Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Weakly nonlinear, multi-modal evolution of wind-generated long internal waves in a closed basin LARRY REDEKOPP, University of Southern Californina, TAKAHIRO SAKAI, University of Southern California — A weakly nonlinear evolution model that accounts for multi-modal interaction in a continuously stratified lake of variable depth is derived. The model for the first two vertical modes in a lake that is subject to wind stress forcing is numerically simulated. Defining modal energies, energy transfer between the first and the second vertical modes is calculated for several different forms of the density stratification. Modal energy transfer mainly occurs during reflection of mode-one waves at the vertical end walls, and it is shown that the amount of energy transfer from the first to the second mode is greatly dependent on the shape of the stratification. Also, the initial modal energy partition at the end of the wind setup is shown to depend significantly on the penetration depth of the wind stress, especially if the stress distribution extends into the upper levels of the metalimnion.

Larry Redekopp
University of Southern Californina

Date submitted: 30 Jul 2008 Electronic form version 1.4