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Kinematic parameters of second-mode internal waves in the South China Sea

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Kinematic parameters of second-mode internal waves (in the framework of weakly nonlinear model of the Gardner equation) are calculated for the region of the South China Sea on a base of GDEM climatology. The prognostic parameters of the model include phase speed of long linear waves, coefficients of dispersion, quadratic and cubic nonlinearity, location (in vertical) of minimum, zero and maximum of the second vertical baroclinic mode and the ratio of its maximal and minimal values. All the parameters are presented in the form of geographical maps for winter (January) and summer (July) seasons. Frequence (in the sense of occurrence) histograms and scatter plots with depth are also given for all the parameters.

Special attention is paid to the conditions of normalizing for internal waves of the second mode, as it possesses two extremes. Here some freedom exists, but for correct further modeling of internal waves within the Gardner model one has to fix and keep the same normalization (at maximum or at minimum) for whole a basin.

Constructed arrays of prognostic parameters of second-mode internal waves are necessary for the estimations of shape and width (at fixed amplitude) of internal solitary and breather-like waves, limiting amplitudes of internal solitary waves of different families, for assessment of near-bed and near-surface flows induced by such waves, and for evaluation of transport distance for dissolved and suspended matter.

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