslade, D.J.M., 2001. The Assimilation of ERS-2 Significant Wave Height Data in the Australian region. *Journal of Marine Systems* 28, 141-160.

Harris, P. T., Smith, R., Anderson, O., Coleman, R., and Greenslade, D., 2000. *GEOMAT – modelling of continental shelf sediment mobility in support of Australia's regional marine planning process.* Australian Geological Survey Organisation Record 2000/41. Geoscience Australia, Canberra. 53pp.

Haywood, M.D.E., Browne, M., Skewes, T., Rochester, W., McLeod, I., Pitcher, C.R., Dennis, D., Dunn, J., Cheers, S., & Wassenberg, T. 2007. *Improved Knowledge of Torres Strait Seabed Biota and Reef Habitats.* Tech. Rept. to the Marine and Tropical Sciences Research Facility. Reef and Rainforest Research Centre Limited, Cairns.

Hemer, M.A., 2006. The magnitude and frequency of combined flow bed shear stress as a measure of exposure on the Australian continental shelf. *Continental Shelf Research* 26, 1258-1280.

Hughes, M., Harris, P. T., 2008. Progress Report on Disturbance Task C1, Surrogates Program, Marine Biodiversity Hub. Geoscience Australia, Canberra.

Li, M.Z., and Amos, C.L., 2001. SEDTRANS96: the upgraded and better calibrated sediment transport model for continental shelves. *Computers and Geosciences* 27, 619-645.

Long, B.Z., Bode, L., and Pitcher, R., 1997. Seabed Current Stress as a Predictor of the Distribution and Abundance of Epibenthos in Torres Strait. Torres Strait GIS: Maintenance, Modelling and Reef Resource Inventory. Final Report 1993-1996 to Australian Fisheries Management Authority.

Porter_Smith, R., Harris, P.T., Anderson, O., Coleman, R., Greenslade, D.J.M., and Jenkins, C.J., 2004. Classification of the Australian continental shelf based on predicted sediment threshold exceedance from tidal currents and swell waves. *Marine Geology* 211, 1-20.

Webb, D.J., Cuevas, B.A., and Coward, A.C., 1998. *The first main run of the OCCAM global ocean model.* Internal Report of James Rennell Division, Southampton Oceanography Centre, UK. 50pp. See also:http://www.noc.soton.ac.uk/JRD/OCCAM.

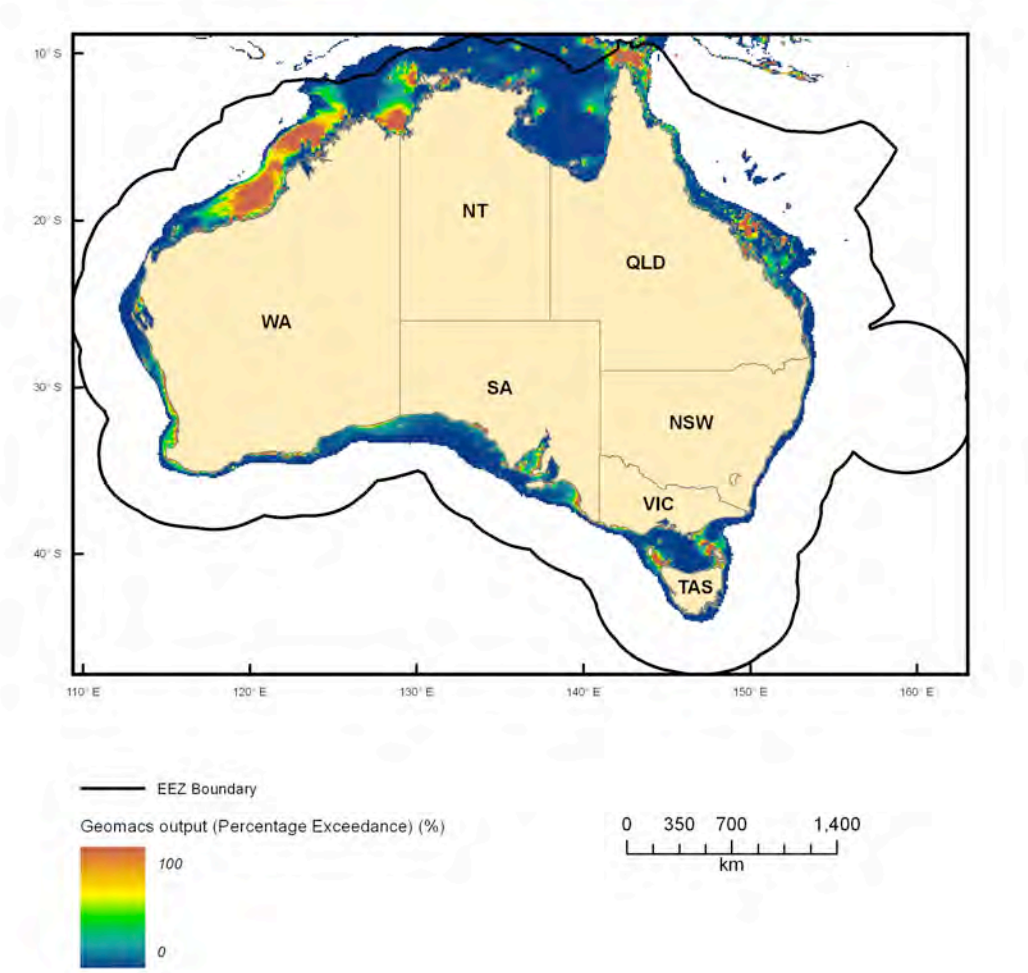

Figure 2.3.8. Percentage Exceedance of the GEOMACS output Map

2.4. CSIRO ATLAS OF REGIONAL SEAS (CARS2006) DATABASE

The CARS2006 database is derived from all available historical subsurface ocean property measurements (Ridgway et al, 2002). The measurements have been collected primarily using research vessel instrument profiles and autonomous profiling buoys. The observations have been collected over approximately 50 years and have been used to provide an estimate at every depth and every location in the world's oceans for each day of the year, but not for any individual year. CARS2006 spans the southern 2/3 of the world's oceans, from 70^{o} S to 26^{o} N, except in the Atlantic where is reaches only to10^{o} N. The six water properties mapped are temperature (deg. C), salinity (PSU), oxygen (ml/litre), nitrate (micromole/litre), silicate (micromole/litre), phosphate (micromole/litre). The data comprise historic mean fields, average seasonal cycles, and spatial and temporal variability measures.

Maps of the six water properties of bottom water presented below include a few small white patches that indicate areas with insufficient field data to generate reliable estimates.

2.4.1. Bottom Water Nitrate Data – Standard Deviation

The bottom water nitrate data were extracted from the CSIRO Atlas of Regional Seas (CARS2006 - http://www.marine.csiro.au/~dunn/cars2006/) database. The standard deviation for the nitrate data (Figure 2.4.1) is used to show the spatial and temporal variation of nitrate in the bottom water.

Nitrates are taken up by primary producers at the ocean surface during photosynthesis (Barnes & Hughes 1988). The primary producers, such as diatoms, are the base of the food chain in the ocean. The presence of nitrate in the bottom water is potentially an indication of the type of biota in the benthic zone.

Dataset TITLE
CSIRO Atlas of Regional Seas (CARS) – 2006 – Bottom Water Nitrate Data – Standard Deviation
Dataset ALTERNATE TITLE (i.e. Dataset Name)
no3_std
Dataset AUTHORS
CSIRO Marine Laboratories
Dataset CUSTODIAN (i.e. Name and Contact Details)
CSIRO
Dataset JURISDICTION (i.e. Region Name)
Australia
Description ABSTRACT
CARS2006 spans the southern 2/3 of the world's oceans, from 70S to 26N, except in the Atlantic where is reaches only to10N. The six water properties mapped in are temperature (deg C), salinity (PSU), oxygen (ml/litre), nitrate (micromole/litre), silicate (micromole/litre), phosphate (micromole/litre). It comprises historic mean fields and average seasonal cycles, derived from all available historical subsurface ocean property measurements (primarily research vessel instrument casts and autonomous profiling buoys). The standard deviation for the nitrate data is used to show the spatial and temporal variation of nitrate in the bottom water utilising all of the historical data for each day of the year.
Description Data Category
Oceans
Description ANZLIC Keyword
OCEANOGRAPHY
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
North: -7.945
South: -48.155
East: 164.225

West: 108.225

COORDINATE SYSTEM DESCRIPTION
Projection: Geographic
Datum: WGS84
Units: DD
Description SPATIAL SCALE or RESOLUTION
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE (yyyy-mm-dd)
2006-02-24
Dataset Currency ENDING DATE (yyyy-mm-dd)
2006-02-24
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As necessary
Access STORED DATA FORMAT
Digital – netCDF
Digital – ASCII
ArcInfo Grid
Access AVAILABLE FORMAT TYPE(S)
Digital – netCDF
Digital – ASCII
ArcInfo Grid
Access ACCESS CONSTRAINT
None
Use USE LIMITATIONS
If publications arise from work that makes use of CARS please forward a copy of publication to CSIRO Marine Laboratories
Use ACKNOWLEDGEMENTS (ie Data Source, Contributing Authors, etc)
CSIRO Marine Laboratories - http://www.marine.csiro.au/~dunn/cars2006/index.html#refs
Data Quality LINEAGE
BLUElink Ocean Archive (BOA) is the result of collecting together the majority of global high-quality buoy and shipboard deepwater hydrographic cast data. It is built on the NOAA/NODC World Ocean Database, WOCE WHP3, Argo, TAO, CSIRO and NIWA archives, and a number of other sources. BOA is an integral component of the development of the CARS climatologies.
The quality control of profile data involves many steps, including:

- location and depth plausibility check
- value range checking against 3D global value range tables
- comparison to global S(T) climatology for outlier detection
- comparison to existing CARS seasonal estimates (ie residuals testing) for outlier detection
- ingestion into CARS, and a second level of residuals testing, using a tighter threshold (thresholds are set as a multiple of the mapped RMS of residuals.)
- examination of resultant CARS fields, especially for bullseyes and structure in the RMS-residuals and seasonal harmonics fields, since these are more sensitive to bad data.

Prior to being compared with CARS fields, the profiles are interpolated onto a set of 79 CSIRO Version-3 Standard Depth Levels (CSL3).
The component datasets of BOA are stored separately in a range of formats since the nature of these datasets is quite varied. This approach allows easy updating of components (for example, the Argo subset is completely renewed every couple of months.) Where the same data could reside in multiple datasets, those datasets are duplicate cross-checked after any updates (scanning only on the basis of time and location, not the enormous task of searching for duplicated property profiles.)
Data Quality POSITIONAL ACCURACY

Errors may occur in location of cast data, which especially arises when data is passed from originator to accumulator organisations. For example, 1100 WOA94 casts were rejected prior to mapping due to being landward of the GEBCO coastline.

Data Quality ATTRIBUTE ACCURACY
Unknown
Data Quality LOGICAL CONSISTENCY
Data was screened for duplicates and bad positions, outliers to global t-s relations, and outliers of residuals to intermediate mappings.
Data Quality COMPLETENESS
Completed
Contact Information CONTACT ORGANISATION
CSIRO Marine Laboratories
Contact Information CONTACT POSITION
Jeff Dunn
Contact Information MAIL ADDRESS 1
GPO Box 1538
Contact Information SUBURB OR PLACE OR LOCALITY
Hobart
Contact Information STATE
Tasmania
Contact Information COUNTRY
Australia
Contact Information POSTCODE
7000
Contact Information TELEPHONE
+61 3 6232 5417 (J.Dunn); +61 3 9239 4645 (CMAR); 1300 363 400, +61 3 9545 2176 (CSIRO)
Contact Information FACSIMILE
+612 6249 9999
Contact Information ELECTRONIC MAIL ADDRESS
Jeff.Dunn@csiro.au
Metadata Date METADATA DATE (yyyy-mm-dd)
2006-02-24
ADDITIONAL METADATA
None

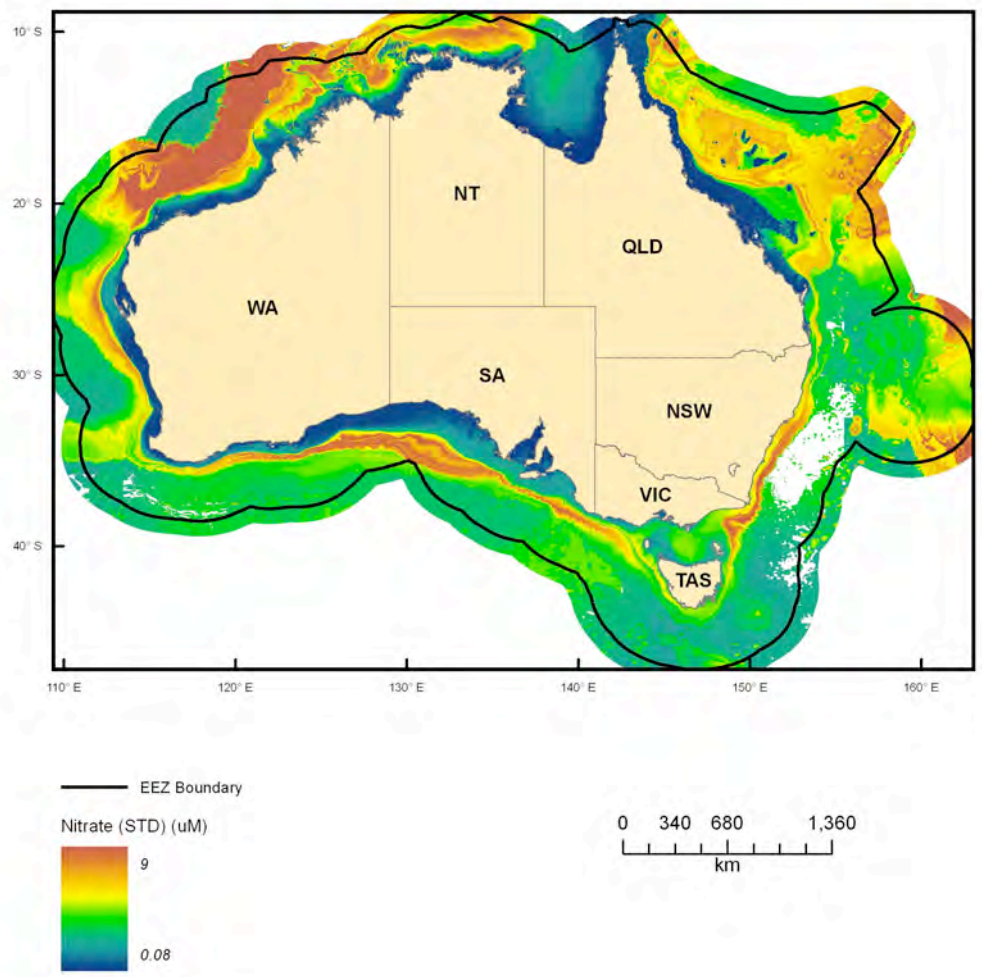

Figure 2.4.1. Bottom Water Nitrate Data – Standard Deviation Map

2.4.2. Bottom Water Nitrate Data – Mean

The bottom water nitrate data were extracted from the CSIRO Atlas of Regional Seas (CARS2006 - http://www.marine.csiro.au/~dunn/cars2006/) database. The mean for the nitrate data (Figure 2.4.2) is used to show the local spatial variation and variation throughout and between years, of nitrate in the bottom water.

Nitrates are taken up by primary producers at the ocean surface during photosynthesis (Barnes & Hughes 1988). The primary producers, such as diatoms, are the base of the food chain in the ocean. The presence of nitrate in the bottom water is potentially an indication of the type of biota in the benthic zone.

