Geophysical Research Abstracts
Vol. 14, EGU2012-11645, 2012
EGU General Assembly 2012
© Author(s) 2012

On the Probability and Spatial Distribution of Ocean Surface Currents

Y. Ashkenazy (1) and H. Gildor (2)

(1) Ben-Gurion University, Solar Energy and Environmental Physics, Midreshet Ben-Gurion, Israel (ashkena@bgu.ac.il), (2) The Fredy and Nadine Herrmann Institute of Earth Sciences, The Hebrew University of Jerusalem, Jerusalem, Israel (hezi.gildor@huji.ac.il)

Insights into the probability distribution of ocean currents are important for various applications such as the chance to encounter extreme events, which may affect, for example, marine construction, and for estimating the energy that can be extracted from the ocean. In addition, for devising better parameterizations for submesoscale mixing, which present climate models cannot resolve, one should understand the velocity distribution and its relation to the various forcing of surface ocean circulation. Here, the authors investigate the probability distribution of surface currents from the Gulf of Eilat/Aqaba measured by high-frequency radar. Their results show that the distribution of ocean current speeds can be approximated by a Weibull distribution. Moreover, the authors demonstrate the existence of spatial variations of the scale and shape parameters of the Weibull distribution over a relatively small region of only a few kilometers. They use a simple surface Ekman layer model to investigate this spatial variability. They find that, when forced by local winds, this model does not reproduce the observations. The addition of Gaussian noise to the zonal and meridional components of the bottom geostrophic currents has only a slight effect on the surface current distribution. However, noise added to the components of the local wind (mimicking wind gusts) has a much greater effect on the distribution of surface currents, suggesting that wind spatial and temporal variability underlay the observed spatial variability of the parameters of the Weibull distribution.