CTOH Coastal Products – What’s new in 2011?

The CTOH computes and distributes specific, coastal along-track sea level anomalies (SLA) using its X-TRACK processor for all precise altimeter missions: Topex/Poseidon (TP), Jason-1 (J1), Jason-2 (J2), Topex + Jason-1 combined, Jason-1 interleaved (J1N), Topex/Poseidon interleaved (TPN), Geosat Follow on (GFO) and Envisat. Using the latest corrections available in the CTOH database, CTOH computes a coastally-adapted Sea Surface Height (SSH) along the satellites ground-track for each cycle. Additional geophysical corrections are applied accounting for the aliasing of tides and short-term atmospheric effects in the SSH measurements. The Mean Sea Surface (MSSH) is computed at each point, based on the mission period currently available, and subtracted from the corrected SSH in order to form the SLA. The SLA are finally projected onto a reference track.

1Hz SLA coastal product

High Frequency SLA experimental product

Table 1: Availability of SLA data by mission and by region

Details on corrections applied, data processing.
Access to some regional diagnostics: maps of rms, percentage of data available, minimum and maximum values.

Table request: mailto://ctoh.products@legos.obs-mip.fr

Application : Multi-mission mapping of 1Hz SLA for fine-scale mesoscale studies in the Bay of Biscay

New mapping methodology

- 1Hz alongtrack SLA from X-TRACK
- Period : 2002-2005 ~ 4 missions
- Grid resolution: - regional configuration : 1/6 daily
- coastal zooms also: 1/10 & 1/5
- Different decorrelation scales tested:
  + fixed (55 to 39km)
  + variable (wavlet analysis of local scales)
- Low resolution maps (AVISO) vs high resolution increment from X-TRACK (see below).

Example of analysis produced

Validation of fine-scale surface currents

- Surface current anomalies derived from new OI analysis
- Slope current (Fig.R4)
- Comparison with current meter data (Fig. 4 for location).
- Better minorities & flow anisotropy (Fig. 5)
- Energetic errors, located in time (subsampling problems)
- Offshore : lagrangian statistics (Fig. 6)
- Comparison against subsurface drifters: Reduction of RMS dev. to drifter velocities (48h filt.)
- Front detection from SST & FSU²
- Submesoscale filaments and fronts detected east of 4°W

Conclusions & Perspectives

- Impact of using different decorrelation scales analysed
- More realistic regional statistics (EKE and RMS levels)
- Current amplitudes and anisotropy in better agreement with in-situ observations
- Smaller scale structures represented (Slope current, small to larger scale eddies & fronts), in agreement with information provided by satellite imagery
- Subsampling errors also detected
- Such dataset has a great potential for studying mesoscale to submesoscale transition in coastal areas but needs to work with efficient error estimation.

References

(1) Ribatlet et al., 2011. Coastal Altimetry, Springer Berlin Heidelberg
(5) Charrion et al., 2011, submitted to JMS