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Specification of initial condition in numerical simulation of seismotectonic tsunamis

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Numerical simulation of seismotectonic tsunamis usually implies solution of an initial value problem within the framework of long wave theory. We discuss imperfectness of traditional method of specification of the initial condition, within which the initial disturbance of water surface is assumed to be equal to the residual vertical bottom deformation. Then we suggest improved method of calculating of the initial elevation from solution of 3D problem in the framework of linear potential theory. Direct numerical solution of 3D problem requires huge computational capability. For practical use a simplified approach based on an exact analytical solution of the problem in case of ocean of constant depth is developed. The suggested method does not violate traditional scheme of tsunami simulation but optimize it. The first point of optimization consists in removing from tsunami spectrum of shortwave components which are not peculiar to real tsunami waves. The second point consists in taking into account all three components of the deformation vector instead of vertical bottom deformation only. Efficiency of the new method as compared with the traditional one is demonstrated by the example of some recent tsunamis.