

WEAKLY NONLINEAR INTERACTION OF SVERDRUP FLOW AND BASIN MODES IN THE BAROTROPIC QUASI-GEOSTROPHIC WIND DRIVEN CIRCULATION

M. Ben Jelloul (1), T. Huck (2)

(1) LODYC, Paris, (2) LPO-UBO, Brest

The linear solution of the barotropic quasi-geostrophic wind driven circulation can be decomposed into a steady forced solution and a time dependent component. The steady wind forced solution consists in a classical Sverdrup flow dissipated in the western boundary layer where the viscosity is active since the homogeneous time dependent solution is a sum of basin modes with arbitrary amplitudes.

The effect of the nonlinear term is handled through a weakly nonlinear analysis providing a set of evolution equations for the modes amplitudes. It can be proven that mode stability is related to the wind stress symmetry and saturation amplitude can be computed in this case. Pure basin modes interactions yield triads with cycling energy and sub-harmonic instabilities.