



CTOH: L1 to L4 Altimetry Products

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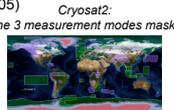
Established in 1989, the **Center for Topographic studies of the Oceans and Hydrosphere (CTOH)** is a French national observation service dedicated to satellite altimetry. The main objective of the CTOH is to develop and maintain altimetric data bases with homogeneous, up-to-date corrections for the long term monitoring of sea level, lake and river levels, and the cryosphere for climate studies. The CTOH aids scientific users in the development of new altimetric products and applications, and works in close relation with the CNES and ESA.

L1/L2 Products

... and R&D

Along-Track L1/L2 GDR Products

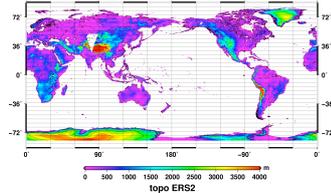
- Topex/Poseidon (1992-2005)
- GFO 1998-2008
- Envisat 2002-2012
- Jason-1 2002-2013
- Jason-2 2008-...
- Saral 2013-...
- Cryosat2 ESA 2010-... (LRM, SAR, SAR-IN)
- Cryosat2 CPP 2011-2012 (LRM, SAR)



Both 1 Hz and 18-20-40 Hz data available over all oceanic and continental surfaces. All in netcdf format (except T/P and GFO).

ERS2 Reprocessing (on going work)

The CTOH is currently re-processing the ERS-2 mission and assesses it with the ENVISAT mission during tandem period. The first results are conform to ENVISAT mission. See the dedicated poster « ERS reprocessing at CTOH for extended applications ».



Corrections added to all GDR data-bases by CTOH :

- GIM ionospheric correction
- Wet Tropo (CLS 01, Brown 2010)
- Tide models (FES04, GOT47)
- Inverse barometer (ECMWF, MOG2D)
- Mean Dynamic Topo (RIO05, RIO09)
- Mean Sea Surface: (CLS_01, CNES_10)
- Geoids (GGM02, EGM2008, GOCE2010, EIGEN_6)
- Bathymetry (Gridone)
- Dist. to nearest coast (Leuliette, Stump)
- Dry Troposphere
- Doppler Slope

New Dry Tropo and Doppler Slope Corrections (Envisat)

The CTOH Dry Tropospheric Correction and Doppler Slope Correction are based on the altimetric measurement instead of on a Digital Earth Model (DEM). They have been validated over cryosphere and are currently evaluated over hydrosphere and oceans. They are already available globally for ENVISAT v2.1 and soon for re-processed ERS-2 and other altimetric missions.

AVISO+ Toward a common platform AVISO/CTOH



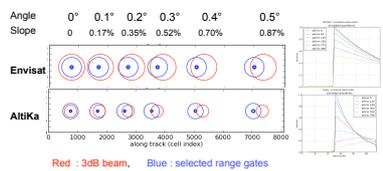
CNES, LEGOS/CTOH and CLS are working on a new interface to download altimetry data in an interactive frame. See poster « AVISO Online Data Extraction Service (ODES): a new way of disseminating altimetry data »

First Analysis of Saral-Altika Waveforms Data

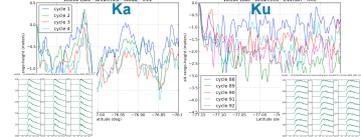
Saral has been launched on Feb 2013 and altimeter data are already available. To continue the 20 years historical series provided by ERS-1, ERS-2 and ENVISAT.

However, it presents important differences with its predecessors : Ka (35 GHz) versus Ku (13.6 GHz) radar frequency; 0.6 deg. vs. 1.3 deg. antenna beam ; lower snow penetration ; 0.3m vs. 0.47m waveform sampling ; 30m vs. 60m tracking window ; 165m vs 330m ground sampling. These differences call for investigations to be able to extend the historical series in a consistent way (see D.Blumstein et al. « Analysis of AltiKa waveforms data over Antarctica » in SARAL/AltiKa 1st Verification Meeting, Toulouse, August 2013).

