NONLINEAR FEATURES OF EQUATORIAL ROSSBY WAVES DETECTED IN TOPEX ALTIMETER OBSERVATIONS

R.E. Glazman, A. Fabrikant, and A.M. Greysukh
(JPL, California Institute of Technology, Pasadena, **CA,** 91109-8099. USA; E-mail: reg@pacific.jpl.nasa.gov)

Using a recently proposed technique for statistical analysis of non-gridded satellite altimeter data, regime of long equatorially-trapped baroclinic Rossby waves is studied. One-dimensional spatial and spatial-temporal autocorrelation functions of sea surface height (SSH) variations yield a broad spectrum of baroclinic Rossby waves and permit determination of their propagation velocity and of the meridional variation of the wave amplitude (the waveguide profile). The wave speed is found to be greater than that predicted by linear theory, and the waveguide structure is significantly different from the well known theoretical predictions. Moreover, the 1-d wavenumber spectrum of zonal variations is given by a power-law k^{-2} on scales from about 800 km to 9000 km. We demonstrate that the observed wave regime exhibits features of soliton turbulence developing in the long baroclinic Rossby waves, as predicted earlier by J. Boyd and A. Osborne. However, satisfactory explanation of the observed waveguide structure is not yet available..