

Surface aerosol radiative forcing at the Observatory for Atmospheric Research, Thailand during 2009-2011

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ABSTRACT

Surface radiation measurements were made at Phimai Observatory for Atmospheric Research, Thailand between 2009 and 2011 aimed to assess the impact of aerosols on the climate. The study area is located in agricultural activities surround the observatory. There are cassava field around there. The remaining crop during/after harvesting are burnt then more aerosols were released through the atmosphere. Downwelling total, direct, and diffuse radiative fluxes were measured. Aerosol optical depth measurements at 500 nm were also made by using a skyradiometer. Surface radiative forcing values were determined during 14 days of clear-sky conditions in the period of study. The maximum of aerosol optical depth was in summer in the range between 0.772 ± 0.368 and followed by winter (0.255 ± 0.151) and rainy season (0.255 ± 0.151) in respectively. Single scattering albedo in 500 nm average was 0.946 ± 0.037 . It implied that aerosol in the study area has optical properties as non-absorbing aerosol. From the 14 days clear sky condition, the diurnal forcing efficiency, determined by taking the slope of the best linear fit through the flux versus optical depth plot, was found to be -32.590 ± 9.264 watts per square meter in November 2010 and , -33.429 ± 11.368 watts per square meter in December 2010.