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Monitoring the Algerian Basin through glider observations, satellite altimetry and numerical simulations along a SARAL/AltiKa track

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The Algerian Basin is a key component of the general circulation in the Western Mediterranean Sea. The presence of both fresh Atlantic water and more saline Mediterranean water gives the basin an intense inflow/outflow regime and complex circulation patterns. Energetic mesoscale structures that evolve from meanders of the Algerian Current into isolated cyclonic and anticyclonic eddies dominate the area, with marked repercussions on biological activity. Despite its remarkable importance, this region and its variability are still poorly known and basin-wide knowledge of its meso- and submesoscale features is still incomplete. Studying such complex processes requires a synergistic approach that involves integrated observing systems. In recent years, several studies have demonstrated the advantages of combined use of autonomous underwater vehicles, such as gliders, with a new generation of satellite altimetry. In this context, we present results of an observational program conducted in the Algerian Basin during fall 2014 and 2015 that aimed to advance our knowledge of its main features. The study was carried out through analysis of high resolution glider observations, collected along the Algerian BAsin Circulation Unmanned Survey (ABACUS) chokepoint, in synergy with co-located SARAL/AltiKa altimetric products and CMEMS numerical simulations. Results show that glider-derived dynamic height and SARAL/AltiKa absolute dynamic topography have similar patterns, with RMS of the differences ranging between 1.11 and 2.90 cm. Even though larger discrepancies are observed near the Balearic and Algerian coasts, correlation coefficients between glider and satellite observations seem mostly to be affected by reduced synopticity between the measurements. Glider observations acquired during the four surveys reveal the presence of several water masses of Atlantic and Mediterranean origin (i.e. AW and LIW at different modification levels) with marked seasonal variability.