



The sea level variation around Taiwan and its connection with North Pacific climate

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We analyzed several sites of tide-gauge data around Taiwan to understand the regional sea level history from 1956 to 2007. Based on the monthly-averaged data in Penghu, a sea-level variation rate of +4.5 mm/yr is revealed, by linear regression. The summer data (July to September) yields a larger rate of 4.7mm/yr while the winter data (January to March) shows a smaller rate of +3.2mm/yr. This rising trend of sea level is consistent with the increase of the upper ocean temperature around Taiwan, based on Ishii's ocean climatology. Some comparison is also made with the satellite altimetry data near Taiwan. Further comparison with different climate index such as PDO (pacific decadal oscillation) and NPGO (north pacific gyre oscillation) shows the clear teleconnection in associated with the large scale climate pattern. It was found that the sea-level data are well correlated with PDO ($R = 0.82$), but moderately correlated with NPGO ($R = 0.43$). The most possible connection with PDO results from the variation of Kuroshio transport east of Taiwan. The strength of Kuroshio may play a key role on the advection of heat budget. Through the relationship between our data and the climate index with the link of Kuroshio, we also found that sea level variations of Northwest Pacific could be correlated with sea level of Northeast Pacific, but lagged by 3-5 years.