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1-D linear inverse problem for initial sea level disturbance in the tsunami source.

V. Kaystrenko

Institute of Marine Geology and Geophysis, Rusian Academy of sciences, Yuzhno-Sakhalinsk, Russian Federation (victor@imgg.ru)

1-D linear inverse problem for initial sea level disturbance in the tsunami source $\eta_0(x)$ using sea level record $f(t)$ near the shore was investigated. Sea bottom can be considered as the slopping plane and water depth$h(x) = k \quad x$. Let the function $\eta(x,t)$ describing sea level oscillations depending from time t and space coordinate $x$is satisfying the linear shallow water equation

$$(gkx \cdot \eta_x)_x = \eta_{tt}$$

In this case initial sea level disturbance in the tsunami source $\eta_0(x)$ = $\eta(x,0)$ and sea level record (marigram) on the shore $f(t)$ = $\eta(0,t)$ are tied by the integral equation of Abel type which has an analytical solution:

$\eta_0(z) = f(z) - \frac{2}{\pi} \int\limits_0^z f'(t) \cdot \arcsin(\frac{t}{z}) \cdot dt$, where $z = 2\sqrt{\frac{x}{kg}} = \frac{2x}{\sqrt{gh}}$ is the travel time from the point with coordinate x to the shore.

The case of the 2007 Nevelsk tsunami was analyzed. Tsunami source profile $\eta_0(x)$ was estimated using the initial part of "marigram" $f(t)$ which was created according to eyewitness information. The form of the source profile $\eta_0(x)$ is slightly similar to the "marigram" form but its "amplitude" is approximately seven times less.

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