Modulation instability and hazardous internal waves in South China and Baltic Seas

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The modulation instability of long internal waves can occur in various areas of the World oceans for certain conditions on the density stratification. It leads to appearance of internal "rogue" waves which are appear and disappear very quickly. In weakly nonlinear theory of long internal waves based on the Gardner equation these conditions satisfy to the positiveness of the coefficient of cubic nonlinearity term. Our calculations show that the cubic nonlinear term is positive for the conditions of the South China Sea in January and the Baltic Sea in July. Parameters of internal wave groups which are optimal for modulation instability are discussed. The numerical modeling of modulation instability development and the appearance of internal waves of huge amplitudes is performed in the framework of the Gardner equation and full nonlinear Euler equations.