Dataset TITLE
CSIRO Atlas of Regional Seas (CARS) – 2006 – Bottom Water Nitrate Data - Mean
Dataset ALTERNATE TITLE (i.e. Dataset Name)
no3_mean
Dataset AUTHORS
CSIRO Marine Laboratories
Dataset CUSTODIAN (i.e. Name and Contact Details)
CSIRO
Dataset JURISDICTION (i.e. Region Name)
Australia
Description ABSTRACT
CARS2006 spans the southern 2/3 of the world's oceans, from 70S to 26N, except in the Atlantic where is reaches only to10N. The six water properties mapped in are temperature (deg C), salinity (PSU), oxygen (ml/litre), nitrate (micromole/litre), silicate (micromole/litre), phosphate (micromole/litre). It comprises historic mean fields and average seasonal cycles, derived from all available historical subsurface ocean property measurements (primarily research vessel instrument casts and autonomous profiling buoys). The mean refers to the long-term average of nitrate in the bottom water at each location.
Description Data Category
Oceans
Description ANZLIC Keyword
OCEANOGRAPHY
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
North: -7.945
South: -48.155
East: 164.225
West: 108.225
COORDINATE SYSTEM DESCRIPTION
Projection: Geographic
Datum: WGS84
Units: DD
Description SPATIAL SCALE or RESOLUTION
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE (yyyy-mm-dd)
2006-02-24
Dataset Currency ENDING DATE (yyyy-mm-dd)
2006-02-24
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As necessary
Access STORED DATA FORMAT
Digital – netCDF

Digital – ASCII
ArcInfo Grid
Access AVAILABLE FORMAT TYPE(S)
Digital – netCDF
Digital – ASCII
ArcInfo Grid
Access ACCESS CONSTRAINT
None
Use USE LIMITATIONS
If publications arise from work that makes use of CARS please forward a copy of publication to CSIRO Marine Laboratories
Use ACKNOWLEDGEMENTS (ie Data Source, Contributing Authors, etc)
CSIRO Marine Laboratories - http://www.marine.csiro.au/~dunn/cars2006/index.html#refs
Data Quality LINEAGE
BLUElink Ocean Archive (BOA) is the result of collecting together the majority of global high-quality buoy and shipboard deepwater hydrographic cast data. It is built on the NOAA/NODC World Ocean Database, WOCE WHP3, Argo, TAO, CSIRO and NIWA archives, and a number of other sources. BOA is an integral component of the development of the CARS climatologies.
The quality control of profile data involves many steps, including:

- location and depth plausibility check
- value range checking against 3D global value range tables
- comparison to global S(T) climatology for outlier detection
- comparison to existing CARS seasonal estimates (ie residuals testing) for outlier detection
- ingestion into CARS, and a second level of residuals testing, using a tighter threshold (thresholds are set as a multiple of the mapped RMS of residuals.)
- examination of resultant CARS fields, especially for bullseyes and structure in the RMS-residuals and seasonal harmonics fields, since these are more sensitive to bad data.

Prior to being compared with CARS fields, the profiles are interpolated onto a set of 79 CSIRO Version-3 Standard Depth Levels (CSL3).
The component datasets of BOA are stored separately in a range of formats since the nature of these datasets is quite varied. This approach allows easy updating of components (for example, the Argo subset is completely renewed every couple of months.) Where the same data could reside in multiple datasets, those datasets are duplicate cross-checked after any updates (scanning only on the basis of time and location, not the enormous task of searching for duplicated property profiles.)
Data Quality POSITIONAL ACCURACY
Errors may occur in location of cast data, which especially arises when data is passed from originator to accumulator organisations. For example, 1100 WOA94 casts were rejected prior to mapping due to being landward of the GEBCO coastline.
Data Quality ATTRIBUTE ACCURACY
Unknown
Data Quality LOGICAL CONSISTENCY
Data was screened for duplicates and bad positions, outliers to global t-s relations, and outliers of residuals to intermediate mappings.
Data Quality COMPLETENESS
Completed
Contact Information CONTACT ORGANISATION
CSIRO Marine Laboratories
Contact Information CONTACT POSITION
Jeff Dunn
Contact Information MAIL ADDRESS 1
GPO Box 1538
Contact Information SUBURB OR PLACE OR LOCALITY
Hobart
Contact Information STATE
Tasmania

Contact Information COUNTRY
Australia
Contact Information POSTCODE
7000
Contact Information TELEPHONE
+61 3 6232 5417 (J.Dunn); +61 3 9239 4645 (CMAR); 1300 363 400, +61 3 9545 2176 (CSIRO)
Contact Information FACSIMILE
+612 6249 9999
Contact Information ELECTRONIC MAIL ADDRESS
Jeff.Dunn@csiro.au
Metadata Date METADATA DATE (yyyy-mm-dd)
2006-02-24
ADDITIONAL METADATA
None

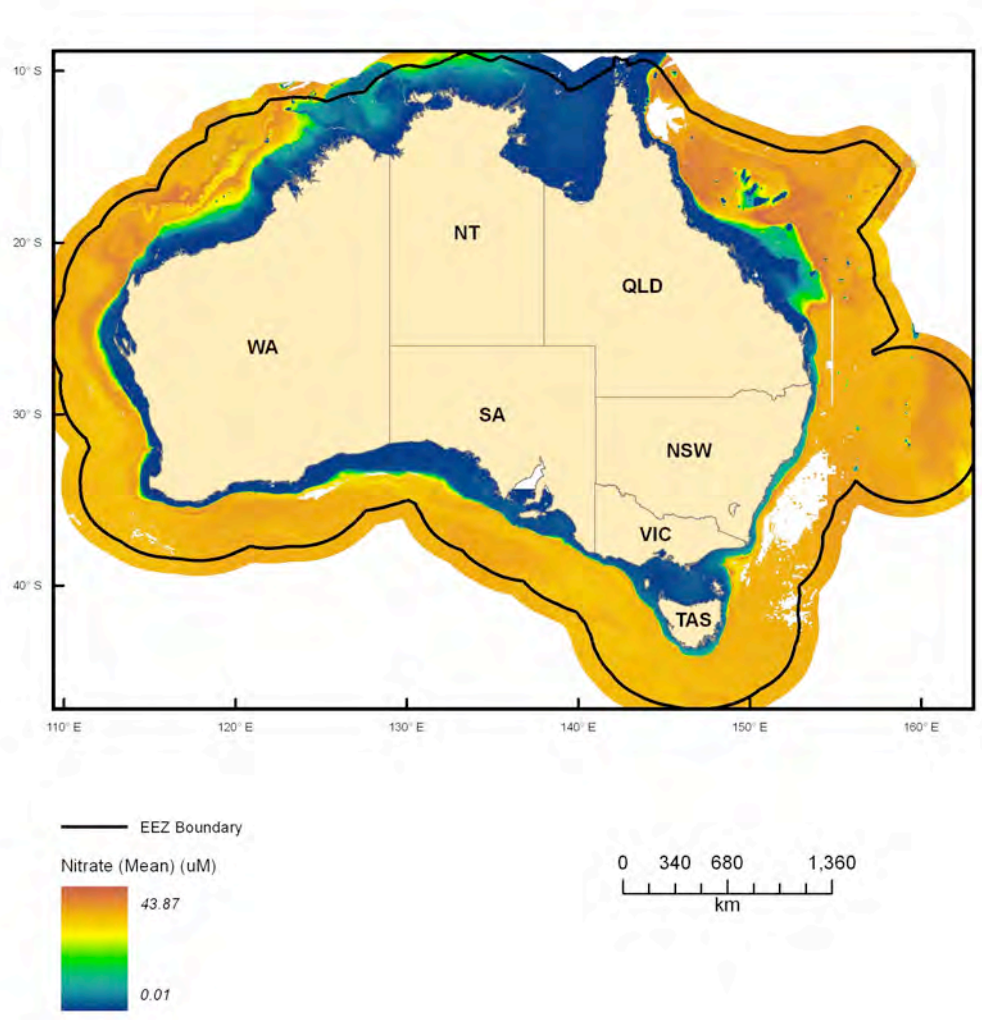

Figure 2.4.2. Bottom Water Nitrate Data – Mean Map

2.4.3. Bottom Water Oxygen Data – Standard Deviation

The bottom water oxygen data were extracted from the CSIRO Atlas of Regional Seas (CARS2006 - http://www.marine.csiro.au/~dunn/cars2006/) database. The standard deviation for the oxygen data (Figure 2.4.3) is used to show the local spatial and temporal variation of oxygen in the bottom water.

Oxygen is dissolved into the surface water of the ocean from the atmosphere; it is also produced during photosynthesis by primary producers. Dissolved oxygen is necessary for respiration in aquatic animals and its presence is essential for most marine life (Barnes & Hughes 1988). The quantity of oxygen in the bottom water is potentially an indication of the type of biota in the benthic zone.

Dataset TITLE
CSIRO Atlas of Regional Seas (CARS) – 2006 – Bottom Water Oxygen Data – Standard Deviation
Dataset ALTERNATE TITLE (i.e. Dataset Name)
o2_std
Dataset AUTHORS
CSIRO Marine Laboratories
Dataset CUSTODIAN (i.e. Name and Contact Details)
CSIRO
Dataset JURISDICTION (i.e. Region Name)
Australia
Description ABSTRACT
CARS2006 spans the southern 2/3 of the world's oceans, from 70S to 26N, except in the Atlantic where is reaches only to10N. The six water properties mapped in are temperature (deg C), salinity (PSU), oxygen (ml/litre), nitrate (micromole/litre), silicate (micromole/litre), phosphate (micromole/litre). It comprises historic mean fields and average seasonal cycles, derived from all available historical subsurface ocean property measurements (primarily research vessel instrument casts and autonomous profiling buoys). The standard deviation for the oxygen data is used to show the spatial and temporal variation of oxygen in the bottom water utilising all of the historical data for each day of the year.
Description Data Category
Oceans
Description ANZLIC Keyword
OCEANOGRAPHY
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
North: -7.945
South: -48.155
East: 164.225
West: 108.225
COORDINATE SYSTEM DESCRIPTION
Projection: Geographic
Datum: WGS84
Units: DD
Description SPATIAL SCALE or RESOLUTION
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE (yyyy-mm-dd)
2006-02-24
Dataset Currency ENDING DATE (yyyy-mm-dd)
2006-02-24

Dataset Status PROGRESS
Completed

Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As necessary
Access STORED DATA FORMAT
Digital – netCDF
Digital – ASCII
ArcInfo Grid
Access AVAILABLE FORMAT TYPE(S)
Digital – netCDF
Digital – ASCII
ArcInfo Grid
Access ACCESS CONSTRAINT
None
Use USE LIMITATIONS
If publications arise from work that makes use of CARS please forward a copy of publication to CSIRO Marine Laboratories
Use ACKNOWLEDGEMENTS (ie Data Source, Contributing Authors, etc)
CSIRO Marine Laboratories - http://www.marine.csiro.au/~dunn/cars2006/index.html#refs
Data Quality LINEAGE
BLUElink Ocean Archive (BOA) is the result of collecting together the majority of global high-quality buoy and shipboard deepwater hydrographic cast data. It is built on the NOAA/NODC World Ocean Database, WOCE WHP3, Argo, TAO, CSIRO and NIWA archives, and a number of other sources. BOA is an integral component of the development of the CARS climatologies.
The quality control of profile data involves many steps, including:
- location and depth plausibility check
- value range checking against 3D global value range tables
- comparison to global S(T) climatology for outlier detection
- comparison to existing CARS seasonal estimates (ie residuals testing) for outlier detection
- ingestion into CARS, and a second level of residuals testing, using a tighter threshold (thresholds are set as a multiple of the mapped RMS of residuals.)
- examination of resultant CARS fields, especially for bullseyes and structure in the RMS-residuals and seasonal harmonics fields, since these are more sensitive to bad data.

Prior to being compared with CARS fields, the profiles are interpolated onto a set of 79 CSIRO Version-3 Standard Depth Levels (CSL3).
The component datasets of BOA are stored separately in a range of formats since the nature of these datasets is quite varied. This approach allows easy updating of components (for example, the Argo subset is completely renewed every couple of months.) Where the same data could reside in multiple datasets, those datasets are duplicate cross-checked after any updates (scanning only on the basis of time and location, not the enormous task of searching for duplicated property profiles.)
Data Quality POSITIONAL ACCURACY
Errors may occur in location of cast data, which especially arises when data is passed from originator to accumulator organisations. For example, 1100 WOA94 casts were rejected prior to mapping due to being landward of the GEBCO coastline.
Data Quality ATTRIBUTE ACCURACY
Unknown
Data Quality LOGICAL CONSISTENCY
Data was screened for duplicates and bad positions, outliers to global t-s relations, and outliers of residuals to intermediate mappings.
Data Quality COMPLETENESS
Completed
Contact Information CONTACT ORGANISATION
CSIRO Marine Laboratories
Contact Information CONTACT POSITION
Jeff Dunn
Contact Information MAIL ADDRESS 1
GPO Box 1538

Contact Information SUBURB OR PLACE OR LOCALITY
Hobart
Contact Information STATE
Tasmania
Contact Information COUNTRY
Australia
Contact Information POSTCODE
7000
Contact Information TELEPHONE
+61 3 6232 5417 (J.Dunn); +61 3 9239 4645 (CMAR); 1300 363 400, +61 3 9545 2176 (CSIRO)
Contact Information FACSIMILE
+612 6249 9999
Contact Information ELECTRONIC MAIL ADDRESS
Jeff.Dunn@csiro.au
Metadata Date METADATA DATE (yyyy-mm-dd)
2006-02-24
ADDITIONAL METADATA
None

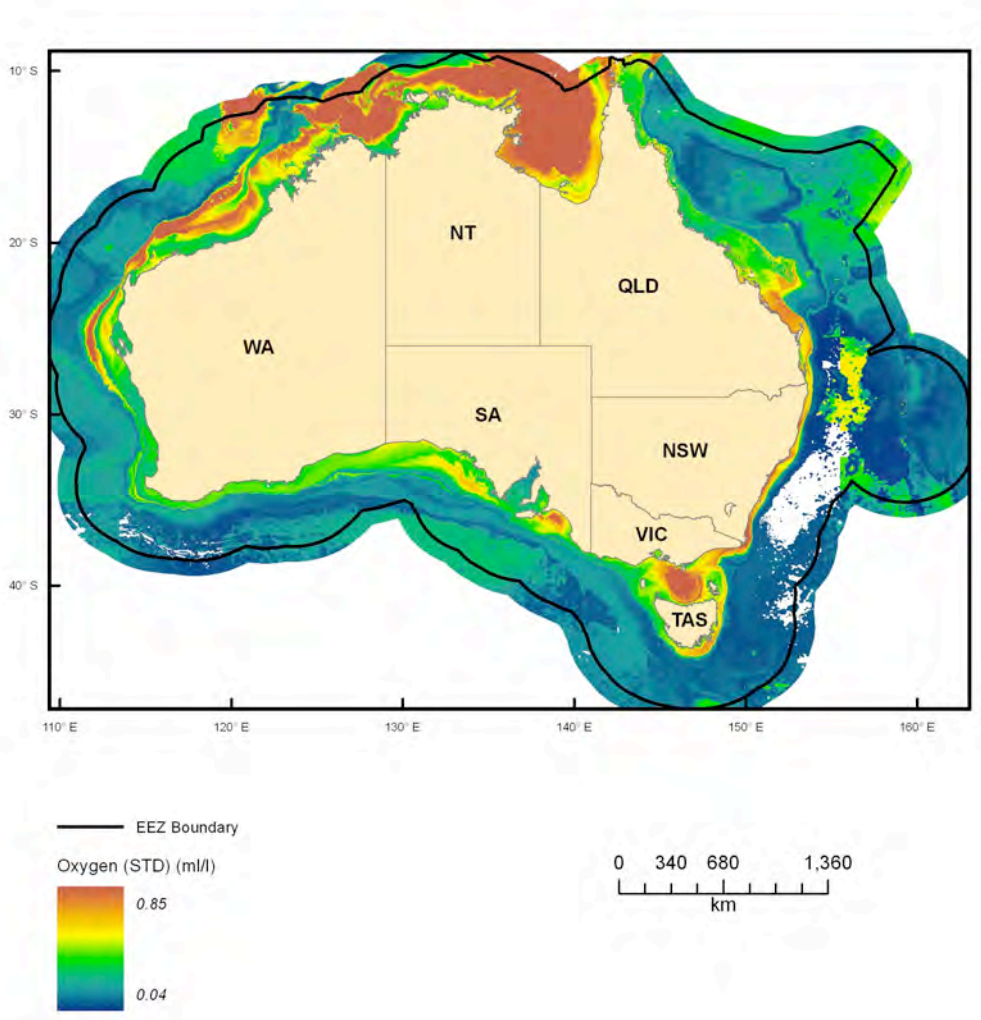

Figure 2.4.3. Bottom Water Oxygen Data – Standard Deviation Map

2.4.4. Bottom Water Oxygen Data – Mean

The bottom water oxygen data were extracted from the CSIRO Atlas of Regional Seas (CARS2006 - http://www.marine.csiro.au/~dunn/cars2006/) database. The mean for the oxygen data (Figure 2.4.4) is used to show the local spatial variation and variation throughout and between years, of oxygen in the bottom water.

