MEDITERRANEAN TIDAL CURRENTS: A QUALIFICATION OF CURRENT METERS PERFORMANCES

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Calibrating current sensors in the lab needs sophisticated equipments and a qualified staff. Therefore, nearly all teams use standard calibrations provided by the manufacturer. However, mechanical sensors used on most of the instruments wear from year to year. They can also suffer from damages. Besides, deep measurements in the western Mediterranean Sea have evidenced currents of several tens of cm/s. The occurrence of such large currents at depth overthrows generally accepted ideas. Therefore, an in situ qualification of current measurements is needed. Surprisingly, this is a very easy task which provides an extremely accurate calibration of the sensors.

Tidal currents in the interior of the ocean are mostly barotropic. Therefore, any location is associated with specific values of the amplitude and phase of each tidal component. Harmonic analyses technics have been proved very efficient to compute these values. Nevertheless, in most of the ocean, tidal currents are relatively large. This is especially the case at depth, when they are compared to longer time scale currents as, for instance, those due to the general circulation. Because of the threshold of a mechanical speed sensor, when tidal currents are relatively large, the change in direction they induce will be associated with an overestimated speed value. On the contrary, when tidal currents are relatively low, as in the Mediterranean Sea, they only induce small variations of the speed and direction of the recorded current. In this case, the efficiency of harmonic analysis extends to the utmost.

A lot of mechanical current meters have been moored over the whole western Mediterranean Sea allowing the computation of tidal currents (ALBEROLA *et al.*, 1994). In the interior of the Algerian Basin, relatively long time series have been collected at different depths and locations. This allows a statistical analysis of the amplitude and phase of the M2, S2 and N2 tidal components. It is demonstrated that amplitudes as low as a few mm/s can be accurately computed together with phases which accuracy is a few degrees. This provides a qualification test for current meters and accounts for their generally good performances.

REFERENCES

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