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Mapping Mediterranean tidal currents with surface drifters

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Abstract

Velocities of surface drifters are analyzed to study tidal currents throughout the Mediterranean Sea, with main focus on the semi-diurnal tide. Harmonic analysis on 15-day long trajectory segments reveals semi-diurnal tidal amplitudes larger than 5 cm/s in the Alboran Sea, the northern Adriatic Sea, the Sicily Channel and the Gulf of Gabès. Elsewhere the tidal currents are weak (< 2 cm/s) except for a few isolated locations where the semi-diurnal currents are significant, such as in the eastern Aegean Sea. S₂ is similar to M₂, but the amplitudes are generally smaller. In general, the drifter-inferred results confirm previous (mostly coastal) observations and numerical simulations of the Mediterranean tidal currents. In addition, they provide novel information on the tidal currents in the open sea. It was found that substantial K₁ signals prevail in the Alboran Sea and some regions of the Sicily Channel and the Adriatic Sea. However, the results for the diurnal constituents should be interpreted with caution due to the possible contamination by leakage of near-inertial energy in the tidal bands and by currents forced by the sea breeze.

Keywords:

Mediterranean Sea; drifters; tidal currents

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