Oxygen is dissolved into the surface water of the ocean from the atmosphere; it is also produced during photosynthesis by primary producers. Dissolved oxygen is necessary for respiration in aquatic animals and its presence is essential for most marine life (Barnes & Hughes 1988). The quantity of oxygen in the bottom water is potentially an indication of the type of biota in the benthic zone.

Dataset TITLE
CSIRO Atlas of Regional Seas (CARS) – 2006 – Bottom Water Oxygen Data - Mean
Dataset ALTERNATE TITLE (i.e. Dataset Name)
o2_mean
Dataset AUTHORS
CSIRO Marine Laboratories
Dataset CUSTODIAN (i.e. Name and Contact Details)
CSIRO
Dataset JURISDICTION (i.e. Region Name)
Australia
Description ABSTRACT
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Description Data Category
Oceans
Description ANZLIC Keyword
OCEANOGRAPHY
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
North: -7.945
South: -48.155
East: 164.225
West: 108.225
COORDINATE SYSTEM DESCRIPTION
Projection: Geographic
Datum: WGS84
Units: DD
Description SPATIAL SCALE or RESOLUTION
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE (yyyy-mm-dd)
2006-02-24
Dataset Currency ENDING DATE (yyyy-mm-dd)
2006-02-24
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As necessary
Access STORED DATA FORMAT

Digital – netCDF
Digital – ASCII
ArcInfo Grid
Access AVAILABLE FORMAT TYPE(S)
Digital – netCDF
Digital – ASCII
ArcInfo Grid
Access ACCESS CONSTRAINT
None
Use USE LIMITATIONS
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Data Quality LOGICAL CONSISTENCY
Data was screened for duplicates and bad positions, outliers to global t-s relations, and outliers of residuals to intermediate mappings.
Data Quality COMPLETENESS
Completed
Contact Information CONTACT ORGANISATION
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Metadata Date METADATA DATE (yyyy-mm-dd)
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ADDITIONAL METADATA
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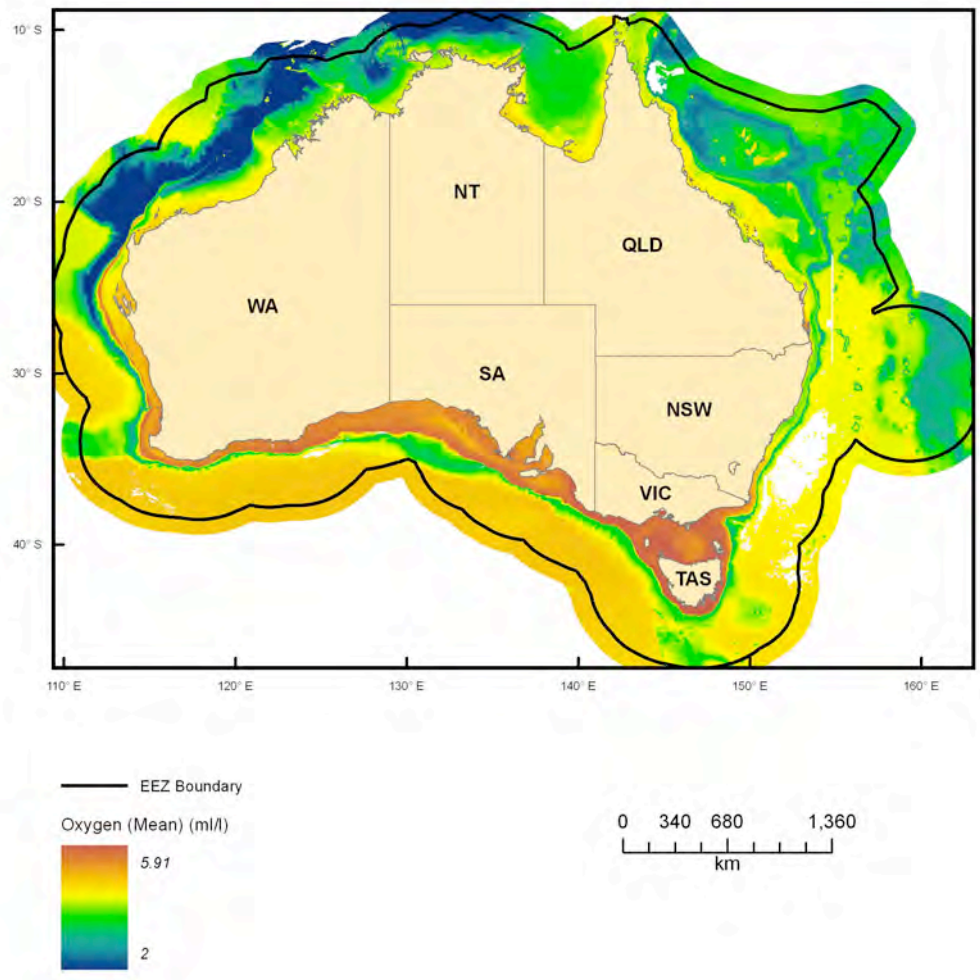

Figure 2.4.4. Bottom Water Oxygen Data – Mean Map

2.4.5. Bottom Water Salinity Data – Standard Deviation

The bottom water salinity data were extracted from the CSIRO Atlas of Regional Seas (CARS2006 - http://www.marine.csiro.au/~dunn/cars2006/) database. The standard deviation for the salinity data (Figure 2.4.5) is used to show the local spatial and temporal variation of salinity in the bottom water.

The dissolved salts which control the salinity of the water are derived from the weathering of the earths crust. The quantity of dissolved salt in the water is influenced by a number of factors, these include; inflows from rivers, melting of ice, precipitation, wave and current regimes, and evaporation. Salinity exerts an influence over the type of marine plants and organisms which are able to survive in a body of water (Przeslawski *et al.* 2008).

Dataset TITLE
CSIRO Atlas of Regional Seas (CARS) – 2006 – Bottom Water Salinity Data – Standard Deviation
Dataset ALTERNATE TITLE (i.e. Dataset Name)
s_std
Dataset AUTHORS
CSIRO Marine Laboratories
Dataset CUSTODIAN (i.e. Name and Contact Details)
CSIRO
Dataset JURISDICTION (i.e. Region Name)
Australia
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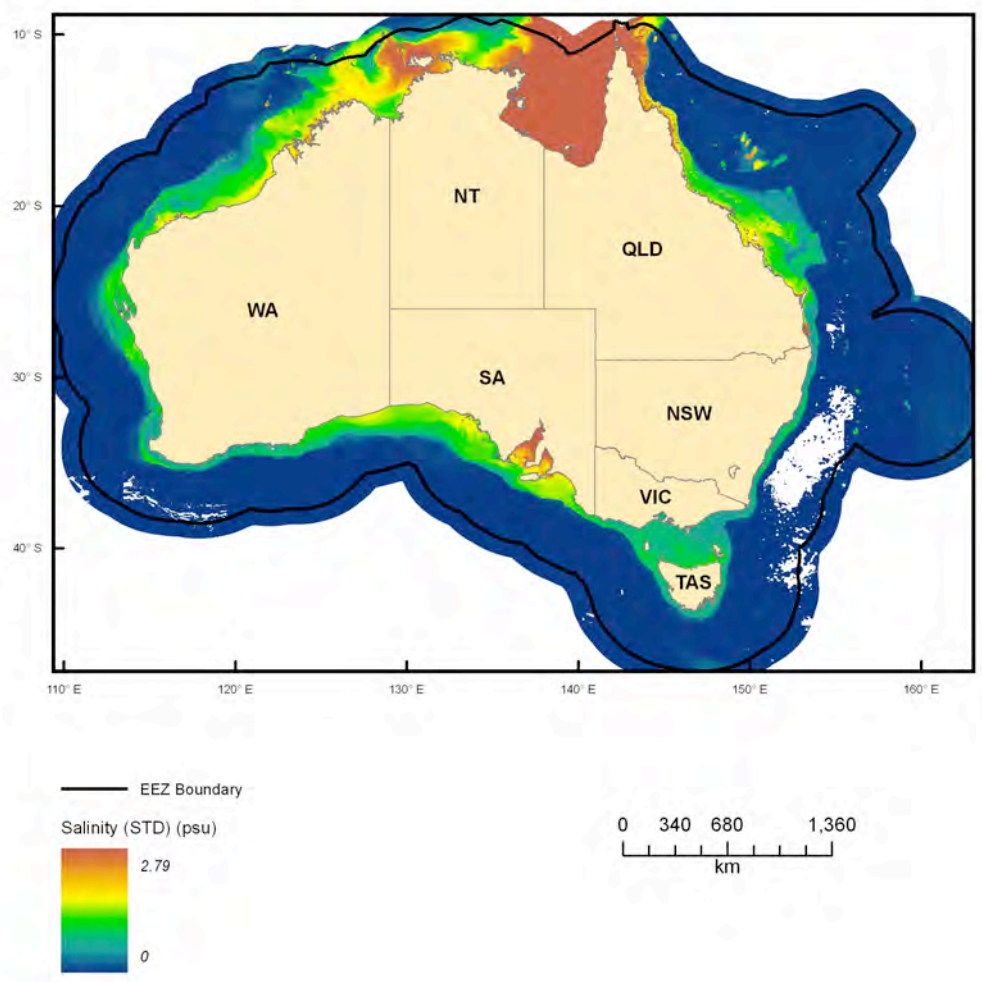

Figure 2.4.5. Bottom Water Salinity Data – Standard Deviation Map

2.4.6. Bottom Water Salinity Data - Mean

The bottom water salinity data were extracted from the CSIRO Atlas of Regional Seas (CARS2006 - http://www.marine.csiro.au/~dunn/cars2006/) database. The mean for the salinity data (Figure 2.4.6) is used to show the local spatial variation and variation throughout and between years, of salinity in the bottom water.

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Dataset TITLE
CSIRO Atlas of Regional Seas (CARS) – 2006 – Bottom Water Salinity Data - Mean
Dataset ALTERNATE TITLE (i.e. Dataset Name)
s_mean
Dataset AUTHORS
CSIRO Marine Laboratories
Dataset CUSTODIAN (i.e. Name and Contact Details)
CSIRO
Dataset JURISDICTION (i.e. Region Name)
Australia
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OCEANOGRAPHY
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COORDINATE SYSTEM DESCRIPTION
Projection: Geographic
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Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As necessary
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Digital – ASCII
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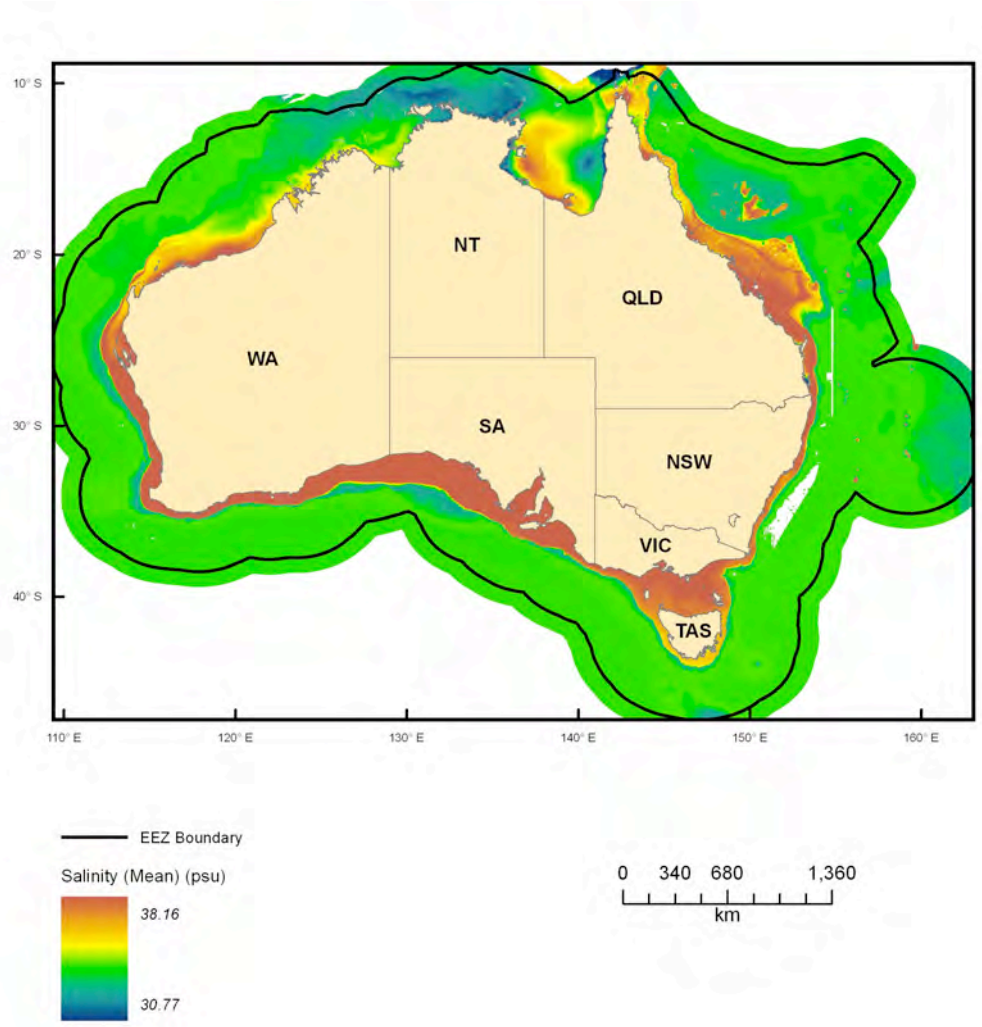

Figure 2.4.6. Bottom Water Salinity Data – Mean Map

2.4.7. Bottom Water Silicate Data – Standard Deviation

The bottom water silicate data were extracted from the CSIRO Atlas of Regional Seas (CARS2006 - http://www.marine.csiro.au/~dunn/cars2006/) database. The standard deviation for the silicate data (Figure 2.4.7) is used to show the local spatial and temporal variation of silicate in the bottom water.

Silicates achieve an aqueous phase by chemical weathering and mixing with water. Once dissolved in the ocean the silicate which occurs as a silicic acid is polymerised by diatoms to construct their cell walls. Silicic acid acts as the limiting agent in the production of diatoms; therefore its quantity is an indicator of the level of primary productivity in respect to diatoms (Gilpin, Davidson & Roberts 2004). Silica is also used by some sponges to produce spicules, which can be described as a form of skeleton for the sponges (Barnes & Hughes 1988).

