Influence of hydrological data sources upon the geographical and seasonal distribution of kinematic and nonlinear parameters of long internal gravity waves

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When internal wave processes in the ocean waters are modeled numerically, the important problem is to specify the hydrological conditions determining density variations with depth in the domain of computations to initialize the numerical models. Appropriate data from in situ measurements are hardly available; therefore model stratifications approximated analytically can be used as well as gridded temperature-salinity data from international hydrological atlases. As for the latter approach, data from different sources can have different resolution, be based on different input data sets and have different averaging and smoothing algorithms. Therefore the aim of the present study is to examine the influence of hydrological data sources (GDEM and WOA) upon the geographical and seasonal distribution of kinematic and nonlinear parameters of long internal waves. The discrepancies are estimated and discussed. The considered parameters, such as phase speed, dispersion parameter and nonlinearity parameters of the weakly-nonlinear KdV-type models, can be used for express-evaluations of the possible polarities, shapes of solitary internal waves, their limiting amplitudes, propagation speeds, etc. They are useful not only for simulations of internal wave evolution in the framework of weakly-nonlinear models, but also to set-up and initialize more complex models for internal gravity waves (IGW, MIT GCM, POM).