

Application of numerical forecast model of storm surge to tidal correction for tsunami survey

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In order to measure tsunami inundation height, a watermark which remained at building or tree is used. The inundation height is measured as a height from nearby sea surface or as an altitude from nearby altitude reference point. Since the tide level is always changed, tidal correction is necessary for accurate measurement of the tsunami height. In case of measurement as the height from sea surface, two tide levels, at the time of measured the height and the time of reached maximum tsunami wave, are necessary for tidal correction. In case of measurement as the altitude, the tide level, at the time of reached maximum tsunami wave, is necessary. Usually tidal correction is done by using the observed data at nearest tide gauge station or computed astronomical tide. However, since the tide level is changed by atmospheric pressures and winds, they become error factors for tidal correction.

A numerical forecast model of storm surge has been developed by Japan Meteorological Agency since 1998 for forecast storm surge by typhoon mainly. Generally tide level consists of two factors, one is astronomical tide and the other is tide level departure caused by atmospheric conditions and ocean current. In the computing procedure of the forecast model, the tide level departure is computed at first, and then computed astronomical tide will be added to the obtained tide level departure. Today the numerical forecast data, called storm surge guidance data, is forecasting the tide level at all along Japanese coastline spacing one km grid, and is used for the storm surge alarming system.

The storm surge hind-cast data, which is initial model of forecasting storm surge, has an advantage over the astronomical tide, because it is including effect of the tide level departure. And one more advantage is that it can offer high density data which is one km spacing of tide level. Therefore, the storm surge hind-cast data may be able to use for tidal correction of tsunami survey.

In this study, we researched about whether the storm surge hind-cast data is able to use for tidal correction or not. We checked the accuracy of the storm surge hind-cast data by comparing observed tide level at 69 tide gauge stations, which are operated by Japan Meteorological Agency, in the period of November 2012. As the result, it is found that in almost all cases the storm surge hind-cast data is able to use for the tidal correction for tsunami survey.

Keywords: tsunami, tidal correction, tide gauge station, storm surge, watermark of tsunami