



A method for tsunami wave form re-calculation trough the shelf

V. Kaystrenko

Institute of Marine Geology and Geophysics FEB RAS, Yuzhno-Sakhalinsk, Russia
(victor@imgg.ru)

It is rather difficult to calculate the tsunami propagation from source to the coastal zone within the scope of single numerical model. It is known that the tsunami field varies highly near the coastal zone because of relatively small wave length. Therefore the tsunami calculation in this zone needs a small grid steps about 10 - 100 meter, and consequently the calculation of tsunami propagation in domain 1000 km x 1000 km needs a grid dimension up to $10^5 \cdot 10^5$. Really a such small grid step is needed for tsunami description in shallow water only. Therefore usually the full domain is divided into several parts in which a different grids or different methods are used.

Tsunami wave form can be calculated by the grid model up to minimal depth H_0 according to Courant condition. After them the tsunami wave form can be re-calculated from the depth H_0 to the shore line using the special integral transformation.

$$\eta_1(t)|_{x=0} = \int_0^{T-t} \frac{t-\tau}{\sqrt{(t-\tau)^2 - T^2}} \eta'(\tau)|_{x=L} \cdot d\tau,$$

where $t > T$ and $T = 2L/kg = 2L/gH$ is the travel time from point $x = L$ to the coast.

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