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Interpreting operational altimetry signals in near-coastal areas using underwater autonomous vehicles and remotely sensed ocean colour data

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During the LOGMEC16 (Long-Term Glider Mission for Environmental Characterization) sea trial carried out in the eastern Ligurian Sea (Northwestern Mediterranean Sea), two oceanographic gliders rated to a maximum depth of 1000m were operating continuously from 3 May to 27 June 2016. When possible, glider tracks were synchronized with the footprints of contemporaneous altimeters (i.e. Jason 2, Altika and Cryosat 2).
Temperature and salinity measured by the gliders along the tracks that were co-localized with the altimeter passages, were used to calculate along-track dynamic heights. The latter were then compared with near-real time absolute sea level CMEMS-TAPAS (Copernicus Marine Environment Monitoring Service - Tailored Product for Data Assimilation) product. TAPAS provides along-track sea level anomaly (SLA) estimates together with all the terms used in the correction and the associated Mean Dynamic Topography. Where available, the CMEMS near-real time 1km resolution, Aqua-MODIS ocean colour data was also used as a tracer of the main oceanographic features of the region.

Comparison between SLA derived from gliders and TAPAS along common transects, indicates that differences increase for larger sampling time lags between platforms and especially when time differences exceed $\sim$ 20 hrs. In fact, contemporaneous ocean color images reveal the presence of several mesoscale/sub-mesoscale structures (i.e. transient meanders and filaments), suggesting that the oceanographic variability of the region is likely the main cause for the differences observed between the glider and altimetry-based SLA.
Results from this study provide additional evidence of the advantages on using a networked ocean observing system. In fact, the interpretation of in-situ observations obtained from a continuously operating sampling platform (also during ongoing experiments at sea) can be greatly improved when combined with other operational datasets, as the CMEMS SLA used here.