Issues in predicting solitary waves in Luzon Strait and South China Sea region

A.Warn-Varnas[1], S. Piacsek[1] and J. Hawkins[2]

[1]Naval Research Laboratory
Stennis Space Center
MS 39529, USA

[2]Planning Systems Inc.,
Slidell, LA 70458
USA

Studies of solitary wave generation and propagation are conducted in Luzon Strait and South China Sea region. The EULAG nonhydrostatic model is used for simulating the generation and propagation of internal solitary waves. The model is initialized from density profiles obtained from the Navy Coastal Ocean Model (NCOM) with tides and is forced with an analytical tidal function derived from data or by assimilating the barotropic tidal forcing predicted by NCOM.

The emphasis of this investigation is on various issues that arise in conducting the model predictions. The domain size is about 600 km along longitude and 444 km along latitude.
Grid resolution is varied from 100 m to 1 km in longitude and 1 km to 25 km in latitude. The effects on solitary wave train structure and horizontal curvature are considered, including decoupling of dynamics along latitude as the resolution becomes coarse. Vertical resolution is varied from 21 to 41 sigma layers. Tidal forcing issues involve variation of analytical forcing function in time and space. Assimilation of barotropic tidal forcing from NCOM can lead to damping of internal bores as they propagate away from Luzon Strait towards China. Various settings of model parameters are considered.