



## Combined use of glider, radar and altimetry data to study a coastal current in the western Mediterranean Sea

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The Mediterranean Sea is characterized by a small Rossby radius of deformation, hence small structures and eddies. The Ibiza Channel, located in the Balearic Sea, is of particular importance since it controls the exchanges in the western Mediterranean Sea.

In order to understand and describe the upper ocean dynamics, a multi-sensor/integrated approach was applied in the Ibiza Channel in the first days of August 2013 during the *G-Altika* mission. This approach combines:

**Sea-level anomaly (SLA)** measurements from Saral-Altika track no. 16, which passed west of Ibiza island. 1-Hz and 40-Hz data were considered.

**Glider data** obtained along the satellite track a few hours after its passage. The horizontal resolution ranges from 5 km offshore to about 1 km in the coastal area.

**HF radar** hourly velocities on a 3 km-resolution grid that partially covers the study region (range up to 74 km offshore).

Dynamic height (DH) was derived from the glider temperature and salinity profiles, while Absolute Dynamic Topography (ADT) was obtained by combining SLA and the new Mean Dynamic Topography (MDT) jointly produced by CLS and SOCIB. From DH and SLA, the cross-track velocities were derived using geostrophy relations. Different filters were applied on SLA data and different reference levels were tested for the DH computation.

DH and ADT both displayed very weak variations, on the order of 2-3 cm, along the glider trajectory. The glider- and the altimetry-derived velocities exhibit the signal of a meander centered at 38.65°N and a narrow coastal current flowing northward a few kilometers off Ibiza. These computed velocities are on the order of 20 cm/s, as confirmed by the HF radar. The time separation between the passage of the satellite and the glider can explain the discrepancies observed between the two platforms.

Our results highlight the promising measurements offered by SARAL/Altika in the coastal band. In particular, the satellite was able to capture the northern edge of the meander which lied on a shallow bathymetry, less than 10 km from the coast. They also constitute the first experiment where satellite altimetry and glider measurements were obtained almost simultaneously on the same track, in a region covered by a HF radar. Such an approach allows us to process, validate and intercalibrate multi-platform datasets dedicated to coastal ocean.