Maps of Sea Level Anomalies (HH_MSLA) from GEOSAT

This series of files correspond to maps of Sea Level Anomaly (MSLA) obtained from a complete reprocessing of Geosat data. There is one map every 7 days over a period of 2 years (Mid-December 1986 to Late December 1988). They were computed using ERM Geosat data distributed by Noaa (enhanced JGM3 GDR CD-ROMs).

1. Corrections applied, processing and filtering of MSLA

Tidal and inverse barometer corrections were updated to be as homogenous as possible with the T/P and ERS/2 SLAs (GOT99 tidal correction, and inverse barometer with a time-varying mean pressure). Additional corrections (radiometer troposphere correction, sea state bias, HCAL and USO corrections were also applied as recommended by Noaa (the hcal correction is based on the internal calibration measurement of the altimeter electronics, primarily reflecting the internal temperature of the altimeter system. This correction shows large semi-annual fluctuations). All atmospheric corrections are based on NCEP data. A global adjustment was finally performed to reduce orbit error: the orbit error model, based on one and two cycles per revolution sinusoidal functions, is fitted to the crossover differences by global minimization.

Sea Level Anomalies (SLA) were computed using conventional repeat-track analysis. The CLS Mean Sea Surface was used to correct for cross-track geoid gradient errors. SLA were referenced to a 7-year mean (January 1993 to January 1999). Indeed, a specific processing was performed to compute a Geosat mean profile consistent with the T/P and ERS-2 means (Hernandez et al., 2000).

Polynomial functions are then fitted along each pass to estimate and to remove the long wavelength signals, mainly composed of remaining orbit errors. The functions used depend on the pass length: a first degree polynom for passes shorter than 5000 km, a second degree polynom for passes longer than 5000 km and shorter than 10000 km, and two second degree polynoms for passes longer than 10000km.

Maps of Sea Level Anomalies were obtained using the mapping method detailed in reference. It is a global sub-optimal space/time objective analysis which takes into account along-track correlated errors. The objective analysis software and parameters used for Geosat are similar to the ones used for T/P and ERS-2 MSLAs.

2. Grid Resolution and Units

The maps are provided on a Mercator 1/3° grid. Resolutions are in kilometers in latitude and longitude are thus identical and vary with the cosine of latitude (e.g. from 37 km at the equator to 18.5 km at ±60°). Units are in meters.

3. Nomenclature and format

The files are in a NetCDf format and filenames are as follows: (e.g. Geosat map for December 21, 1988 = *hh_msla_pf_Geosat_h_14234.nc*).

Mapping errors (in percentage of signal variance) are provided on separate files.

Formats as well as reading softwares are described in the Ssalto/Duacs (CLS/Cnes near real time altimeter processing system) handbook available at:
http://www.aviso.oceanobs.com/fileadmin/documents/data/tools/hdbk_duacs.pdf

Reading softwares for the NetCDF maps (as well as a sample program and a sample NetCDF file with ASCII dump) are available on the AVISO ftp site at :
ftp://ftp.cls.fr/pub/oceano/AVISO/DUACS/SOFTWARE/PublicReadGridDelivery.tar.gz

4. Citation

When using these data, please cite :

"The altimeter products were produced by the CLS Space Oceanography Division as part of the Environment and Climate EU ENACT project (EVK2-CT2001-00117)".

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5. References

- AVISO/Altimetry 1996, "AVISO User Handbook for Merged TOPEX/POSEIDON products", AVI-NT-02-101, Edition 3.0.
- Dorandeu, J. and P.Y. Le Traon, 1999: Effects of Global Mean Pressure variations on Sea Level changes from TOPEX/POSEIDON. J. Atmos. Oceanic Technol.,16, 1279-1283.
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- Ray, R., 1999: A Global Ocean Tide model from TOPEX/Poseidon Altimetry, GOT99.2. NASA Tech. Memo. NASA/TM-1999-209478, 58 pp. Goddard Space Flight Center, NASA Greenbelt, MD, USA.
- Tierney, C., J. Wahr, F. O. Bryan, and V. Zlotnicki, 2000: Short-period oceanic circulation: implications for satellite altimetry. Geophys. Res. Lett., 27, 1255-1258.

6. Further information:

- Aviso website : Mission Geosat,
  http://www.aviso.oceanobs.com/en/missions/past-missions/gfo/index.html
- Noaa website : Geosat JGM-3 GDRs,
  http://ibis.grdl.noaa.gov/SAT/gdrs/geosat_handbook/docs/chap_4.htm