Dataset TITLE
Seabed gravel, mud and sand content in the Petrel sub-basin in the Australian continental EEZ 2012

Dataset AUTHOR(S)
Jin Li

Dataset CUSTODIAN
Geoscience Australia

Dataset JURISDICTION
Australia

Description ABSTRACT
This dataset provides the spatially continuous data of seabed gravel (sediment fraction >2000 µm), mud (sediment fraction < 63 µm) and sand content (sediment fraction 63-2000 µm) expressed as a weight percentage ranging from 0 to 100%, presented in 0.0025 decimal degree (dd) resolution raster grids format and ascii text file.

The dataset covers the Petrel sub-basin in the Australian continental EEZ.

This dataset supersedes previous predictions of sediment gravel, mud and sand content for the basin with demonstrated improvements in accuracy. Accuracy of predictions varies based on density of underlying data and level of seabed complexity. Artefacts occur in this dataset as a result of insufficient samples in relevant regions. This dataset is intended for use at the basin scale. The dataset may not be appropriate for use at smaller scales in areas where sample density is insufficient to detect local variation in sediment properties. To obtain the most accurate interpretation of sediment distribution in these areas, it is recommended that additional samples be collected and interpolations updated.

Description SEARCH WORD(S)
MARINE
OCEANS
SEABED SEDIMENTS

Description GEOGRAPHIC EXTENT NAME(S): CODE(S)
AUSTRALIA EXCLUDING EXTERNAL TERRITORIES:
PETREL SUB-BASIN

Description GEOGRAPHIC BOUNDING BOX
N_LAT: -9.584891
S_LAT: -15.579891
E_LONG: 131.7497
W_LONG: 125.2522

Data Currency BEGINNING DATE
18/12/2012

Data Currency ENDING DATE
18/12/2012

Dataset Status PROGRESS
Complete

Dataset Status MAINTENANCE AND UPDATE FREQUENCY
Not Planned

Access STORED FORMATS Digital/Non-Digital Description
DIGITAL Raster-grid Raster grid Geographic WGS84 WGS84
DIGITAL ascii ASCII text Geographic WGS84 WGS84

Access AVAILABLE FORMATS Digital/Non-Digital Description
DIGITAL Raster-grid Raster grid Geographic WGS84 WGS84
DIGITAL ascii ASCII text Geographic WGS84 WGS84

Access ACCESS CONSTRAINT
No restrictions

Data Quality LINEAGE
Sediment samples were exported from Geoscience Australia's Marine Sediments database (MARS), an Oracle database developed by Geoscience Australia in line with ANZLIC data standards. A subset of this data was selected for use in predicting spatial distribution of gravel, mud and sand content based on a set of data quality control criteria (see Li *et al*. 2010 and 2012). Predicting the spatial distribution of gravel, mud and sand content at a 0.0025 decimal degree resolution was undertaken using a combined method of random forest and ordinary kriging (see Li *et al*. 2010, 2011 and 2012). The spatial interpolation method used was experimentally selected from over 40 methods/sub-methods based on assessment of predictive errors (Li *et al.* 2010, 2011 and 2012) and was refined for gravel, mud and sand respectively based on further experimental testing during Nov and Dec 2012. The predictions in raster grids and ascii text file were generated in R. Final file is in WGS 84 coordinate system with a 0.0025 dd spatial resolution. File sizes are approximately 73 MB for each sediment type (gravel, mud and sand) (raster grids) and 258 MB (all sediment types) (ascii text) with dimension of 2399 x 2600 (6237400 cells).

Data Quality POSITIONAL ACCURACY
Sediment samples used in the interpolation incorporate data from various surveys since 1899 by a range of organizations. Modern surveys which used GPS have a positional accuracy of 5-30 m, while earlier surveys which had positions probably accurate to 50-2000 m depending upon the water depth and strength of currents. Only samples with positional information recorded to 0.001 dd accuracy were used in the spatial interpolation.

Data Quality ATTRIBUTE ACCURACY
NA

Data Quality LOGICAL CONSISTENCY
Point data at each grid cell was checked to ensure that the sum of gravel, mud and sand content was 100%. Interpolated grids were further checked by visual comparison with maps initially produced in R to ensure no errors introduced during the process of producing the grid file.

Data Quality COMPLETENESS
This dataset is complete.

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/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 ELECTRONIC MAIL ADDRESS
sales@ga.gov.au

Metadata Date METADATA DATE
18/12/2012

Additional Metadata ADDITIONAL METADATA

Acknowledgements
Xiaojing Li extracted sediment samples from MARS database. Tony Nicholas provided some recently collected samples. Zhi Huang provided bathymetry, slope, distance to coast, and relief data. Tanya Whiteway and Chris Lawson clarified relevant issues associated with bathymetry data. Anna Potter provided clarification on data quality control aspect. Tanya Whiteway produced the ArcGIS grid datasets based on the ascii text datasets.

References:
Li, J., Potter, A., Huang, Z., Daniell, J. J. and Heap, A. D., 2010. Predicting Seabed Mud Content across the Australian Margin: Comparison of Statistical and Mathematical Techniques Using a Simulation Experiment. Geoscience Australia, Record 2010/11, 146 pp. (GeoCat No. 70150)

Li, J., Heap, A. D., Potter, A. and Daniell, J. J., 2011. Predicting Seabed Mud Content across the Australian Margin II: the Performance of Machine Learning Methods and Their Combinations with Ordinary Kriging and Inverse Distance Squared. Geoscience Australia, Record 2011/07, 69 pp. (GeoCat No. 71407)

Li, J., Potter, A., Huang, Z., Heap, A., 2012. Predicting Seabed Sand Content across the Australian Margin Using Machine Learning and Geostatistical Methods. Geoscience Australia, Record 2012/48, 115pp (GeoCat No. 74030)

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