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Structure of the recurrence function for tsunami heights

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Statistical long-term prediction of tsunami heights is a very important problem. It is the basement for tsunami zoning and insurance politic.

There are several difficulties to realize this problem. Main of them is stochastic character of tsunami activity. It is known that a sequence of earthquakes exceeding an elected magnitude threshold differs little from the Poissonian one. Deviations from the Poissonian type are related to aftershocks which does not produce any tsunami as a rule. According to it the consequence of tsunamis occurred at the each point with the maximal run-up height exceeding an elected threshold can be considered as the Poissonian one. The main parameter of the Poissonian process depending from the tsunami height "threshold" h is a recurrence function. To find the good asymptotic approximation of this function for extreme tsunami heights is one of essential problem. It can be showed that recurrence function structure is following: $\varphi(h) = \sum_{k=1}^{m} f_k \varphi_k \left(\frac{h}{H_k *}\right)$, were ϕ_k are partial tsunami recurrence functions related to each part of tsunami source zone and f_k are partial frequencies of strong tsunamis. We can propose (like L.Esteva's principle for seismicity) that physical processes of tsunami activity are similar everywhere. This case are the functions ϕ_k should be same. The last function can be arbitrary power function or should be function decreasing more rapidly than each power function. The work was supported by the Russian foundation for basic research, grant 08-05-01096

L.Esteva. Seismicity/ In the book: Seismic risk and engineering decisions. 1970