Temporal and spatial distribution of the mid-tropospheric CO_2 concentrations in Malaysia'

ABSTRACT

Satellite observations of CO_2 offer a unique portunities to improve our understanding of the carbon sources and sinks. Due to the lack of studies of carbon dioxide (CO_2) concentration in this region, we first confirmed the reliability of the mid-tropospheric Atmospheric Infrared Sounder (AIRS) CO_2 data using atmospheric CO_2 concentration data from the only available Global Atmospheric Watch (GAW) ground-based station observation in Malaysia. In this study, the spatial and temporal distribution of mid-troposphere CO_2 in Malaysia from January 2009 to December 2012 was analyzed based on AIRS satellite product. The results show that the average CO_2 concentrations were high in the eastern part of the study area and lower in the west. From January 2009 to December 2012, the mid-tropospheric CO_2 concentrations increased gradually with annual growth rate about 1.293 ppmv/a. There was a significant seasonal CO2 variation with peak concentration was observed during the North-East monsoon (NEM) and the lowest was during South-West monsoon (SWM). The temporal distribution of CO_2 concentrations was mainly affected by the amount of sunlight and precipitation received during both monsoons. The study suggested that mid-tropospheric AIRS CO_2 data product was able to help in understanding the variations of atmospheric CO_2 concentrations comprehensively.

Keyword : Mid-troposphere CO_2; Malaysia