Coastal current estimates from Glider mounted ADCP

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Abstract (Oral Presentation)

The underwater glider has become an important platform for ocean observation. The miniaturization and refinement of environmental sensors provide new opportunities for long-term monitoring of physical and biogeochemical parameters in the marine environment. As part of the MATUGLI (Autnonomous Measurements of coastal TUrbidity using GLIders) experiments, a Slocum glider equipped with an acoustic profiler sensor was deployed in the Gulf of Lions in front of the Rhône River, NW Mediterranean in February 2017. The coastal area of the Gulf of Lions is a key area for the French Mediterranean Sea in terms of carbon sequestration. It is a buffer zone that receives and stores particulate and dissolved matter (natural or anthropogenic) from rivers and exports a part of it to the open ocean. Measurements obtained with Explorer Doppler Velocity Log (DVL) from glider are used to compute absolute horizontal velocities on continental shelf (upper 200 m of the ocean). Two methods were compared to assess the associated errors and determine significance of different parameters for coastal zone absolute velocities. First, a simplify flight model has been used to reconstruct the entire profile of the glider underwater motion. The regression between available bottom track and the simplify flight model velocities are used to extrapolate the missing bottom track velocities (top of profile, when the acoustic sensor doesn't see the seabed). The final bottom track profile is used to reference relative velocities and estimate absolute horizontal velocities with RMS error values of +/- 0.1 m.s-1. Then, velocity inversion method, developed for the lowered ADCP, has been used. The relative velocity profile is combined with external absolute constraints and a set of linear equations is solved to separate the ocean and glider velocities. We expect a lower RMS error of absolute horizontal velocities by coupling external absolute constraints such as an accurate flight model, bottom tracking and dive average current.