



Spatio-temporal Distribution of Cloud Cover in Central Taiwan

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The Experimental Forest which belongs to National Taiwan University is situated in central Taiwan. It covers an area of 32,781 hectares and occupies about 1% of Taiwan. Six tracts are under the jurisdiction of the Experimental Forest, located in Xitou, Qingshuigou, Shuili, Neimaopu, Heshe, and Duigaoyue. The terrain rises from 220 (m a.s.l.) to 3,952 (m a.s.l.). Due to it covering an elevation range of about 3,700 meters, this forest area worthy of being called the microcosm of Taiwan's forests, in addition to one of the best sites in Southeast Asia for conducting forest research (Wang, 2011). The mid-elevation area, approximately from 700 (m a.s.l.) to 2600 (m a.s.l.), is usually covered by cloud and fog and possesses the richest diversity of flora and fauna found in Taiwan. This forest ecosystem is often called "Cloud Forest". The cloud cover pattern and trend are influenced by ocean-atmosphere-land interaction, climate change and natural climate variability. This study used the cloud mask product (MOD35/MYD35, version 006), which was inverted from the long-term monitoring images (from 2000 to 2014) of Moderate Resolution Imaging Spectroradiometer (MODIS), to assess inter-annual, seasonal and diurnal patterns of cloud cover above the Experimental Forest.

The result indicated there was no significant trend in long-term mean annual cloud cover ratio. Further analysis showed the long-term seasonal trends decreased during January to March, but increased from April to June and October to December. The diurnal analysis indicated the highest cloud cover ratio occurred from noon to midnight from April to June and the highest cloud cover ratio was at the Xitou tract. The annual variability of cloud cover ratio of 6 tracts was between 0.35 to 0.6 and was significantly correlated with the Oceanic Niño Index (ONI, adjusted- $R^2 = 0.23 - 0.29$, p -value < 0.05). Since the ONI is the 3 month running mean of ERSST.v5 SST (sea surface temperature) anomalies in the Niño 3.4 region (5°N - 5°S , 120°W - 170°W) and this area is far from Taiwan, we can logically conclude that SST around Taiwan might much more directly influence cloud cover than the ONI. This study is ongoing.