Dataset TITLE
CSIRO Atlas of Regional Seas (CARS) – 2006 – Bottom Water Silicate Data – Standard Deviation
Dataset ALTERNATE TITLE (i.e. Dataset Name)
si_std
Dataset AUTHORS
CSIRO Marine Laboratories
Dataset CUSTODIAN (i.e. Name and Contact Details)
CSIRO
Dataset JURISDICTION (i.e. Region Name)
Australia
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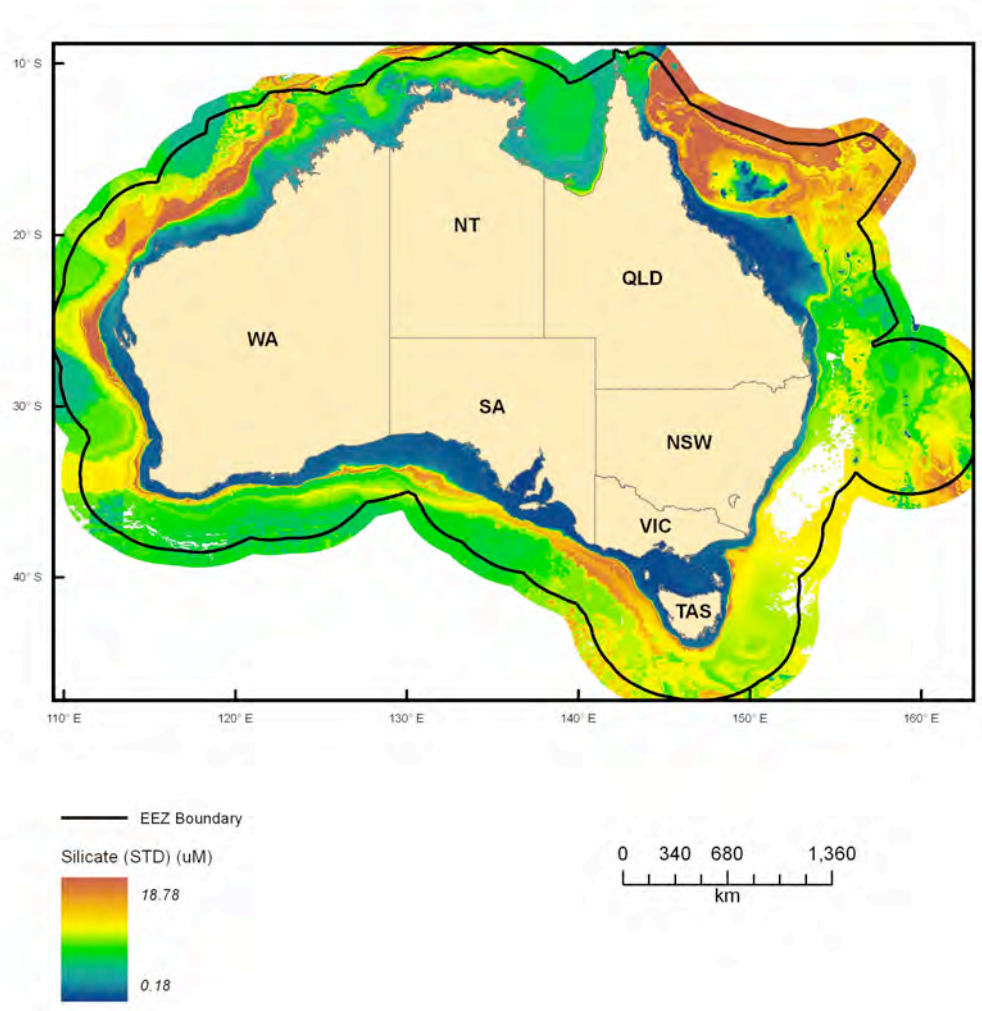

Figure 2.4.7. Bottom Water Silicate Data – Standard Deviation Map

2.4.8. Bottom Water Silicate Data – Mean

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si_mean
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ADDITIONAL METADATA
None

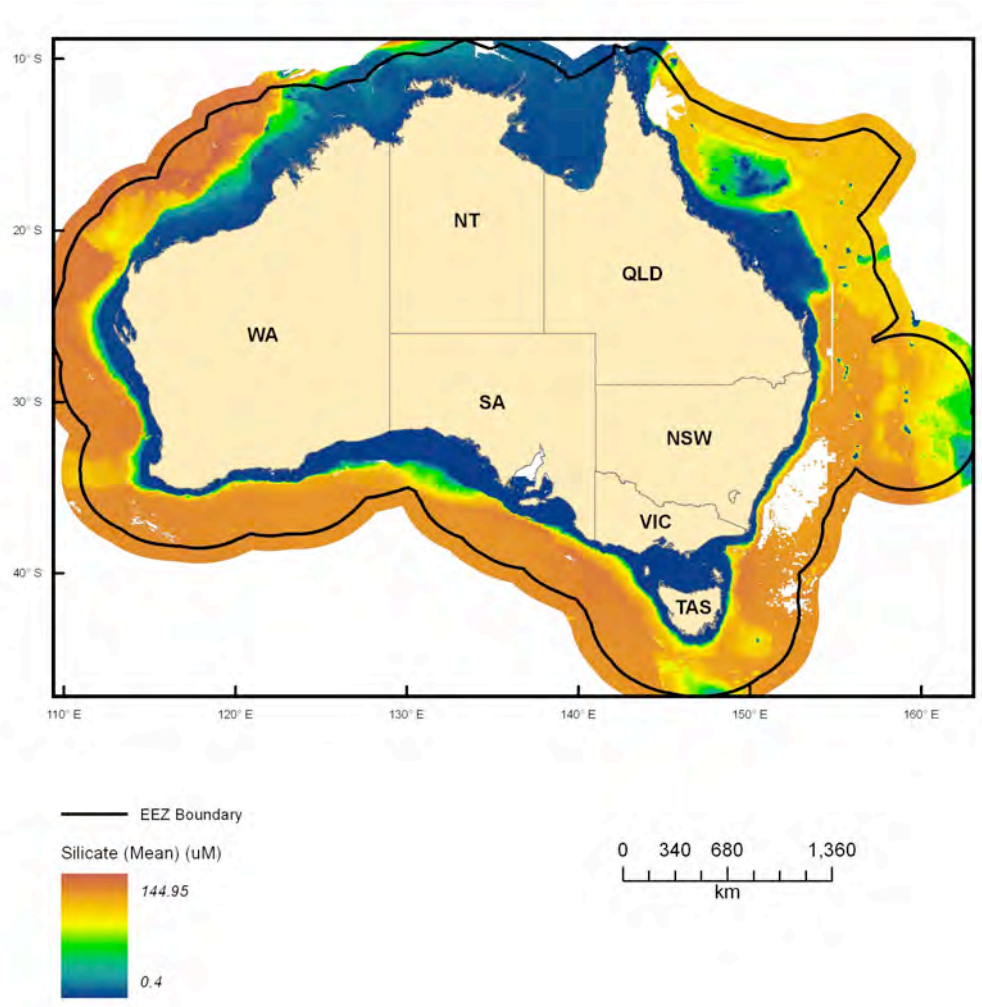

Figure 2.4.8. Bottom Water Silicate Data – Mean Map

2.4.9. Bottom Water Phosphate Data – Standard Deviation

The bottom water phosphate data were extracted from the CSIRO Atlas of Regional Seas (CARS2006 - http://www.marine.csiro.au/~dunn/cars2006/) database. The standard deviation for the phosphate data (Figure 2.4.9) is used to show the local spatial and temporal variation of phosphate in the bottom water.

Phosphate is essential in biological systems as it is necessary for a number of chemical reactions which occur in living tissue. A number of phosphates are soluble in water, and these phosphates are made available by the chemical weathering of phosphorous from the earths crust. As phosphates are a limiting agent in organic growth (Barnes & Hughes 1988) its presence is an indicator of the type of benthic marine biota.

Dataset TITLE
CSIRO Atlas of Regional Seas (CARS) – 2006 – Bottom Water Phosphate Data – Standard Deviation
Dataset ALTERNATE TITLE (i.e. Dataset Name)
po4_std
Dataset AUTHORS
CSIRO Marine Laboratories
Dataset CUSTODIAN (i.e. Name and Contact Details)
CSIRO
Dataset JURISDICTION (i.e. Region Name)
Australia
Description ABSTRACT
CARS2006 spans the southern 2/3 of the world's oceans, from 70S to 26N, except in the Atlantic where is reaches only to10N. The six water properties mapped in are temperature (deg C), salinity (PSU), oxygen (ml/litre), nitrate (micromole/litre), silicate (micromole/litre), phosphate (micromole/litre). It comprises historic mean fields and average seasonal cycles, derived from all available historical subsurface ocean property measurements (primarily research vessel instrument casts and autonomous profiling buoys). The standard deviation for the phosphate data is used to show the spatial and temporal variation of phosphate in the bottom water utilising all of the historical data for each day of the year.
Description Data Category
Oceans
Description ANZLIC Keyword
OCEANOGRAPHY
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
North: -7.945
South: -48.155
East: 164.225
West: 108.225
COORDINATE SYSTEM DESCRIPTION
Projection: Geographic
Datum: WGS84
Units: DD
Description SPATIAL SCALE or RESOLUTION
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE (yyyy-mm-dd)
2006-02-24
Dataset Currency ENDING DATE (yyyy-mm-dd)
2006-02-24
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY

As necessary
Access STORED DATA FORMAT
Digital – netCDF
Digital – ASCII
ArcInfo Grid
Access AVAILABLE FORMAT TYPE(S)
Digital – netCDF
Digital – ASCII
ArcInfo Grid
Access ACCESS CONSTRAINT
None
Use USE LIMITATIONS
If publications arise from work that makes use of CARS please forward a copy of publication to CSIRO Marine Laboratories
Use ACKNOWLEDGEMENTS (ie Data Source, Contributing Authors, etc)
CSIRO Marine Laboratories - http://www.marine.csiro.au/~dunn/cars2006/index.html#refs
Data Quality LINEAGE
BLUElink Ocean Archive (BOA) is the result of collecting together the majority of global high-quality buoy and shipboard deepwater hydrographic cast data. It is built on the NOAA/NODC World Ocean Database, WOCE WHP3, Argo, TAO, CSIRO and NIWA archives, and a number of other sources. BOA is an integral component of the development of the CARS climatologies.
The quality control of profile data involves many steps, including:
- location and depth plausibility check
- value range checking against 3D global value range tables
- comparison to global S(T) climatology for outlier detection
- comparison to existing CARS seasonal estimates (ie residuals testing) for outlier detection
- ingestion into CARS, and a second level of residuals testing, using a tighter threshold (thresholds are set as a multiple of the mapped RMS of residuals.)
- examination of resultant CARS fields, especially for bullseyes and structure in the RMS-residuals and seasonal harmonics fields, since these are more sensitive to bad data.

Prior to being compared with CARS fields, the profiles are interpolated onto a set of 79 CSIRO Version-3 Standard Depth Levels (CSL3).
The component datasets of BOA are stored separately in a range of formats since the nature of these datasets is quite varied. This approach allows easy updating of components (for example, the Argo subset is completely renewed every couple of months.) Where the same data could reside in multiple datasets, those datasets are duplicate cross-checked after any updates (scanning only on the basis of time and location, not the enormous task of searching for duplicated property profiles.)
Data Quality POSITIONAL ACCURACY
Errors may occur in location of cast data, which especially arises when data is passed from originator to accumulator organisations. For example, 1100 WOA94 casts were rejected prior to mapping due to being landward of the GEBCO coastline.
Data Quality ATTRIBUTE ACCURACY
Unknown
Data Quality LOGICAL CONSISTENCY
Data was screened for duplicates and bad positions, outliers to global t-s relations, and outliers of residuals to intermediate mappings.
Data Quality COMPLETENESS
Completed
Contact Information CONTACT ORGANISATION
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Contact Information POSTCODE
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Contact Information TELEPHONE
+61 3 6232 5417 (J.Dunn); +61 3 9239 4645 (CMAR); 1300 363 400, +61 3 9545 2176 (CSIRO)
Contact Information FACSIMILE
+612 6249 9999
Contact Information ELECTRONIC MAIL ADDRESS
Jeff.Dunn@csiro.au
Metadata Date METADATA DATE (yyyy-mm-dd)
2006-02-24
ADDITIONAL METADATA
None

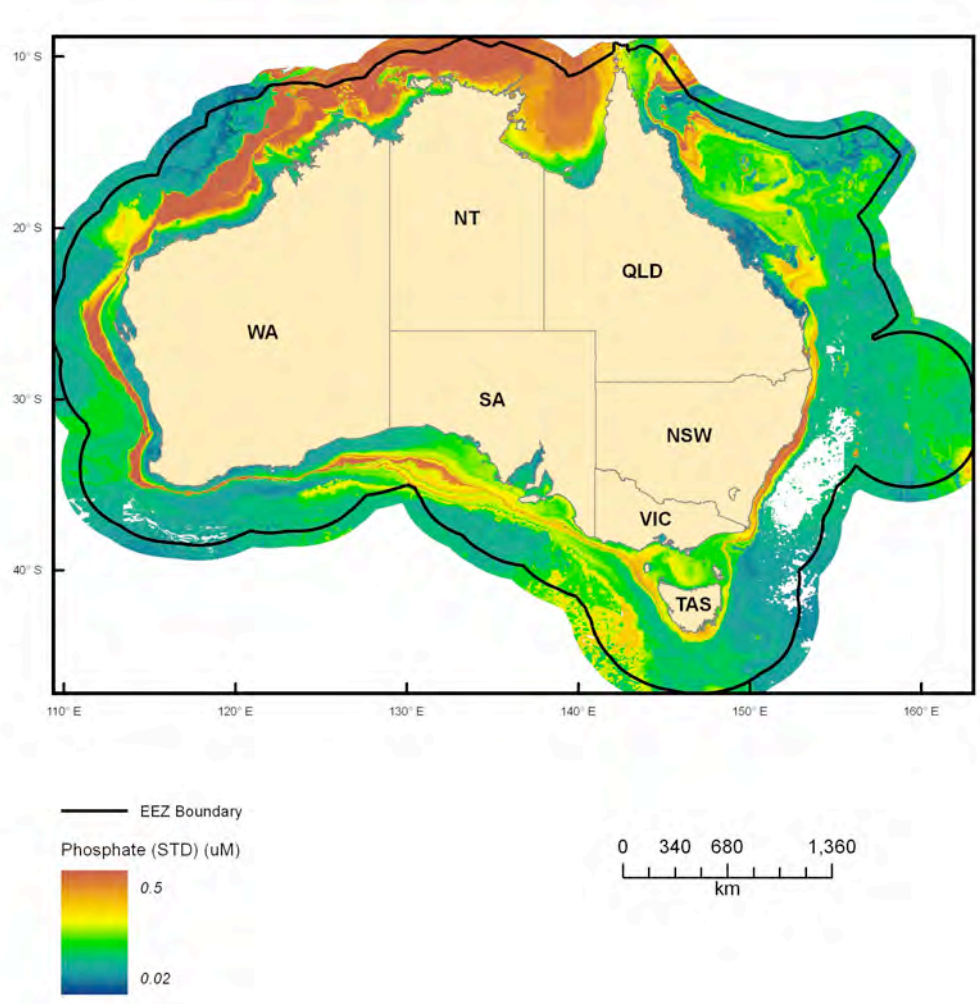

Figure 2.4.9. Bottom Water Phosphate Data – Standard Deviation Map

2.4.10. Bottom Water Phosphate Data - Mean

The bottom water phosphate data were extracted from the CSIRO Atlas of Regional Seas (CARS2006 - http://www.marine.csiro.au/~dunn/cars2006/) database. The mean for the phosphate data (Figure 2.4.10) is used to show the local spatial variation and variation throughout and between years, of phosphate in the bottom water.

Phosphate is essential in biological systems as it is necessary for a number of chemical reactions which occur in living tissue. A number of phosphates are soluble in water, and these phosphates are made available by the chemical weathering of phosphorous from the earths crust. As phosphates are a limiting agent in organic growth (Barnes & Hughes 1988) its presence is an indicator of the type of benthic marine biota.

