Measurements of Trace Gases at Lulin Atmospheric Background Station (LABS) and Dongsha Island (DSI), Taiwan

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Measurements of trace gases (CO, ozone, etc.) were performed at LABS (Lulin Atmospheric Background Station, 23.5°N, 120.9°E, 2,862 m a.s.l.) and DSI (Dongsha Island, 20.70°N, 116.73°E, 3 m a.s.l.). Based on the nearly six-year measurements, diurnal variations of these species at the LABS were found to be distinctively different from those at the surface. CO show maximum concentrations in late afternoon, and minima at night. Ozone however, shows a nearly opposite variation to CO with minima at noon, contradictory to the photochemistry production of maximum ozone at the surface. However, this pattern of ozone diurnal variation repeated for the last five years, but changed since July 2011. The results of flask samples analyzed by NOAA/ESRL/GMD were also discussed in this study.

For the measurements at Dongsha Island, a small island situated between Taiwan and the Philippines, both Greenhouse Gases and ozone were measured during the spring of 2010. Our measurements suggested that strong northeasterly winds arising from the winter Asian monsoon may have transported polluted air masses from the northern continent to locations as far south as Dongsha (latitude 20.70°N), as indicated by elevated ozone levels of approximately 60 ppbv. In contrast, during the calm periods when the monsoon subsided, low ozone levels of about 30 ppb were detected, which is typical for marine air masses.

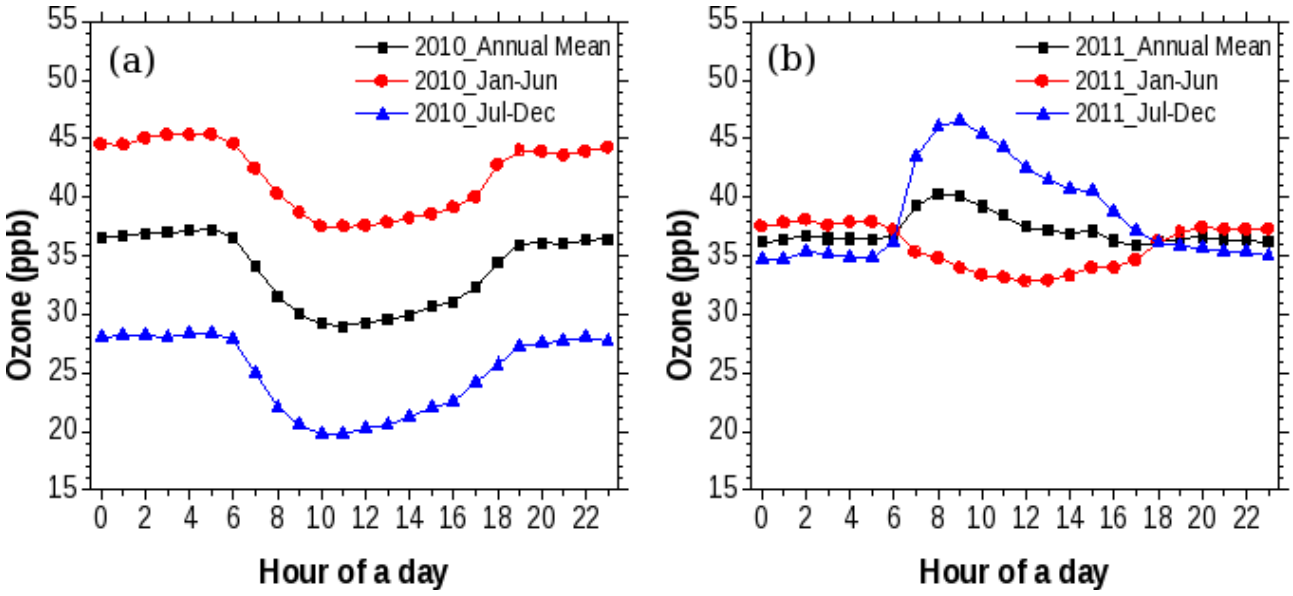

Figure 1. Diurnal variations of ozone observed at LABS in (a) 2010 and (b) 2011.