



Characters of Vertical Variability with Geodetic Satellites and Ground-based Continuous GPS in Taiwan

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Present-day GPS network have been extensively used to monitor crustal deformation due to various geodynamic mechanisms. Situated among the Pacific Ring of Fire on the suture zone of Eurasian and Philippine Sea Plates, the island of Taiwan with a dense continuous GPS network since \sim 1996 and now over 300 stations sees plenty of geophysical phenomena including particularly prominent crustal motions. We assessed daily solution of each station's coordinate time series, and made the routine corrections, such as orbital, EOP, atmospheric and tidal corrections, using GAMIT/GLOBK software (with ITRF05). We then employ the Quasi-Observation Combination Analysis (QOCA) package to obtain the variability and trend after removing occasional earthquake "disruptions". Preliminary results show strong seasonal variations. We then utilize the numerical method of Empirical Orthogonal Function (EOF) to analysis the geophysical signals from the continuous and dense GPS vertical crustal motion observations. We wish to be able to characterize both the seasonal and non-seasonal variability in the vertical crustal motion, in terms of the EOF modes in the spatial domain over Taiwan (plus a few offshore islets) with time evolution spanning the entire period of time. Corroborating with time-variable gravity data from the geodetic satellite mission GRACE, we can further obtain vertical components of both mass-induced loading with respect to the precipitation minus evaporation and the crustal motion caused by the active tectonic processes on Taiwan.