Dataset TITLE
CSIRO Atlas of Regional Seas (CARS) – 2006 – Bottom Water Phosphate Data - Mean
Dataset ALTERNATE TITLE (i.e. Dataset Name)
po4_mean
Dataset AUTHORS
CSIRO Marine Laboratories
Dataset CUSTODIAN (i.e. Name and Contact Details)
CSIRO
Dataset JURISDICTION (i.e. Region Name)
Australia
Description ABSTRACT
CARS2006 spans the southern 2/3 of the world's oceans, from 70S to 26N, except in the Atlantic where is reaches only to10N. The six water properties mapped in are temperature (deg C), salinity (PSU), oxygen (ml/litre), nitrate (micromole/litre), silicate (micromole/litre), phosphate (micromole/litre). It comprises historic mean fields and average seasonal cycles, derived from all available historical subsurface ocean property measurements (primarily research vessel instrument casts and autonomous profiling buoys). The mean refers to the long-term average of phosphate in the bottom water at each location.
Description Data Category
Oceans
Description ANZLIC Keyword
OCEANOGRAPHY
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
North: -7.945
South: -48.155
East: 164.225
West: 108.225
COORDINATE SYSTEM DESCRIPTION
Projection: Geographic
Datum: WGS84
Units: DD
Description SPATIAL SCALE or RESOLUTION
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE (yyyy-mm-dd)
2006-02-24
Dataset Currency ENDING DATE (yyyy-mm-dd)
2006-02-24
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As necessary
Access STORED DATA FORMAT

Digital – netCDF
Digital – ASCII
ArcInfo Grid
Access AVAILABLE FORMAT TYPE(S)
Digital – netCDF
Digital – ASCII
ArcInfo Grid
Access ACCESS CONSTRAINT
None
Use USE LIMITATIONS
If publications arise from work that makes use of CARS please forward a copy of publication to CSIRO Marine Laboratories
Use ACKNOWLEDGEMENTS (ie Data Source, Contributing Authors, etc)
CSIRO Marine Laboratories - http://www.marine.csiro.au/~dunn/cars2006/index.html#refs
Data Quality LINEAGE
BLUElink Ocean Archive (BOA) is the result of collecting together the majority of global high-quality buoy and shipboard deepwater hydrographic cast data. It is built on the NOAA/NODC World Ocean Database, WOCE WHP3, Argo, TAO, CSIRO and NIWA archives, and a number of other sources. BOA is an integral component of the development of the CARS climatologies.
The quality control of profile data involves many steps, including:
- location and depth plausibility check
- value range checking against 3D global value range tables
- comparison to global S(T) climatology for outlier detection
- comparison to existing CARS seasonal estimates (ie residuals testing) for outlier detection
- ingestion into CARS, and a second level of residuals testing, using a tighter threshold (thresholds are set as a multiple of the mapped RMS of residuals.)
- examination of resultant CARS fields, especially for bullseyes and structure in the RMS-residuals and seasonal harmonics fields, since these are more sensitive to bad data.

Prior to being compared with CARS fields, the profiles are interpolated onto a set of 79 CSIRO Version-3 Standard Depth Levels (CSL3).
The component datasets of BOA are stored separately in a range of formats since the nature of these datasets is quite varied. This approach allows easy updating of components (for example, the Argo subset is completely renewed every couple of months.) Where the same data could reside in multiple datasets, those datasets are duplicate cross-checked after any updates (scanning only on the basis of time and location, not the enormous task of searching for duplicated property profiles.)
Data Quality POSITIONAL ACCURACY
Errors may occur in location of cast data, which especially arises when data is passed from originator to accumulator organisations. For example, 1100 WOA94 casts were rejected prior to mapping due to being landward of the GEBCO coastline.
Data Quality ATTRIBUTE ACCURACY
Unknown
Data Quality LOGICAL CONSISTENCY
Data was screened for duplicates and bad positions, outliers to global t-s relations, and outliers of residuals to intermediate mappings.
Data Quality COMPLETENESS
Completed
Contact Information CONTACT ORGANISATION
CSIRO Marine Laboratories
Contact Information CONTACT POSITION
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Contact Information SUBURB OR PLACE OR LOCALITY
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Contact Information STATE

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Contact Information POSTCODE
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Contact Information TELEPHONE
+61 3 6232 5417 (J.Dunn); +61 3 9239 4645 (CMAR); 1300 363 400, +61 3 9545 2176 (CSIRO)
Contact Information FACSIMILE
+612 6249 9999
Contact Information ELECTRONIC MAIL ADDRESS
Jeff.Dunn@csiro.au
Metadata Date METADATA DATE (yyyy-mm-dd)
2006-02-24
ADDITIONAL METADATA
None

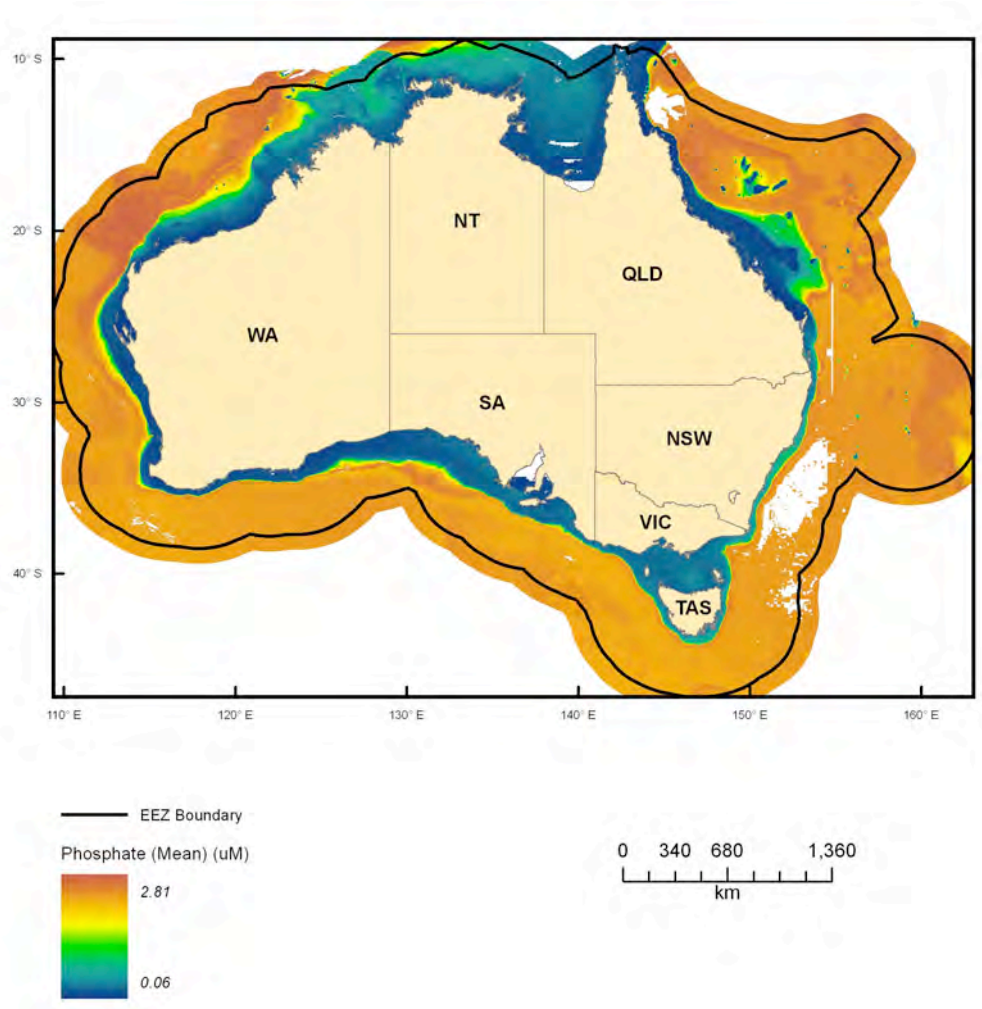

Figure 2.4.10. Bottom Water Phosphate Data – Mean Map

2.4.11. Bottom Water Temperature Data – Standard Deviation

The bottom water temperature data were extracted from the CSIRO Atlas of Regional Seas (CARS2006 - http://www.marine.csiro.au/~dunn/cars2006/) database. The standard deviation for the temperature data (Figure 2.4.11) is used to show the local spatial and temporal variation of temperature in the bottom water.

Ocean temperature is a useful indicator of the type of marine life that could be found at a particular location. Many marine plants and organisms have a relatively narrow range of tolerance for temperature, and will either perish or be out-competed where temperatures are outside their comfort zone (Przeslawski *et al.* 2008).

Dataset TITLE
CSIRO Atlas of Regional Seas (CARS) – 2006 – Bottom Water Temperature Data – Standard Deviation
Dataset ALTERNATE TITLE (i.e. Dataset Name)
t_std
Dataset AUTHORS
CSIRO Marine Laboratories
Dataset CUSTODIAN (i.e. Name and Contact Details)
CSIRO
Dataset JURISDICTION (i.e. Region Name)
Australia
Description ABSTRACT
CARS2006 spans the southern 2/3 of the world's oceans, from 70S to 26N, except in the Atlantic where is reaches only to10N. The six water properties mapped in are temperature (deg C), salinity (PSU), oxygen (ml/litre), nitrate (micromole/litre), silicate (micromole/litre), phosphate (micromole/litre). It comprises historic mean fields and average seasonal cycles, derived from all available historical subsurface ocean property measurements (primarily research vessel instrument casts and autonomous profiling buoys). The standard deviation for the bottom water temperature data is used to show the spatial and temporal variation of temperature in the bottom water utilising all of the historical data for each day of the year.
Description Data Category
Oceans
Description ANZLIC Keyword
OCEANOGRAPHY
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
North: -7.945
South: -48.155
East: 164.225
West: 108.225
COORDINATE SYSTEM DESCRIPTION
Projection: Geographic
Datum: WGS84
Units: DD
Description SPATIAL SCALE or RESOLUTION
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE (yyyy-mm-dd)
2006-02-24
Dataset Currency ENDING DATE (yyyy-mm-dd)
2006-02-24
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As necessary

Access STORED DATA FORMAT
Digital – netCDF
Digital – ASCII
ArcInfo Grid
Access AVAILABLE FORMAT TYPE(S)
Digital – netCDF
Digital – ASCII
ArcInfo Grid
Access ACCESS CONSTRAINT
None
Use USE LIMITATIONS
If publications arise from work that makes use of CARS please forward a copy of publication to CSIRO Marine Laboratories
Use ACKNOWLEDGEMENTS (ie Data Source, Contributing Authors, etc)
CSIRO Marine Laboratories - http://www.marine.csiro.au/~dunn/cars2006/index.html#refs
Data Quality LINEAGE
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- value range checking against 3D global value range tables
- comparison to global S(T) climatology for outlier detection
- comparison to existing CARS seasonal estimates (ie residuals testing) for outlier detection
- ingestion into CARS, and a second level of residuals testing, using a tighter threshold (thresholds are set as a multiple of the mapped RMS of residuals.)
- examination of resultant CARS fields, especially for bullseyes and structure in the RMS-residuals and seasonal harmonics fields, since these are more sensitive to bad data.

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Data Quality POSITIONAL ACCURACY
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Data Quality ATTRIBUTE ACCURACY
Unknown
Data Quality LOGICAL CONSISTENCY
Data was screened for duplicates and bad positions, outliers to global t-s relations, and outliers of residuals to intermediate mappings.
Data Quality COMPLETENESS
Completed
Contact Information CONTACT ORGANISATION
CSIRO Marine Laboratories
Contact Information CONTACT POSITION
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Contact Information MAIL ADDRESS 1
GPO Box 1538
Contact Information SUBURB OR PLACE OR LOCALITY
Hobart

Contact Information STATE
Tasmania
Contact Information COUNTRY
Australia
Contact Information POSTCODE
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Contact Information TELEPHONE
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Contact Information FACSIMILE
+612 6249 9999
Contact Information ELECTRONIC MAIL ADDRESS
Jeff.Dunn@csiro.au
Metadata Date METADATA DATE (yyyy-mm-dd)
2006-02-24
ADDITIONAL METADATA
None

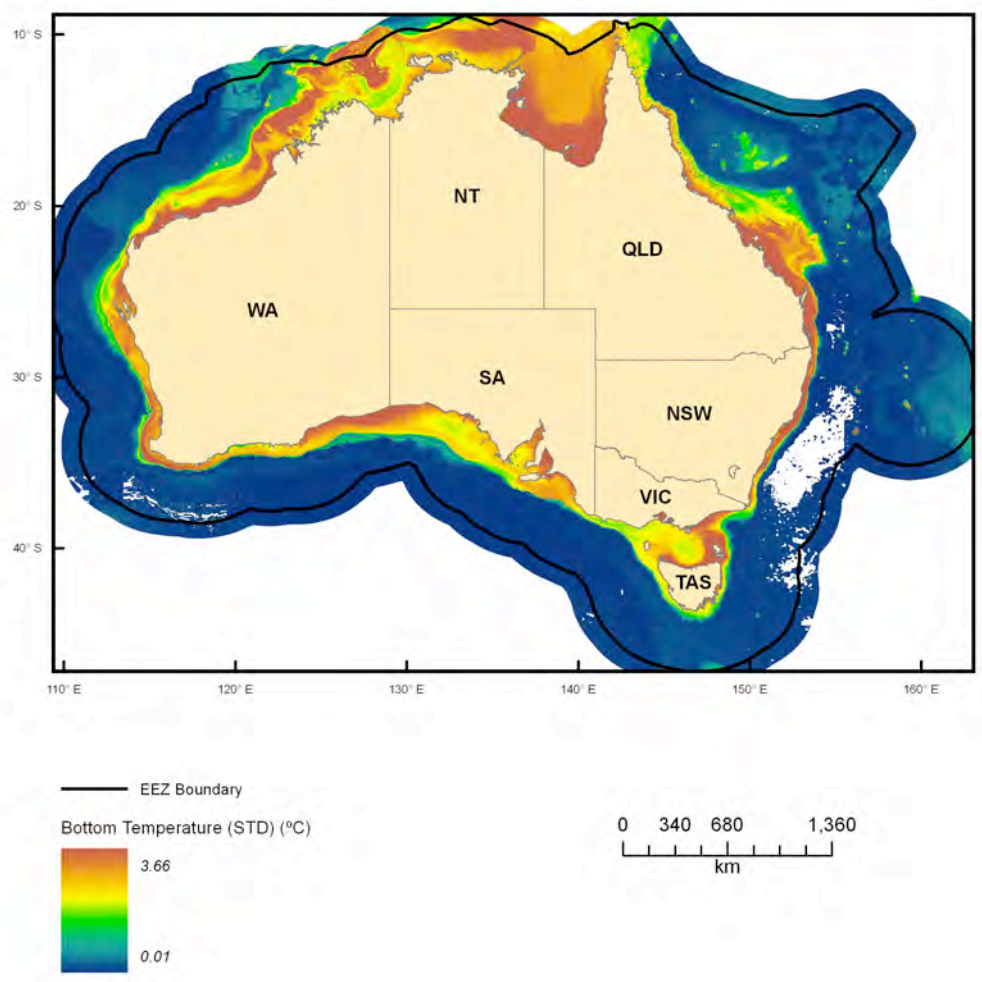

Figure 2.4.11. Bottom Water Temperature Data – Standard Deviation Map

2.4.12. Bottom Water Temperature Data – Mean

The bottom water temperature data were extracted from the CSIRO Atlas of Regional Seas (CARS2006 - http://www.marine.csiro.au/~dunn/cars2006/) database. The mean for the temperature data (Figure 2.4.12) is used to show the local spatial variation and variation throughout and between years, of temperature in the bottom water.

Ocean temperature is a useful indicator of the type of marine life that could be found at a particular location. Many marine plants and organisms have a relatively narrow range of tolerance for temperature, and will either perish or be out-competed where temperatures are outside their comfort zone (Przeslawski *et al.* 2008).

