

Reexamination of sea area divisions by Tsumura for vertical crustal movement estimation using tidal records

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The method by Tsumura (1963) or the method by Kato and Tsumura (1979) are well used in order to estimate vertical crustal movement from the tide gauge records. Tsumura (1963) divided monthly mean sea level data into a linear trend component, an annual component and a deviation component. They removed the effect of the hydrographic condition by deducting the average of deviation component in the appropriately divided sea area, and estimated the vertical crustal movement. In this study, we calculated correlation coefficients of the deviation components and carried out cluster analyses, and then reexamined the sea area divisions defined by Tsumura.

We used monthly mean sea level data from 1961 to 2000 of 117 tide gauge stations. The monthly mean sea level data was corrected by the atmospheric pressure, subtracted an annual and a linear trend components, then a deviation component was obtained. The correlation coefficients of the deviation components were calculated for all stations. By referring to the correlation coefficients between all stations, it will be possible to choose an appropriate combination of stations for the hydrographic condition correction. Two types of cluster analyses using the correlation coefficients were carried out in order to verify the sea area divisions defined by Tsumura. As this result, it was confirmed that sea area divisions by Tsumura were appropriate in most stations.