Impact of terrain slope on the waveforms (simulation)



Impact of wave penetration in the snowpack (Vostok lake, Antarctica)

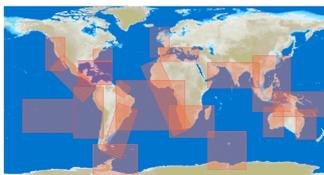


L3 Products

... and R&D

Coastal products with X-Track

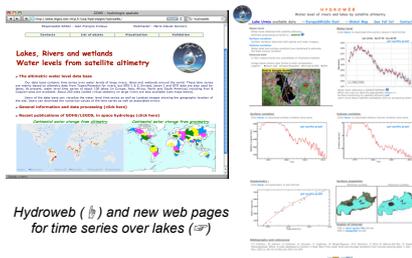
Coastal processing of 1Hz along-track SLA are available in 20 regions for different altimetric missions (T/P, J1&2, Envisat, GFO) based on CTOH along-track data. High sampling rate coastal SLA are available for 3 regions (see oral presentation Birol et al. @ CAW2013).



Since June 2012 along-track tidal constants (amplitude, phase lags and accuracy), based on the ~20 years of T/P and Jason time series, are available every 6-7 km along-track for the 20 X-Track regions (see poster « Using CTOH tidal constants for coastal studies » Delebecque et al. @ CAW2013 and OSTST2013)

Hydrosphere : Hydroweb

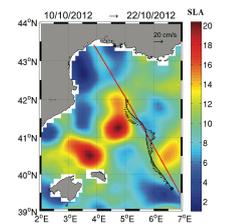
Hydroweb provides near real-time time series of water level on the lakes (about 160), rivers and flooded plains (about 1300 virtual stations) using Topex, ERS-1&2, GFO, Envisat, Jason1&2 altimeters.



Hydroweb (h) and new web pages for time series over lakes (i)

Along-Track Mesoscale Structures

Investigation of the observability of mesoscale structures in along-track data: Comparison between mesoscale structures observed from glider trajectories and the velocity fields obtained from along-track CTOH Jason-2 SLA. See the poster in the « Quantifying Errors and Uncertainties in Altimetry Data » splinter.

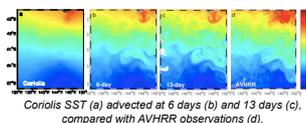


L4 Products

... and R&D

Tracer Advection by Altimetry

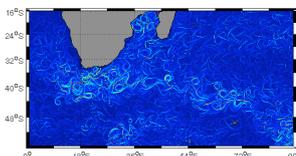
Stirring by altimetric currents can induce finer-resolution structures in low-resolution 2D tracer fields, such as SST or SSS fields. 10 years of fine-resolution SST and SSS fields are now available south of Australia across the Antarctic Circumpolar Current. Other regions are being tested & validated before distribution.



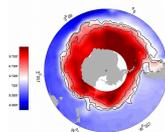
Coriolis SST (a) advected at 6 days (b) and 13 days (c), compared with AVHRR observations (d).

Filaments

FSLE position and strength based on analyses by F. D'Ovidio (LOCEAN, Paris) calculated from gridded AVISO surface current and using Finite-Size Lyapunov Exponents (FSLE), at 4km resolution, every 4 days from 1993 to today.



Southern Ocean Fronts



The CTOH distributes the weekly position of Southern Ocean Fronts based on the DUACS/AVISO altimetry data, and a validated sea level contouring technique developed by Sallée et al. (2008).

Hydrology: monitoring of the Amazon Basin

Monthly observation for 2003-2007 of the variations of surface water using multisatellite observations of inundation extent and altimetry-based water levels (more than 500 stations).

During the 2005 drought, the amount of water of the Amazon basin was ~130 km3 (~70%) below its 2003-7 average. Frappart F, et al. Surface freshwater storage in the Amazon basin during the 2005 exceptional drought, Environmental Research Letters, 2012.

