Description of data for the coastMDT package

January 16, 2018

`DTU15MSS` *DTU15MSS*

Description

DTU15MSS is the DTU15 mean sea surface (MSS). DTU15MSS is a 2880 x 1440 matrix. The first cell is longitude 0 to 1/8 degree, latitude -90 to -90+1/8 degree cells are all 1/8 by 1/8 degree order is east to west, then south to north

The MSS is in meters and are referenced to the TOPEX ellipsoid. The grid is in the permanent mean tide system.

Usage

```
load("DTU15MSS.rda")
```

Format

A matrix[lon,lat] of dimension 2880 x 1440

Details

...

Source

...

References

Created by Ole B. Andersen <oa@space.dtu.dk>

Examples

```
load("DTU15MSS.rda")
```

TF2mean_AddThis *TF2mean_AddThis*

Description

Grid to go from tide free to mean tide. The grid should be added. TF2mean_AddThis is a 2880 x 1440 matrix.

Usage

```
load("TF2mean_AddThis.rda")
```

Format

A matrix[lon,lat] of dimension 2880 x 1440

Details

...

Source

...

References

Created by Ole B. Andersen <oa@space.dtu.dk>

Examples

```
load("TF2mean_AddThis.rda")
```

TG *TG*

Description

Tide gauge information and data: MSL estimates relative to WGS84 must be created by adding the RLR heights to the MSL estimates for the respective reference periods.

Usage

```
load("TG.rda")
```

Format

A data frame with 302 observations of the following variables.

`PSMSL_ID` a numeric vector

`Latitude` a numeric vector

`Longitude` a numeric vector

`Station_Name` a factor vector

`Coastline` a numeric vector

`Station` a numeric vector

`QC_Flag` a factor vector

`GPS_type` a factor vector

`GPS_code` a factor vector

`Geoid.pt.LAT` a numeric vector

`Geoid.pt.LONG` a numeric vector

`RLR_ell_2005.5` a numeric vector

`Uncertainty_2005.5` a numeric vector

`MSL_2003_2007` a numeric vector

`RLR_ell_2010.5` a numeric vector

`Uncertainty_2010.5` a numeric vector

`MSL_2008_2012` a numeric vector

`IB_2003_2007` a numeric vector

`IB_2008_2012` a numeric vector

`DAC_2003_2007` a numeric vector

`DAC_2008_2012` a numeric vector

`egm08C` a numeric vector, EGM2008 geoid height above TOPEX ellipsoid. The values have been extracted the high resolution EGM2008

`egm08H` a numeric vector, EGM2008 geoid height above TOPEX ellipsoid. The values have been extracted a 1/8 degree version of EGM2008

`eigen6c4rC` a numeric vector, GOCO+Eigen6c4r geoid height above TOPEX ellipsoid. The values have been extracted a 1/8 degree version of Eigen6c4r

Details

To construct MSL values above WGS84 for the reference period 2003-2007; MSLWGS84=`RLR_ell_2005.5`+ `MSL_2003_2007`. MSLWGS84 will be in the tide free system.

Source

...

References

Create by Mederic Gravelle and Karina Nielsen

Examples

```
load("TG.rda")
```

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dDTU15MSS_ref2003_2007

dDTU15MSS_ref2003_2007

Description

Grid to transform the DTU15 MSS (DTU15MSS) to the MSS of the period 2003-2007. The grid should be added. dDTU15MSS_ref2003_2007 is a 2880 x 1440 matrix. The unit is meter.

The first cell is longitude 0 to 1/8 degree, latitude -90 to -90+1/8 degree cells are all 1/8 by 1/8 degree order is east to west, then south to north

Usage

```
load("dDTU15MSS_ref2003_2007.rda")
```

Format

A matrix[lon,lat] of dimension 2880 x 1440

Details

...

Source

...

References

Created by Ole B. Andersen <oa@space.dtu.dk>

Examples

```
load("dDTU15MSS_ref2003_2007.rda")
```

dacCor5Y_2003_2007 *dacCor5Y_2003_2007*

Description

Dynamic atmosphere corrections for the reference period 2003-2007. The corrections are given on the following grid:

2880 = longitudes (0.5+(0,1,2....2879))/8. degrees 1440 = latitudes (0.5+(0,1,2....1439))/8. -90 degrees

These numbers should be added to ssh in metres to give ib-corrected ssh

They are derived from the DAC, as provided by aviso at 6-hour and 1/4 degree resolution.

dacCor5Y_2003_2007 represents the 5-year average of the period 2003 to 2007.

Usage

```
load("dacCor5Y_2003_2007.rda")
```

Format

A matrix[lon,lat] of dimension 2880 x 1440

Details

...

