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Observation of a "holiday effect ": a case of Chinese New Year in Taiwan

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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 be applied to other countries with similar national or cultural holidays. Hourly and daily surface measurements of six major air pollutants from fifty-four air quality monitoring stations of the Environmental Protection Administration in Taiwan during the Chinese New Year (CNY) and non-Chinese New Year (NCNY) periods of 1994-2008 were used.

The air pollutant concentrations were significantly different between holidays (CNY) and non-holidays (NCNY), in almost all the Taiwan area, except CO in the eastern part which is a relatively less-developed area. The industrial development of Taiwan extends from the north to the south; and then from the west to the east, due to the inconvenient transportation in the east. The difference percentage, defined as the concentration difference of CNY minus NCNY relative to the NCNY concentration, is highly related to the degree of industrialization. The difference percentages of NO_x, CO, NMHC, O_3, SO_2, and PM_{10} are more in the west than in the east. Over the western part of Taiwan, the difference percentages of NO_x, CO, NMHC and O_3 are more in the north than in the south; that of SO_2basically follows a similar trend but is more in the middle Taiwan, which might be related to emission change of a major coal-fired power plant. The difference percentage of PM_{10} over the western Taiwan is more in the south than in the north, probably due to stronger dust storm impacts on the northern Taiwan, where the dust storm sometimes occurs to “pollute” the clean air during the CNY period, and then causes fewer difference percentage.