

Statistical test of the correlation between low-frequency tremors and earth and ocean tide loading

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Low-frequency tremors occur in a non-volcanic region in southwest Japan. Tremors occur synchronously in each region, and their activities have a quasi-periodicity with the interval of two to six months. During active period, tremors activity shows a quasi-periodicity with the interval of 12 hours. In this study, we note 12 hours periodicity, and we applied periodogram and autoregressive (AR) model. Then, both results show that tremor activities have 12 and 24 hours periodicity (Nakata & Suda, 2005 SSJ fall meeting).

We computed both solid earth tide and ocean tide loading, at the 30 km depth under the center of tremor occurring region. We use tremor durations per one hour as event data. Based on the tidal phase angle, we test whether tremors take place around a certain phase angle or not by using Schuster's test. As the parameter p becomes smaller, the confidence in rejecting the null hypothesis that tremors occur randomly with respect to the tidal phase angle becomes higher.

As a result of Schuster's test, p values show less than 1 % at almost period. There may be correlation between Low frequency tremor and tidal stress.