Source

...

References

Created by Christopher W. Hughes <cwh@noc.ac.uk>

Examples

```
load("dacCor5Y_2003_2007.rda")
```

`eigen6c4r` *eigen6c4r*

Description

eigen6c4r is a geoid model based on GOCO5 and EIGEN-6C4. Eigen6c4r is a 2880 x 1440 matrix. The first cell is longitude 0 to 1/8 degree, latitude -90 to -90+1/8 degree cells are all 1/8 by 1/8 degree order is east to west, then south to north.

The unit is in meters. The geoid is referenced to the TOPEX ellipsoid and is given in the permanent mean tide system.

Usage

```
load("eigen6c4r.rda")
```

Format

A matrix[lon,lat] of dimension 2880 x 1440

Details

...

Source

...

References

F\"orste, Christoph; Bruinsma, Sean.L.; Abrikosov, Oleg; Lemoine, Jean-Michel; Marty, Jean Charles; Flechtner, Frank; Balmino, G.; Barthelmes, F.; Biancale, R. (2014): EIGEN-6C4 The latest combined global gravity field model including GOCE data up to degree and order 2190 of GFZ Potsdam and GRGS Toulouse. GFZ Data Services. http://doi.org/10.5880/icgem.2015.1

Examples

```
load("eigen6c4r.rda")
```

ibCor5Y_2003_2007 *ibCor5Y_2003_2007*

Description

Inverse barometer correction for the 5 year reference period given on the following grid:

2880 = longitudes (0.5+(0,1,2....2879))/8. degrees 1440 = latitudes (0.5+(0,1,2....1439))/8. -90 degrees

These numbers should be added to ssh in metres to give ib-corrected ssh

They are derived from monthly-mean sea-level pressure from the era-interim analysis, as provided by ECMWF at 1/4 degree resolution. The conversion from pressure in Pa to sea level correction in m is given by correction = -1.e-4*(0.99*(p-101100.)-0.974*(pglob-101100.)) where p is pressure and pglob is global-ocean-average pressure at the same time.

(the reason for the different coefficients, 0.99 and 0.974, is that global ocean average pressure does produce a small sea level change due to compressibility of seawater - without this effect, the formula would reduce to -1.e-4*0.99*(p-pglob))

ibCor5Y_2003_2007 represents the 5-year average of the period 2003 to 2007.

NOTE: Gibbs fringes can be seen in both these products, slightly larger in the ib than the dac, but are typically at the 1 mm level or less (the largest ocean values occur by the Pacific South American coast).

Usage

```
load("ibCor5Y_2003_2007.rda")
```

Format

A matrix[lon,lat] of dimension 2880 x 1440

Details

...

Source

...

References

Created by Christopher W. Hughes <cwh@noc.ac.uk>

Examples

```
load("ibCor5Y_2003_2007.rda")
```

`landmask8` *landmask8*

Description

landmasks from GEBCO2014, on a 1/8 degree grid.

landmask8 is a 2880 x 1440 matrix

first cell is longitude 0 to 1/8 degree, latitude -90 to -90+1/8 degree cells are all 1/8 by 1/8 degree order is east to west, then south to north

value is 1 for any cell which is 50 0 for any cell which is less than 50

isolated ocean points have been removed (excluding Black Sea and Sea of Marmara)

Usage

```
load("landmask8.rda")
```

Format

A matrix of dimension 2880 x 1440

Details

points below sea level, but enclosed by land (e.g. Caspian Sea, Dead Sea) are here classed as land.

GEBCO2014 original data have been modified by hand to allow the Sea of Marmara and the Black Sea to be connected. This involved converting 1 point in the Dardanelles (strait connecting Sea of Marmara to the Mediterranean), and 3 points in the Bosphorus (strait connecting Sea of Marmara to the Black Sea), from land to ocean. For reference, these points are:

i values (counting in range 1 to 43200) = 3167, 3484, 3486, 3486 j values (counting in range 1 to 21600) = 15618,15725,15726,15729

Source

...

References

Create from GEBCO2014 by Chris Hughes

Examples

```
load("landmask8.rda")
```

mean2TF_AddThis *mean2TF_AddThis*

Description

Grid to go from mean tide to tide free. The grid should be added. mean2TF_AddThis is a 2880 x 1440 matrix.

Usage

```
load("mean2TF_AddThis.rda")
```

Format

A matrix[lon,lat] of dimension 2880 x 1440

Details

...

Source

...

References

Created by Ole B. Andersen <oa@space.dtu.dk>

Examples

```
load("mean2TF_AddThis.rda")
```

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