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The Influence of Meteorology on ambient PM2.5 and PM10 concentration in Chiang Mai

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Abstract

A concentration of particulate matter (PM), i.e. PM10 and PM2.5, peaks annually in March from 2015 to 2018, exceeding both Thailand emission (24-hour averaged 120 μ g/m3 for PM10 and 50 μ g/m3 for PM2.5) and World Health Organization (WHO) standards. This study will consider relationship between the PM concentrations and meteorological data of Chiang Mai in 2018 affecting the highest PM near surface. The hourly PM10 and PM2.5 concentrations in Chiang Mai town reach the maximum values on 30 March 2018 by two stations 35T and 36T. The former is 155.22 μ g/m3 at 35T and the latter is 117.73 μ g/m3 at 36T, superior to the Thailand standard. When both PM concentrations are over the standard, slightly stable atmosphere are occurred as indicated by E-class stability plot. Furthermore, an atmospheric inversion near surface appears from ground level to approximately 660 mb as shown in Skew-T diagram so air pollutants in Chiang Mai are trapped underneath 50 meters height of planetary boundary layer. Persistent slightly stable and neutral atmosphere (E and D class respectively) approximately 24 hours in Chiang Mai also encourages surplus PM10 and PM2.5 from 28 to 30 March 2018 in accordance with low speed western and south western winds (1 m/s to less than 4 m/s). Keywords: ambient PM2.5 and PM10, meteorological data, atmospheric turbulence, surface temperature inversion

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