

Seasonal adjustment for tidal data (3)

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In this study, long-term tidal records, which contain sea level change data longer than a few months, are considered. Because the change of the tidal record consists of both an oceanic effect and a crustal deformation, it can be used for the monitoring tool of the long-term crustal deformation if we can remove the oceanic effect. The methods introduced by Tsumura (1963) and Kato & Tsumura (1979) overcame the problem under the assumption that the regional crustal deformation can be expressed as a linear change. On the other hand, recent studies revealed that interplate coupling changes not only spatially but also temporally --- sometimes, we regard the change as a long-term slow slip event. Hence a new method that allows a much flexible trend than the linear trend previous studies assumed is required. Ochi (2018, 2019; the meeting of the Geodetic Society of Japan) adopted the seasonal adjustment method to separate the oceanic effects and the crustal deformations from the tidal records and presented the results in southwestern Japan. In this method, I assumed the tidal records to be the sum of non-linear trends, seasonal variations, and residuals. Under the assumption, I ignored the seasonal variation component as the oceanic effect, and only the non-linear trend and residual components are regarded as the vertical crustal deformation. To verify the assumption, I compared the difference of the trend components between the neighboring tidal stations and the GEONET vertical components. The results show that these two data well agree in southwestern Japan, especially along the coast of the Pacific Ocean. In the presentation, I will show the results of the other regions in Japan.

Keywords: Tidal records, Long-term crustal deformation