Dataset TITLE
CSIRO Atlas of Regional Seas (CARS) – 2006 – Bottom Water Temperature Data - Mean
Dataset ALTERNATE TITLE (i.e. Dataset Name)
t_mean
Dataset AUTHORS
CSIRO Marine Laboratories
Dataset CUSTODIAN (i.e. Name and Contact Details)
CSIRO
Dataset JURISDICTION (i.e. Region Name)
Australia
Description ABSTRACT
CARS2006 spans the southern 2/3 of the world's oceans, from 70S to 26N, except in the Atlantic where is reaches only to10N. The six water properties mapped in are temperature (deg C), salinity (PSU), oxygen (ml/litre), nitrate (micromole/litre), silicate (micromole/litre), phosphate (micromole/litre). It comprises historic mean fields and average seasonal cycles, derived from all available historical subsurface ocean property measurements (primarily research vessel instrument casts and autonomous profiling buoys). The mean refers to the long-term average of temperature in the bottom water at each location.
Description Data Category
Oceans
Description ANZLIC Keyword
OCEANOGRAPHY
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
North: -7.945
South: -48.155
East: 164.225
West: 108.225
COORDINATE SYSTEM DESCRIPTION
Projection: Geographic
Datum: WGS84
Units: DD
Description SPATIAL SCALE or RESOLUTION
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE (yyyy-mm-dd)
2006-02-24
Dataset Currency ENDING DATE (yyyy-mm-dd)
2006-02-24
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As necessary

Access STORED DATA FORMAT

Digital – netCDF
Digital – ASCII
ArcInfo Grid
Access AVAILABLE FORMAT TYPE(S)
Digital – netCDF
Digital – ASCII
ArcInfo Grid
Access ACCESS CONSTRAINT
None
Use USE LIMITATIONS
If publications arise from work that makes use of CARS please forward a copy of publication to CSIRO Marine Laboratories
Use ACKNOWLEDGEMENTS (ie Data Source, Contributing Authors, etc)
CSIRO Marine Laboratories - http://www.marine.csiro.au/~dunn/cars2006/index.html#refs
Data Quality LINEAGE
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- comparison to existing CARS seasonal estimates (ie residuals testing) for outlier detection
- ingestion into CARS, and a second level of residuals testing, using a tighter threshold (thresholds are set as a multiple of the mapped RMS of residuals.)
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Data Quality POSITIONAL ACCURACY
Errors may occur in location of cast data, which especially arises when data is passed from originator to accumulator organisations. For example, 1100 WOA94 casts were rejected prior to mapping due to being landward of the GEBCO coastline.
Data Quality ATTRIBUTE ACCURACY
Unknown
Data Quality LOGICAL CONSISTENCY
Data was screened for duplicates and bad positions, outliers to global t-s relations, and outliers of residuals to intermediate mappings.
Data Quality COMPLETENESS
Completed
Contact Information CONTACT ORGANISATION
CSIRO Marine Laboratories
Contact Information CONTACT POSITION
Jeff Dunn
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Contact Information SUBURB OR PLACE OR LOCALITY
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Contact Information POSTCODE
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+61 3 6232 5417 (J.Dunn); +61 3 9239 4645 (CMAR); 1300 363 400, +61 3 9545 2176 (CSIRO)
Contact Information FACSIMILE
+612 6249 9999
Contact Information ELECTRONIC MAIL ADDRESS
Jeff.Dunn@csiro.au
Metadata Date METADATA DATE (yyyy-mm-dd)
2006-02-24
ADDITIONAL METADATA
None

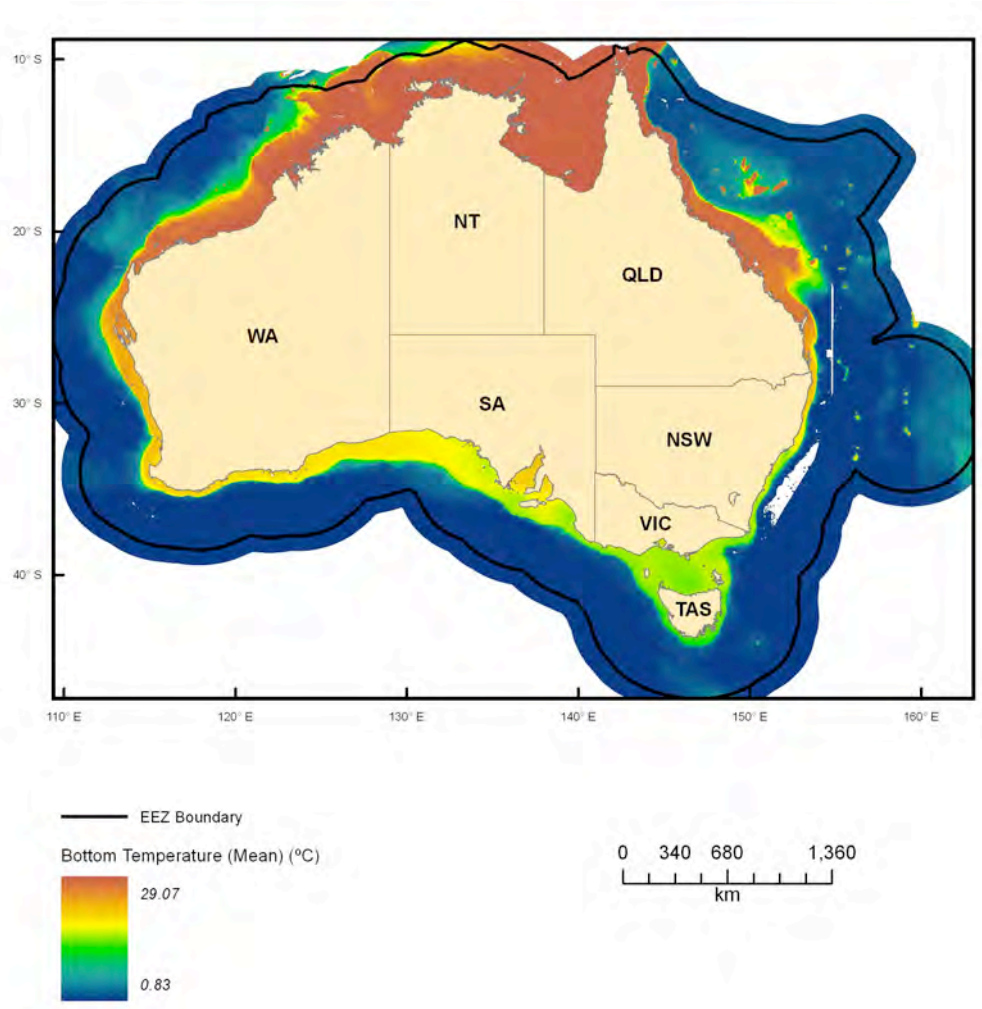

Figure 2.4.12. Bottom Water Temperature Data – Mean Map

2.5. SATELLITE DATA (CSIRO)

MODIS - The Moderate Resolution Imaging Spectroradiometer (MODIS - http://modis.gsfc.nasa.gov/) administered by NASA Goddard Space Flight Center, is a 36-band spectroradiometer measuring visible and infrared radiation and obtaining data that are being used to derive products ranging from vegetation, land surface cover, and ocean chlorophyll fluorescence to cloud and aerosol properties, fire occurrence, snow cover on the land, and sea ice cover on the oceans, from a continuous global coverage every 1 to 2 days.

SeaWIFS - The SeaWiFS Transfer Radiometer (SXR) was built for the Sea-viewing Wide Field-of-view Sensor (SeaWiFS - http://oceancolor.gsfc.nasa.gov/SeaWiFS/) Project as part of an Interagency Agreement with the National Aeronautics and Space Administration (NASA). The SXR is a multichannel radiometer designed to verify and compare measurements of spectral radiance at six discrete wavelengths in the visible and near infrared for various calibration sources in the SeaWiFS Project.

2.5.1. MODIS Terra Sea Surface Temperature – Standard Deviation

This data set contains the standard deviation of the MODIS Terra sea surface temperature (Figure 2.5.1) generated from the climatology monthly means gridded into 0.01 degree cells. The monthly climatologies represent the mean values for each month across the whole dataset time series.

Ocean temperature is a useful indicator of the type of marine life that could be found at a particular location. Many marine plants and organisms have a relatively narrow range of tolerance for temperature, and will either perish or be out-competed where temperatures are outside their comfort zone (Przeslawski *et al.* 2008).

Dataset TITLE
MODIS Terra Sea Surface Temperature - Standard Deviation
Dataset ALTERNATE TITLE (i.e. Dataset Name)
mtsst_std
Dataset AUTHORS
CSIRO Division of Marine and Atmospheric Research - Hobart
Dataset CUSTODIAN
CSIRO Division of Marine and Atmospheric Research - Hobart
Dataset JURISDICTION
Australia
Description ABSTRACT
This data set contains the standard deviation of the MODIS Terra sea surface temperature generated from the climatology monthly means; the monthly climatologies represent the mean values for each month across the whole dataset time series. The data are received as monthly composites, with a 4 km resolution, and are constrained to the region between 90E and 180E, and 10N to 60S. The data was sourced from http://modis.gsfc.nasa.gov/. The Moderate Resolution Imaging Spectroradiometer (MODIS) administered by NASA Goddard Space Flight Center, is a 36-band spectroradiometer measuring visible and infrared radiation and obtaining data that are being used to derive products ranging from vegetation, land surface cover, and ocean chlorophyll fluorescence to cloud and aerosol properties, fire occurrence, snow cover on the land, and sea ice cover on the oceans, from a continuous global coverage every 1 to 2 days. The first MODIS instrument was launched on board the Terra satellite in December 1999.
Description Data Category
Oceans
Description ANZLIC Keyword
OCEANOGRAPHY
Description ANZLIC Qualifier
Mapping

Description GEOGRAPHIC EXTENT BOUNDARIES
N_LAT: -7.94
S_LAT: -48.15
E_LONG: 164.22
W_LONG: 108.22
COORDINATE SYSTEM DESCRIPTION
Projection: GEOGRAPHIC
Datum: WGS84
Units: DD
Description NOMINAL SCALE
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE
2008-07-31
Dataset Currency ENDING DATE
2008-07-31
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required
Access STORED DATA FORMAT
DIGITAL – ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL – ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Data Quality LINEAGE
This was extracted from http://modis.gsfc.nasa.gov/data/atbd/atbd_mod19.pdf being the parts relevant to the 4km mapped modis monthly mean chlorophyll, K_490, suspended solids and sea surface temperature data. The source of the data was the MODIS website(http://modis.gsfc.nasa.gov/data). No additional processing or quality control was undertaken on this data set. The only changes made were to restrict the geographical and temporal coverage to the region between 90E and 180E, and 10N to 60S.
Data Quality POSITIONAL ACCURACY
Unknown
Data Quality ATTRIBUTE ACCURACY
Unknown
Data Quality LOGICAL CONSISTENCY
Unknown
Data Quality COMPLETENESS
Where no data is available in a pixel due to clouds or other interference, the previous 8-day average is carried forward in that pixel in this data set. Pixels where no usable data were available during each 8-day compositing period are represented on the image by black dots. Substantial areas of black (eg south of 50S during winter) are a combination of extreme cloudiness and low ambient light.
Contact Information CONTACT ORGANISATION
CSIRO Division of Marine and Atmospheric Research - Hobart
Contact Information CONTACT POSITION
Mr Brian Griffiths
Contact Information MAIL ADDRESS 1
GPO Box 1538
Contact Information SUBURB OR PLACE OR LOCALITY
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Contact Information STATE
TAS
Contact Information COUNTRY
Australia

Contact Information POSTCODE
7000
Contact Information TELEPHONE
+61 3 9239 4645 (CMAR); 1300 363 400, +61 3 9545 2176 (CSIRO)
Contact Information FACSIMILE
+612 6249 9999
Contact Information ELECTRONIC MAIL ADDRESS
brian.griffiths@csiro.au
Metadata Date METADATA DATE
2010-01-01
ADDITIONAL METADATA
None

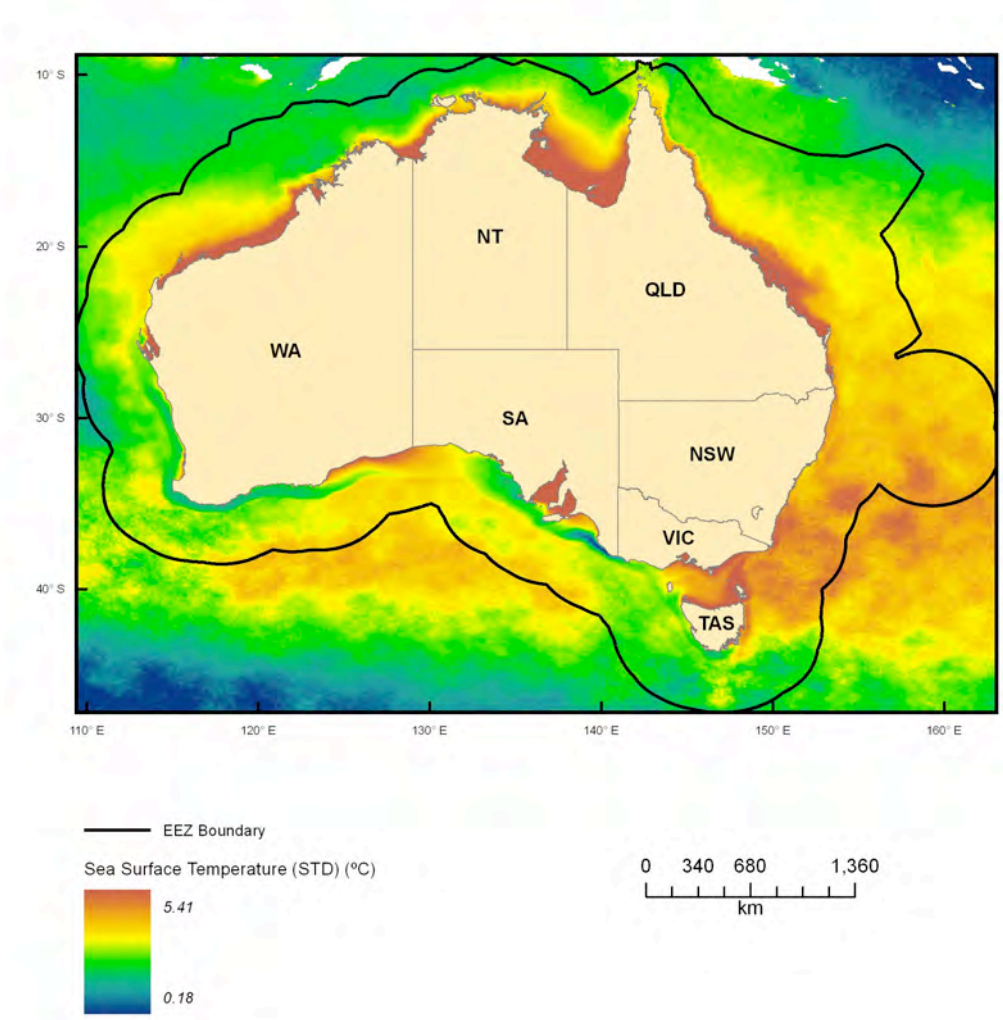

Figure 2.5.1. MODIS Terra Sea Surface Temperature – Standard Deviation Map

2.5.2. MODIS Terra Sea Surface Temperature - Mean

This data set contains the MODIS Terra mean sea surface temperature (Figure 2.5.2) generated from the climatology monthly means gridded into 0.01 degree cells. The monthly climatology's represent the mean values for each month across the whole dataset time series.

Ocean temperature is a useful indicator of the type of marine life that could be found at a particular location. Many marine plants and organisms have a relatively narrow range of tolerance for temperature, and will either perish or be out-competed where temperatures are outside their comfort zone (Przeslawski *et al.* 2008).

