Comparison of the effectiveness of between Boussinesq and the Green Nagdhi equation systems as non-linear calculation methods

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A tsunami wave is strongly affected by the non-linearity in the case that it goes into a shallower sea region. In general Boussinessq equation system had been frequently applied in the calculation of tsunami wave propagation in a shallower sea with considering non-linearity and the effect of dispersion. In the present study we adopt Green-Nagdhi equation system, which was derived with the assumption that the water motion does not changes vertically. It is known that by using Green-Nagdhi equation system we can reproduce the motion of tsunami wave even in shallow sea in the realistic image without heavy calculation. Han(2002) applied this equation system for the problems of nonlinear tsunami wave propagation. He pointed out that an example of soliton fission gives the good agreement by the result of a numerical calculation applying Green Nagdhi equation with the theoretically predicted ones. He also made a numerical calculation successfully on the undular bore typed tsunami wave going upstream along a river.

In the present study we checked the effectiveness of the Green Nagdhi equation system in the calculation of actual tsunami behaviors, and compared the green Nagdhi equation system with that of Boussinesq equation system proposed by Mano(1988) for the problems of soliton fissions, passing over of soliton, and so on. In addition that we conducted an indoor experiment in a water channel for checking the calculated results were exact or not. We next intend to apply this equation system to two dimensional problems such as oblique reflection of solitons.