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Air pollution “holiday effect” resulting from the Chinese New Year

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Abstract

Our study was an attempt to conduct a comprehensive and systematical examination of the holiday effect, defined as the difference in [air pollutant](#) concentrations between holiday and non-holiday periods. This holiday effect can

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be applied to other countries with similar national or cultural holidays. Hourly and daily surface measurements of six major air pollutants from thirteen [air quality monitoring](#) stations of the Taiwan Environmental Protection Administration during the Chinese New Year (CNY) and non-Chinese New Year (NCNY) periods were used. We documented evidence of a “holiday effect”, where air pollutant concentrations were significantly different between holidays (CNY) and non-holidays (NCNY), in the Taipei metropolitan area over the past thirteen years (1994–2006).

The concentrations of NO_x , CO , NMHC, SO_2 and PM_{10} were lower in the CNY than in the NCNY period, while the variation in the concentration of O_3 was reversed, which was mainly due to the [NO titration](#) effect. Similar differences in these six air pollutants between the CNY and NCNY periods were also found in the diurnal cycle and in the interannual variation. For the diurnal cycle, a common traffic-related double-peak variation was observed in the NCNY period, but not in the CNY period. Impacts of dust storms were also observed, especially on SO_2 and PM_{10} in the CNY period. In the 13-year period of 1994–2006, decreasing trends of NO_x and CO in the NCNY period implied a possible reduction of local emissions. Increasing trends of SO_2 and PM_{10} in the CNY period, on the other hand, indicated a possible enhancement of [long-range transport](#). These two mechanisms weakened the holiday effect.

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Keywords

Holiday effect; Weekend effect; Long-range transport; Titration effect; Taipei

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