Geophysical Research Abstracts
Vol. 20, EGU2018-2188, 2018
EGU General Assembly 2018

Lagrangian Statistics and Intermittency in Gulf of Mexico

Wei Zhuang (1), Yongxiang Huang (1), and Liru Lin (2)

(1) Xiamen University, State Key Laboratory of Marine Environmental Science, Department of Physical Oceanography, China (wzhuang@xmu.edu.cn), (2) State Oceanic Administration, South China Sea Institute of Planning and Environmental Research

Due to the nonlinear interaction between different flow patterns, for instance, ocean current, meso-scale eddies, waves, etc, the movement of ocean is extremely complex, where a multiscale statistics is then relevant. In this work, a high time-resolution velocity with a time step 15 minutes obtained by the Lagrangian drifter deployed in the Gulf of Mexico (GoM) from July 2012 to October 2012 is considered. The measured Lagrangian velocity correlation function shows a strong daily cycle due to the diurnal tidal cycle. The estimated Fourier power spectrum E(f) implies a dual-power-law behavior which is separated by the daily cycle. The corresponding scaling exponents are close to -1.75 and -2.75 respectively for the time scale larger (resp. $0.1 \leq f \leq 04$ day-1) and smaller (resp. $2 \leq f \leq 8$ day-1) than 1 day. A Hilbert-based approach is then applied to this data set to identify the possible multifractal property of the cascade process. The results show an intermittent dynamics for the time scale larger than 1 day, while a less intermittent dynamics for the time scale smaller than 1 day. It is speculated that the energy is partially injected via the diurnal tidal movement and then transferred to larger and small scales through a complex cascade process, which needs more studies in the near future.