



Circulation in the northern and middle Adriatic Sea using surface drifters: Mesoscale to seasonal variabilities

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Within the ONR-sponsored DOLCEVITA project, more than 120 satellite-tracked drifters were deployed in the northern and central Adriatic Sea between September 2002 and the end of December 2003, with the purpose of studying the surface circulation in relation to wind forcing, river runoff and bottom topography. The sub-inertial variability of the surface currents, and in particular their structure at meso- to seasonal scales, are described in terms of Eulerian and Lagrangian statistics estimated from interpolated and low-pass filtered data.

The horizontal distribution of mean currents, velocity variance, mean and eddy kinetic energies were evaluated averaging 6-hourly data in bins of 10 km radius. The well-known persistent features in the mean circulation are confirmed by the new data. Moreover, the northern circulation is better resolved showing a westerly intensified cyclonic gyre in the northernmost part of the basin. Mean kinetic energy shows a maximum of $440 \text{ cm}^2/\text{s}^2$ along the Italian coast in front of Ancona, while the eddy kinetic energy is maximal ($260 \text{ cm}^2/\text{s}^2$) to the southeast of Ancona.

Separating data into seasons, the mean kinetic energy is maximal in autumn and winter (up to $700\text{-}800 \text{ cm}^2/\text{s}^2$), while it is very weak in summer. The maximum values are always found in the Western Adriatic Current (WAC) south of Ancona, except in summer. The fall maximum is probably related to a maximum in the Po river outflow ($8000 \text{ m}^3/\text{s}$) that occurred in late fall.

Three-hourly high resolution Local Area Model Italy (LAMI) winds have been used to relate drifter velocity to wind fields. Maps of surface velocity statistics have been pro-

duced for northeasterly Bora, southeasterly Sirocco and northwesterly Maestro wind regimes, by averaging drifter data in each wind regime. The surface currents appear to be greatly influenced by the winds. The mean flow in Bora regime shows an intensification of the across-basin re-circulating currents (near the tip of Istria and off Split) with mean speeds reaching 20-25 cm/s. In addition, the WAC is strongly intensified both in intensity (mean speeds up to 30-40 cm/s) and in its offshore extension. In the Sirocco regime, northward flow without re-circulation dominates throughout the eastern half of the basin, while during Maestro, the WAC is enhanced.