

Interactive comment on “Transit and residence times in the surface Adriatic Sea as derived from drifter data and Lagrangian numerical simulations” by P.-M. Poulain and S. Hariri

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Received and published: 10 April 2013

We thank Referee 2 for its important and positive comments. The revised text has been improved using most of them. Here is our specific responses to these comments:

The words “drifters” or “particles” are used throughout the revised text. The word “object” is only used in the conclusions to represent anything which floats at/near the sea surface.

“advection-diffusion model” was replaced by “advection-dispersion model”

The definitions of transit and residence times are better explained in the new text. They

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might differ from definitions found in the literature, especially in papers dealing with flushing and residence times and age in estuaries. In our case, the transit time after entering the basin on the eastern side of the Otranto Channel could be considered as “age”.

There is indeed substantial variability of the Adriatic surface currents at seasonal and synoptic (wind-driven) scales (see Poulain, 2001; Ursella et al., 2006). In this simple model, variabilities at mesoscale, synoptic, seasonal and inter-annual scales are considered as 2D turbulence and simulated as a random process. The drifter data are not numerous enough to consider the seasonality as a deterministic signal.

The standard deviations of the transit time are large mainly due to the substantial variance of the velocity fluctuations. We can speculate that transit and residence times might be shorter in winter with respect to summer, but again it is difficult to assess this difference with the available drifter data.

The first problem, that is the mortality of the drifters and corresponding short half life of about 40 days, can be alleviated by using numerical drifters with no “mortality”, integrated over long times (750 or 1000 days). The second problem related to the wind/wave induced slip cannot be fully resolved.

Figure 3 shows the mean transit times from particles released throughout the Adriatic and exiting on the western flank of the Otranto Channel. Given the mean cyclonic circulation of the Adriatic Sea, it is obvious that transit times are shorter off the southern Italian coast and longer on the other side near Albania, Montenegro and Croatia. Again transit time is better defined in the new text to avoid any confusion. It corresponds to “age” for particle entering the basin (Figure 5).

Interactive comment on Ocean Sci. Discuss., 10, 197, 2013.

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