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Intercomparison of numerical simulations, satellite altimetry and glider observations in the Algerian Basin during fall 2014 and 2015: focus on a SARAL/AltiKa track

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The Algerian Basin is a key-place for the study of the general circulation of the Western Mediterranean Sea and its role in reaction to climate change. The presence of both fresh Atlantic waters and more saline resident Mediterranean ones characterizes the basin with an intense inflow/outflow regime and complex circulation patterns. Very energetic mesoscale structures, that evolve from meander of the Algerian Current to isolated cyclonic and anti-cyclonic eddies, dominate the area with marked repercussions on the biological activity. Despite their remarkable importance, this region and its variability are still poorly known and basin-wide high resolution knowledge of its mesoscale and sub-mesoscale features is still incomplete. The monitoring of such complex processes requires a synergic approach that involves integrated observing systems. In recent years, several studies proved the advantages of the combined use of autonomous underwater vehicles, such as gliders, with a new generation of satellite altimeters.
In this context, we present the first results of a new integrated oceanographic observing system built up in the Algerian Basin during fall 2014 and 2015, aiming at advancing our knowledge on its main features. The study was realized through the analysis of glider high resolutions three-dimensional observations, collected along the Algerian BAsin Circulation Unmanned Survey (ABACUS) monitoring line, in synergy with co-located SARAL/AltiKa altimetric products and CMEMS numerical simulations. The achieved results confirm that glider derived dynamic height and SARAL/AltiKa absolute dynamic topography present similar patterns, with RMS of the differences ranging between 1.11 and 2.90 cm. Generally, the maximum discrepancies are located nearby the Balearic Islands and the Algerian Coast, but it is important to remark that the correlation coefficients seem to mostly depend on the synopticity between in situ and satellite measurements. Still, this study confirm that the numerical simulations derived from the analyzed CMEMS products agree well with the high resolution glider measurements and provide valuable information for multiplatform observatories that strongly complement in situ and remote sensed observations.