Ananda
Pascual
IMEDEA(CSIC-UIB)
Marc Torner, SOCIB
Charles Troupin, IMEDEA(CSIC-UIB)
Arancha Lana, IMEDEA(CSIC-UIB)
Simó Cusí, SOCIB
Carlos Castilla, SOCIB
Emma Heslop, IMEDEA(CSIC-UIB)
Joan Pau Beltrán, SOCIB
Kristián Sebastián,
Sebastián Lora, SOCIB
Irene Lizarán, SOCIB
Simón Ruiz, IMEDEA(CSIC-UIB)
Joaquín Tintoré, IMEDEA(CSIC-UIB) and SOCIB
Poster
We present preliminary results of a recent multi-sensor experiment (G-ALTIKA, hereinafter) performed in August 2013 in the Western Mediterranean Sea. The two main objectives of G-ALTIKA are: (1) to process, validate and intercalibrate multi-platform datasets dedicated to coastal ocean and (2) to use an integrated approach to improve the monitoring and understanding of dynamical processes in the Western Mediterranean Sea.

During G-ALTIKA, a deep glider followed almost simultaneously a SARAL-AltiKa satellite track (no. 16) located close to Ibiza Island. This track benefits from the SOCIB HF Radar facility, which provides hourly surface currents in the Ibiza Channel, with a 3 km spatial resolution and a range up to 60 km. A Lanczos filter with a 36-h cutoff frequency removed inertial oscillations from radar data. The trajectories of surface drifters deployed in the area of interest were interpolated, low-pass filtered with a 36-h cutoff, and subsampled every 6 h to remove high-frequency components, especially tidal and inertial currents not resolved by altimetry data.

Initial comparisons reveal a relative good agreement between all platforms (drifter, along-track SARAL/AltiKa and HF radar). Dynamic height (DH) was estimated from the glider CTD. Test with different reference levels (ranging from 300 to 900 m) evidences a weak sensitivity of DH to this parameter. After the filtering of scales smaller than 10-15 km, not well resolved by altimetry, the gradient of dynamic height is only of the order of 2-3 cm, but indicates the presence of a coherent cyclonic meander with a diameter of around 25 km, located southwest of Ibiza.

Absolute Dynamic Topography (ADT) is obtained by combining 1 Hz, along-track near real-time SLA from SARAL/AltiKa with the new SOCIB-CLS Mean Dynamic Topography. Surprisingly, SARAL/AltiKa records also capture the weak cyclonic meander, with consistent size, amplitude and position compared to glider observations. Furthermore, SARAL/AltiKa is able to capture the northward edge of the meander, a northwestward current that lies on a shallow bathymetry (less than 100 m) and flows very close to the coast (distance to Ibiza < 10 km). However, 1 Hz along track data fail to depict the fine-scale signals sampled by the glider, which are typical in the Mediterranean Sea (Rossby radius around 10km).

As expected, the resolution of standard gridded altimetric maps is not sufficient for the detection of small mesoscale and submesoscale features present in the glider data, the drifter and the HF radar. High-resolution gridded maps have been generated using the Data-Interpolating Variational Analysis (DIVA), a gridding method based on the minimization of a cost function using a finite-element technique (see poster by Troupin et al.). The application of this method combining SARAL/AltiKa, Jason-2 and Cryosat -2 data allows us to well resolve this meander.

In summary, this study highlights that: (1) SARAL/AltiKa is providing reliable data very close to the coast with weak associated gradients, representing a challenge for the new era of satellite altimetry observations and (2) there is a clear need of high resolution ocean surface topography measurements, by the development of synergic approaches through the combined use of observing systems and model simulations and by the launch of the Surface Water and Ocean Topography (SWOT) mission.

G-ALTIKA was carried out in the frame of MyOcean2 EU FP7 funded project and is a contribution to the SARAL/AltiKa science team under the proposal: ‘On the use of SARAL/Altika products for coastal and MEsoscale studies in the BAlearic Sea: synergy with other sensors (SAMEBA)’.
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