Dataset TITLE
MODIS Terra Sea Surface Temperature - Mean
Dataset ALTERNATE TITLE (i.e. Dataset Name)
mtsst_mean
Dataset AUTHORS
CSIRO Division of Marine and Atmospheric Research - Hobart
Dataset CUSTODIAN
CSIRO Division of Marine and Atmospheric Research - Hobart
Dataset JURISDICTION
Australia
Description ABSTRACT
This data set contains the MODIS Terra mean sea surface temperature generated from the climatology monthly means; the monthly climatologies represent the mean values for each month across the whole dataset time series. The data are received as monthly composites, with a 4 km resolution, and are constrained to the region between 90E and 180E, and 10N to 60S. The data was sourced from http://modis.gsfc.nasa.gov/. The Moderate Resolution Imaging Spectroradiometer (MODIS) administered by NASA Goddard Space Flight Center, is a 36-band spectroradiometer measuring visible and infrared radiation and obtaining data that are being used to derive products ranging from vegetation, land surface cover, and ocean chlorophyll fluorescence to cloud and aerosol properties, fire occurrence, snow cover on the land, and sea ice cover on the oceans, from a continuous global coverage every 1 to 2 days. The first MODIS instrument was launched on board the Terra satellite in December 1999.
Description Data Category
Oceans
Description ANZLIC Keyword
OCEANOGRAPHY
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
N_LAT: -7.94
S_LAT: -48.15
E_LONG: 164.22
W_LONG: 108.22
COORDINATE SYSTEM DESCRIPTION
Projection: GEOGRAPHIC
Datum: WGS84
Units: DD
Description NOMINAL SCALE
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE
2008-07-31
Dataset Currency ENDING DATE
2008-07-31
Dataset Status PROGRESS
Completed

Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required
Access STORED DATA FORMAT
DIGITAL – ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL – ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Data Quality LINEAGE
This was extracted from http://modis.gsfc.nasa.gov/data/atbd/atbd_mod19.pdf being the parts relevant to the 4km mapped modis monthly mean chlorophyll, K_490, suspended solids and sea surface temperature data. The source of the data was the MODIS website (http://modis.gsfc.nasa.gov/data). No additional processing or quality control was undertaken on this data set. The only changes made were to restrict the geographical and temporal coverage to the region between 90E and 180E, and 10N to 60S.
Data Quality POSITIONAL ACCURACY
Unknown
Data Quality ATTRIBUTE ACCURACY
Unknown
Data Quality LOGICAL CONSISTENCY
Unknown
Data Quality COMPLETENESS
Where no data is available in a pixel due to clouds or other interference, the previous 8-day average is carried forward in that pixel in this data set. Pixels where no usable data were available during each 8-day compositing period are represented on the image by black dots. Substantial areas of black (eg south of 50S during winter) are a combination of extreme cloudiness and low ambient light.
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brian.griffiths@csiro.au
Metadata Date METADATA DATE
2010-01-01
ADDITIONAL METADATA
None

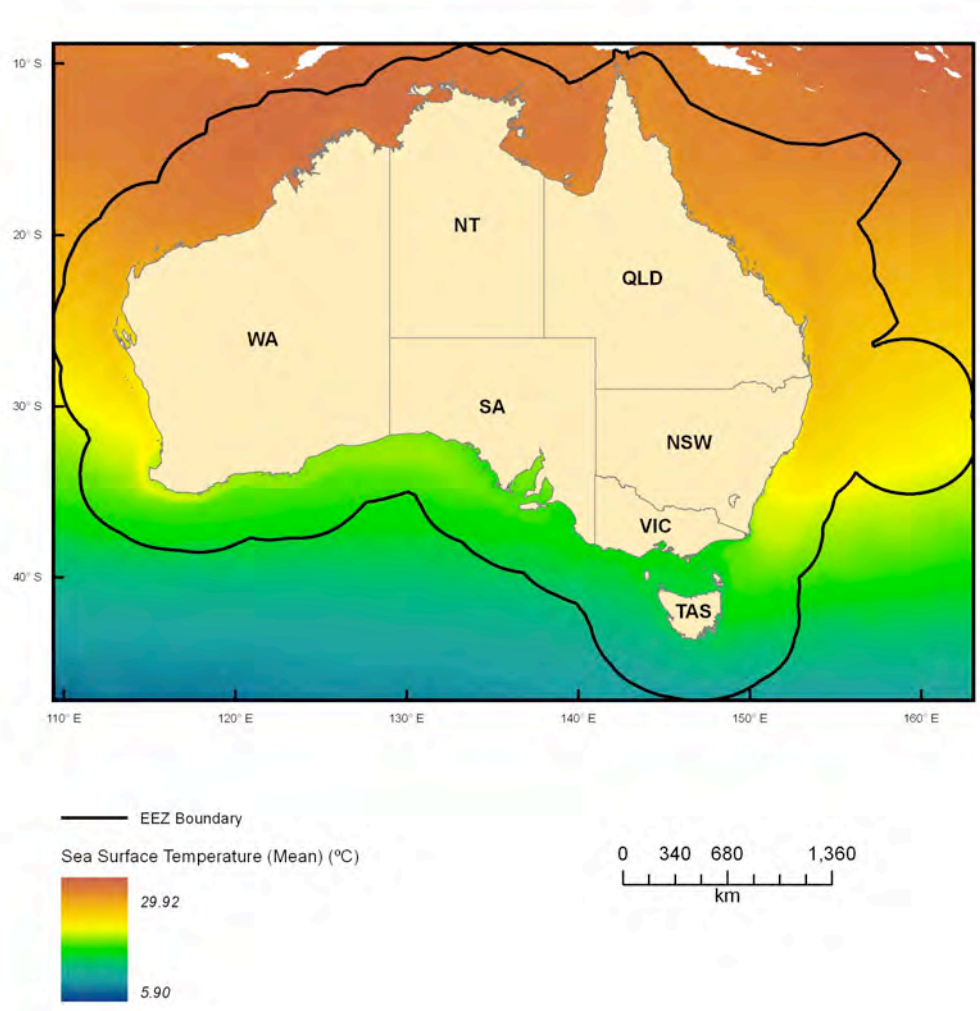

Figure 2.5.2. MODIS Terra Sea Surface Temperature – Mean Map

2.5.3. SeaWiFS Chlorophyll –Standard Deviation

This data set contains the standard deviation of the SeaWiFS chlorophyll data (Figure 2.5.3) generated from the climatology monthly means gridded into 0.01 degree cells. The monthly climatology's represent the mean values for each month across the whole dataset time series.

Chlorophyll *a* is a plant pigment which provides a measurement of the biomass (or quantity) of plants. In the water column, it is a measure of the suspended (or planktonic) biomass of single-celled microscopic plants (Gilpin, Davidson, Roberts 2004). Chlorophyll is a commonly used measure of water quality.

Dataset TITLE
SeaWIFS Chlorophyll – Standard Deviation
Dataset ALTERNATE TITLE (i.e. Dataset Name)
swchlo_std
Dataset AUTHORS
CSIRO Division of Marine and Atmospheric Research - Hobart
Dataset CUSTODIAN
CSIRO Division of Marine and Atmospheric Research - Hobart
Dataset JURISDICTION
Australia
Description ABSTRACT
This data set contains the standard deviation of SeaWIFS chlorophyll generated from the climatology monthly means; the monthly climatologies represent the mean values for each month across the whole dataset time series. Chlorophyll *a* is a plant pigment which provides a measurement of the biomass (or quantity) of plants. In the water column, it is a measure of the suspended (or planktonic) biomass of single-celled microscopic plants. Chlorophyll is a commonly used measure of water quality. High levels of chlorophyll represent algal blooms. The data are received as monthly composites, with a 4 km resolution, and are constrained to the region between 90E and 180E, and 10N to 60S. The data was sourced from http://oceancolor.gsfc.nasa.gov/SeaWiFS/.
Description Data Category
Oceans
Description ANZLIC Keyword
OCEANOGRAPHY
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
N_LAT: -7.94
S_LAT: -48.15
E_LONG: 164.22
W_LONG: 108.22
COORDINATE SYSTEM DESCRIPTION
Projection: GEOGRAPHIC
Datum: WGS84
Units: DD
Description NOMINAL SCALE
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE
2008-07-31
Dataset Currency ENDING DATE
2008-07-31
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required
Access STORED DATA FORMAT

DIGITAL – ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL – ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Data Quality LINEAGE
This was extracted from the SeaWIFS website being the parts relevant to the 4km mapped SeaWIFS monthly mean chlorophyll, k490, suspended solids and sea surface temperature data. The source of the data was the SeaWIFS website http://oceancolor.gsfc.nasa.gov/SeaWiFS/. No additional processing or quality control was undertaken on this data set. The only changes made were to restrict the geographical and temporal coverage to the region between 90E and 180E, and 10N to 60S.
Data Quality POSITIONAL ACCURACY
Unknown
Data Quality ATTRIBUTE ACCURACY
Unknown
Data Quality LOGICAL CONSISTENCY
Unknown
Data Quality COMPLETENESS
Where no data is available in a pixel due to clouds or other interference, the previous 8-day average is carried forward in that pixel in this data set. Pixels where no usable data were available during each 8-day compositing period are represented on the image by black dots. Substantial areas of black (eg south of 50S during winter) are a combination of extreme cloudiness and low ambient light.
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Contact Information FACSIMILE
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Contact Information ELECTRONIC MAIL ADDRESS
brian.griffiths@csiro.au
Metadata Date METADATA DATE
2010-01-01
ADDITIONAL METADATA
None

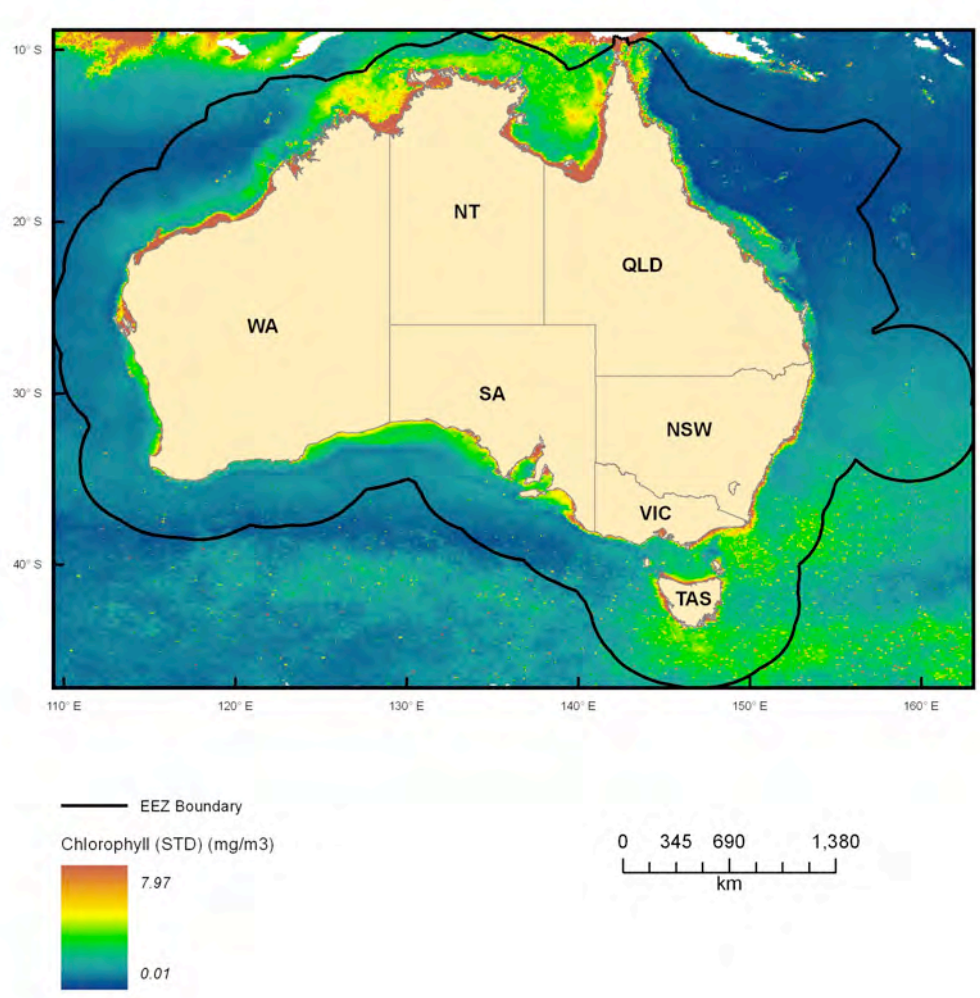

Figure 2.5.3. SeaWIFS Chlorophyll – Standard Deviation Map

2.5.4. SeaWiFS Chlorophyll – Mean

This data set contains the mean of SeaWiFS chlorophyll data (Figure 2.5.4) generated from the climatology monthly means gridded into 0.01 degree cells. The monthly climatologies represent the mean values for each month across the whole dataset time series.

Chlorophyll *a* is a plant pigment which provides a measurement of the biomass (or quantity) of plants. In the water column, it is a measure of the suspended (or planktonic) biomass of single-celled microscopic plants (Gilpin, Davidson, Roberts 2004). Chlorophyll is a commonly used measure of water quality.

Dataset TITLE
SeaWiFS Chlorophyll - Mean
Dataset ALTERNATE TITLE (i.e. Dataset Name)
swchlo_mean
Dataset AUTHORS
CSIRO Division of Marine and Atmospheric Research - Hobart
Dataset CUSTODIAN
CSIRO Division of Marine and Atmospheric Research - Hobart
Dataset JURISDICTION
Australia
Description ABSTRACT
This data set contains the mean of SeaWiFS chlorophyll generated from the climatology monthly means; the monthly climatologies represent the mean values for each month across the whole dataset time series. Chlorophyll *a* is a plant pigment which provides a measurement of the biomass (or quantity) of plants. In the water column, it is a measure of the suspended (or planktonic) biomass of single-celled microscopic plants. Chlorophyll is a commonly used measure of water quality. High levels of chlorophyll represent algal blooms. The data are received as monthly composites, with a 4 km resolution, and are constrained to the region between 90E and 180E, and 10N to 60S. The data was sourced from http://oceancolor.gsfc.nasa.gov/SeaWiFS/.
Description Data Category
Oceans
Description ANZLIC Keyword
OCEANOGRAPHY
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
N_LAT: --7.94
S_LAT: -48.15
E_LONG: 164.22
W_LONG: 108.22
COORDINATE SYSTEM DESCRIPTION
Projection: GEOGRAPHIC
Datum: WGS84
Units: DD
Description NOMINAL SCALE
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE
2008-07-31
Dataset Currency ENDING DATE
2008-07-31
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required
Access STORED DATA FORMAT

