Abstract View

Volume 15, Issue 7 (July 1985)

Journal of Physical Oceanography
Article: pp. 865–884 | Abstract | PDF (1.44M)

Surface Circulation and Kinetic Energy Distributions in the Southern Hemisphere Oceans from FGGE Drifting Buoys

Steven L. Patterson

Department of Oceanography, Texas A&M University, College Station, TX 77843

(Manuscript received September 24, 1984, in final form March 18, 1985)

DOI: 10.1175/1520-0485(1985)015<0865:SCAKED>2.0.CO;2

ABSTRACT

Trajectories of approximately 300 satellite-tracked drifting buoys deployed throughout the Southern Hemisphere oceans during the Fiat GARP Global Experiment (FGGE) have been analyzed to infer the mean surface circulation and kinetic energy distributions of the surface flow. The resulting picture of mean surface circulation is consistent with expectations based on compilations of historical observations of currents and the density field. The distribution of kinetic energy of the mean flow is highly zonal in character with high values in the persistent zonal flows of the Antarctic Circumpolar Current and the South Equatorial Currents and low values in the broad intervening zone. Using statistics based on 5° squares, the western boundary currents do not emerge as dominant features of the mean flow. On the other hand, these currents do appear to be a major source of eddy kinetic energy. Most eddy kinetic energy appears to be due to fluctuations with periods less than one month. Both mean and eddy kinetic energy are influenced by major bathymetric features. The results presented here compare favorably with earlier studies. The good agreement between the distribution of eddy kinetic energy and the variability in sea surface height suggests that most eddy kinetic energy is due to variations in the geostrophic currents.