



## **Generation of intense internal solitary waves in lakes with external periodic forcing**

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The numerical model for internal waves, which are generated by external periodic forcing or evolve from an initial disturbance in a bounded basin (such that counter-propagating waves can not be neglected), is developed. The model is based on the Boussinesq-like equations, and is extended to the next order in nonlinearity: the equations are modified taking into account the cubic nonlinear term. The improved equations allow describing strongly nonlinear wave regimes. It is shown that short-period intensive solitary waves can be generated against a background of large-scale standing mode, and bound state of several impulses propagating in both directions are demonstrated. The situations are also considered when cubic nonlinear corrections are fundamentally important - it leads to the forming of wide solitary waves. The applicability of the model to the description of internal waves in natural basins, such as ponds, lakes, bays or inlets is discussed, and the corresponding scaling is given.