DIGITAL – ArcINFO Grid
Access AVAILABLE FORMAT TYPE(S)
DIGITAL – ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Data Quality LINEAGE
This was extracted from the SeaWiFS website being the parts relevant to the 4km mapped SeaWiFS monthly mean chlorophyll, k490, suspended solids and sea surface temperature data. The source of the data was the SeaWiFS website http://oceancolor.gsfc.nasa.gov/SeaWiFS/. No additional processing or quality control was undertaken on this data set. The only changes made were to restrict the geographical and temporal coverage to the region between 90E and 180E, and 10N to 60S.
Data Quality POSITIONAL ACCURACY
Unknown
Data Quality ATTRIBUTE ACCURACY
Unknown
Data Quality LOGICAL CONSISTENCY
Unknown
Data Quality COMPLETENESS
Where no data is available in a pixel due to clouds or other interference, the previous 8-day average is carried forward in that pixel in this data set. Pixels where no usable data were available during each 8-day compositing period are represented on the image by black dots. Substantial areas of black (eg south of 50S during winter) are a combination of extreme cloudiness and low ambient light.
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brian.griffiths@csiro.au
Metadata Date METADATA DATE
2010-01-01
ADDITIONAL METADATA
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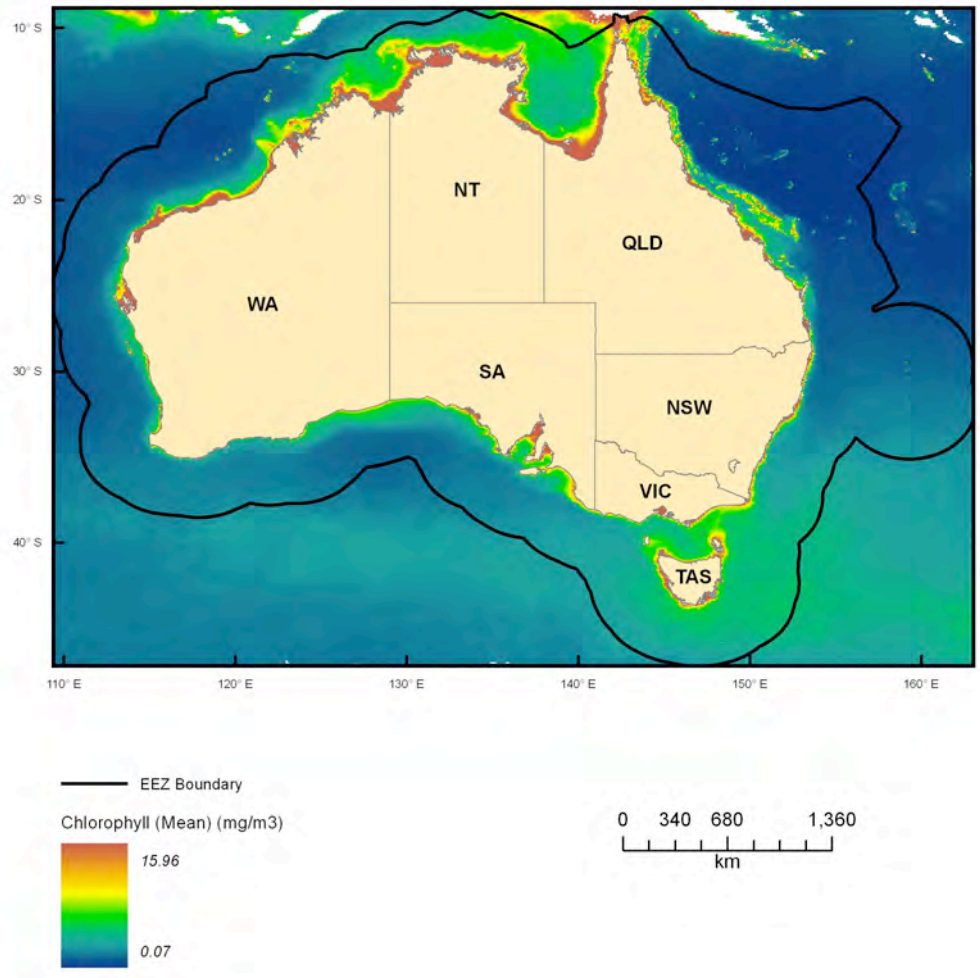

Figure 2.5.4. SeaWIFS Chlorophyll – Mean Map

2.5.5. SeaWiFS K490 –Standard Deviation

This data set contains the standard deviation of the SeaWiFS K490 data (Figure 2.5.5) generated from the climatology monthly means gridded into 0.01 degree cells. The monthly climatologies represent the mean values for each month across the whole dataset time series.

K490 indicates the turbidity of the water column; the depth to which the visible light in the blue–green region of the spectrum penetrates the water column. It is directly related to the presence of particles in the water column (Grobbelaar 2009). Turbidity has consequences for benthic marine life, ranging from the availability of light to the quantity of nutrients in the water column.

Dataset TITLE
SeaWIFS K490 – Standard Deviation
Dataset ALTERNATE TITLE (i.e. Dataset Name)
swk490_std
Dataset AUTHORS
CSIRO Division of Marine and Atmospheric Research - Hobart
Dataset CUSTODIAN
CSIRO Division of Marine and Atmospheric Research - Hobart
Dataset JURISDICTION
Australia
Description ABSTRACT
This data set contains the standard deviation of SeaWIFS k490 generated from the climatology monthly means; the monthly climatologies represent the mean values for each month across the whole dataset time series. K490 indicates the turbidity of the water column – how the visible light in the blue – green region of the spectrum penetrates within the water column. It is directly related to the presence of scattering particles in the water column.
The data are received as monthly composites, with a 4 km resolution, and are constrained to the region between 90E and 180E, and 10N to 60S. The data was sourced from http://oceancolor.gsfc.nasa.gov/SeaWiFS/.
Description Data Category
Oceans
Description ANZLIC Keyword
OCEANOGRAPHY
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
N_LAT: -7.94
S_LAT: -48.16
E_LONG: 164.22
W_LONG: 108.22
COORDINATE SYSTEM DESCRIPTION
Projection: GEOGRAPHIC
Datum: WGS84
Units: DD
Description NOMINAL SCALE
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE
2008-07-31
Dataset Currency ENDING DATE
2008-07-31
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required
Access STORED DATA FORMAT
DIGITAL – ArcINFO Grid

Access AVAILABLE FORMAT TYPE(S)
DIGITAL – ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Data Quality LINEAGE
This was extracted from the SeaWIFS website being the parts relevant to the 4km mapped SeaWIFS monthly mean chlorophyll, K_90, suspended solids and sea surface temperature data. The source of the data was the SeaWIFS website http://oceancolor.gsfc.nasa.gov/SeaWiFS/. No additional processing or quality control was undertaken on this data set. The only changes made were to restrict the geographical and temporal coverage to the region between 90E and 180E, and 10N to 60S.
Data Quality POSITIONAL ACCURACY
Unknown
Data Quality ATTRIBUTE ACCURACY
Unknown
Data Quality LOGICAL CONSISTENCY
Unknown
Data Quality COMPLETENESS
Where no data is available in a pixel due to clouds or other interference, the previous 8-day average is carried forward in that pixel in this data set. Pixels where no usable data were available during each 8-day compositing period are represented on the image by black dots. Substantial areas of black (eg south of 50S during winter) are a combination of extreme cloudiness and low ambient light.
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Contact Information ELECTRONIC MAIL ADDRESS
brian.griffiths@csiro.au
Metadata Date METADATA DATE
2010-01-01
ADDITIONAL METADATA
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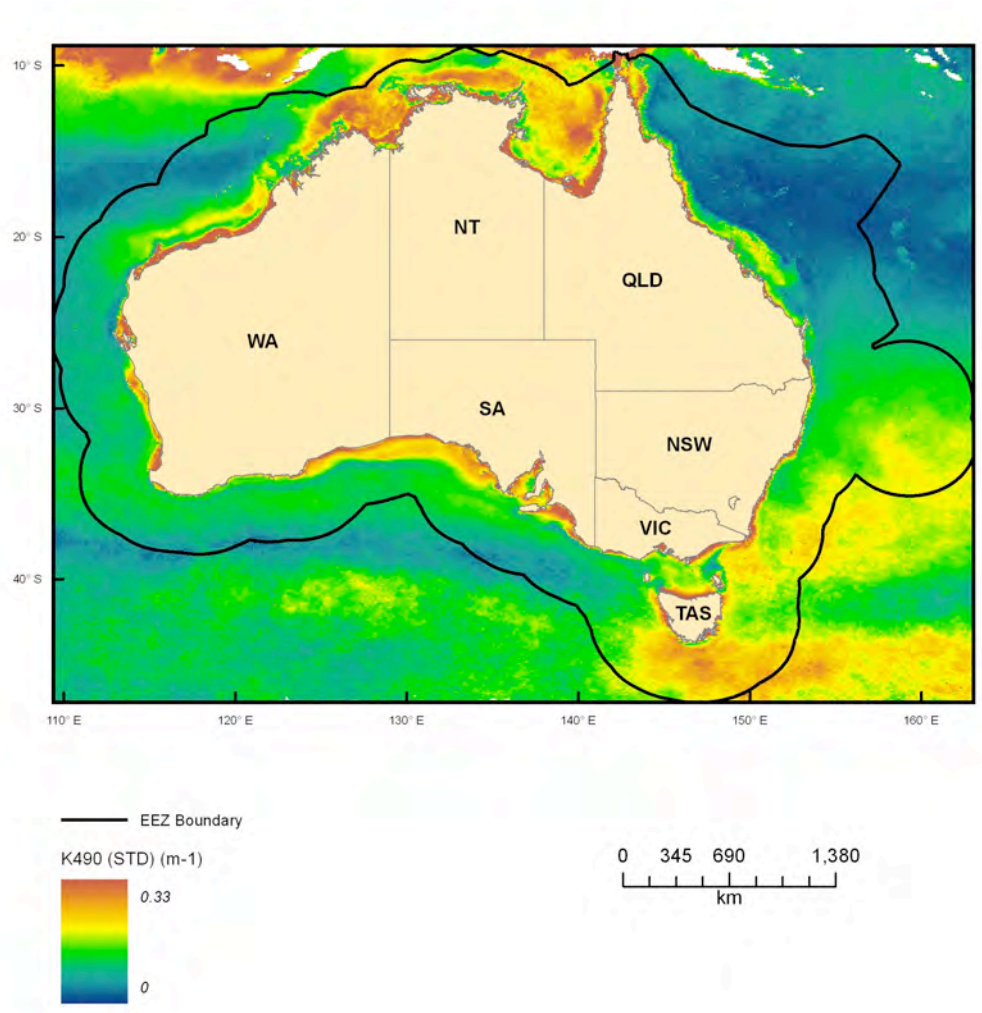

Figure 2.5.5. SeaWIFS k490 – Standard Deviation Map

2.5.6. SeaWiFS K490 – Mean

This data set contains the mean of the SeaWiFS K490 data (Figure 2.5.6) generated from the climatology monthly means gridded into 0.01 degree cells. The monthly climatologies represent the mean values for each month across the whole dataset time series.

K490 indicates the turbidity of the water column; the depth to which the visible light in the blue–green region of the spectrum penetrates the water column. It is directly related to the presence of particles in the water column (Grobbelaar 2009). Turbidity has consequences for benthic marine life, ranging from the availability of light to the quantity of nutrients in the water column.

Dataset TITLE
SeaWIFS K490 - Mean
Dataset ALTERNATE TITLE (i.e. Dataset Name)
swk490_mean
Dataset AUTHORS
CSIRO Division of Marine and Atmospheric Research - Hobart
Dataset CUSTODIAN
CSIRO Division of Marine and Atmospheric Research - Hobart
Dataset JURISDICTION
Australia
Description ABSTRACT
This data set contains the mean of SeaWIFS k490 generated from the climatology monthly means; the monthly climatologies represent the mean values for each month across the whole dataset time series. K490 indicates the turbidity of the water column – how the visible light in the blue – green region of the spectrum penetrates within the water column. It is directly related to the presence of scattering particles in the water column.
The data are received as monthly composites, with a 4 km resolution, and are constrained to the region between 90E and 180E, and 10N to 60S. The data was sourced from http://oceancolor.gsfc.nasa.gov/SeaWiFS/.
Description Data Category
Oceans
Description ANZLIC Keyword
OCEANOGRAPHY
Description ANZLIC Qualifier
Mapping
Description GEOGRAPHIC EXTENT BOUNDARIES
N_LAT: -7.94
S_LAT: -48.15
E_LONG: 164.22
W_LONG: 108.22
COORDINATE SYSTEM DESCRIPTION
Projection: GEOGRAPHIC
Datum: WGS84
Units: DD
Description NOMINAL SCALE
Resolution: 0.01 Decimal Degrees
Dataset Currency BEGINNING DATE
2008-07-31
Dataset Currency ENDING DATE
2008-07-31
Dataset Status PROGRESS
Completed
Dataset Status MAINTENANCE AND UPDATE FREQUENCY
As required
Access STORED DATA FORMAT
DIGITAL – ArcINFO Grid

Access AVAILABLE FORMAT TYPE(S)
DIGITAL – ArcINFO Grid
Access ACCESS CONSTRAINT
DIGITAL – GIS – Contact Data Custodian
Data Quality LINEAGE
This was extracted from the SeaWIFS website being the parts relevant to the 4km mapped SeaWIFS monthly mean chlorophyll, K_90, suspended solids and sea surface temperature data. The source of the data was the SeaWIFS website http://oceancolor.gsfc.nasa.gov/SeaWiFS/. No additional processing or quality control was undertaken on this data set. The only changes made were to restrict the geographical and temporal coverage to the region between 90E and 180E, and 10N to 60S.
Data Quality POSITIONAL ACCURACY
Unknown
Data Quality ATTRIBUTE ACCURACY
Unknown
Data Quality LOGICAL CONSISTENCY
Unknown
Data Quality COMPLETENESS
Where no data is available in a pixel due to clouds or other interference, the previous 8-day average is carried forward in that pixel in this data set. Pixels where no usable data were available during each 8-day compositing period are represented on the image by black dots. Substantial areas of black (eg south of 50S during winter) are a combination of extreme cloudiness and low ambient light.
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Metadata Date METADATA DATE
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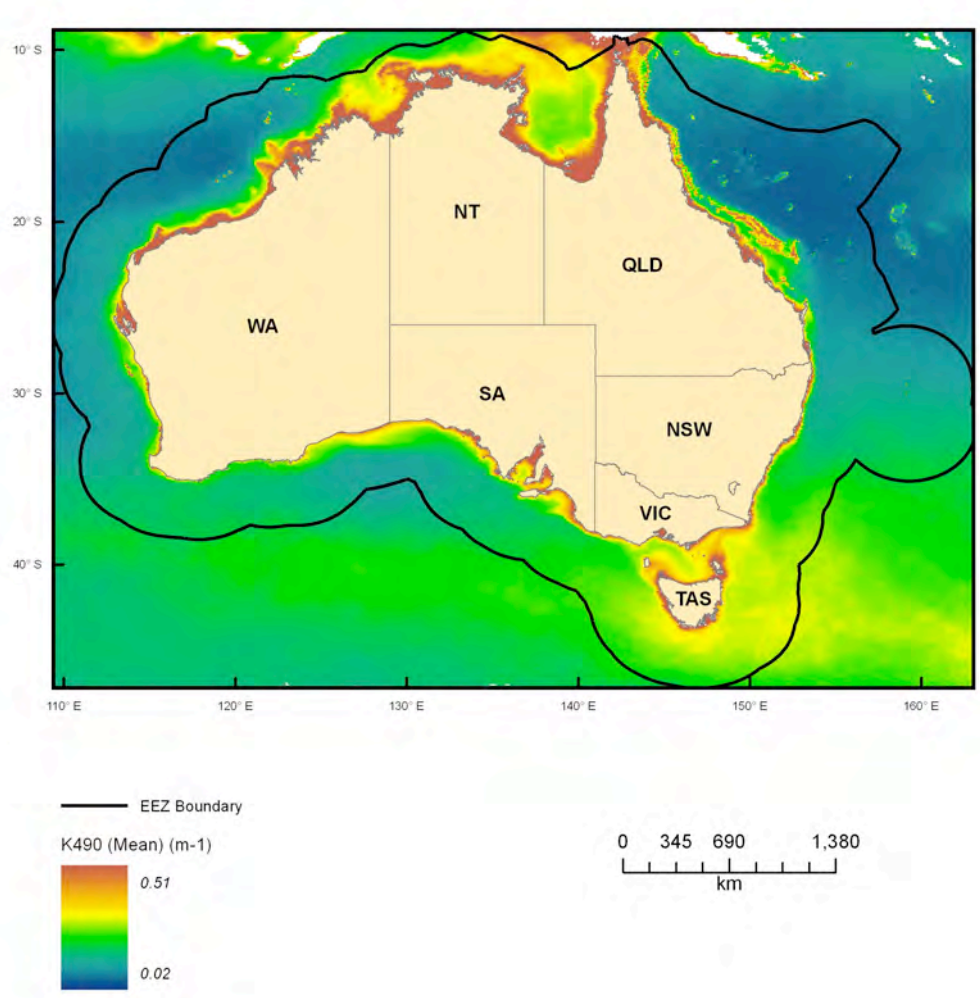

Figure 2.5.6. SeaWIFS k490 – Mean Map

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Heap, A.D., Harris, P.T., Hinde, A. and Woods, M., 2005. *Benthic Marine Bioregionalisation of Australia's Exclusive Economic Zone.* A Report to the National Oceans Office on the Development of a National Benthic Marine Bioregionalisation in support of Regional Marine Planning. Geoscience Australia, Canberra, Australia.

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