



Meteotsunami occurrence in the Gulf of Finland over the past century

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Meteotsunamis, or meteorological tsunamis, are observed on shallow sea areas worldwide, but little is known about long-term variations in their occurrence as sea level time series of sufficiently high resolution are typically rather short, 5-10 years. Here, we present a time series of meteotsunamis observed in the Gulf of Finland, Baltic Sea, in 1922-2017. The time series has been compiled from original tide gauge charts and digital high-resolution sea level data from three tide gauges on the Finnish coast: Hanko, Helsinki, and Hamina. Rapid sea level variations during summer months (May-Oct) were located in the data by visual browsing (charts) or an automated algorithm (digital data), and the meteorological origin of the oscillations was confirmed from air pressure observations. The results show no clear trends in meteotsunami occurrence, rather decadal variability. The connection of meteotsunami occurrence with atmospheric parameters was also studied. The strongest connection was found with lightning observations: meteotsunamis in the Gulf of Finland occur practically always in connection with thunder. The number of lightnings in the region was over 10 times higher during the days when a meteotsunami was observed than during other days in May-October.