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Factors controlling the strength of holiday effect

Pei-Hua Tan (1), Chia Chou (2,3), and Pen-Yuan Chen (4)

(1) National Chiayi University, Department of History and Geography, Chiayi, Taiwan (tan@mail.ncyu.edu.tw, 88652266540), (2) Research Center for Environmental Changes, Academia Sinica, Taipei, Taiwan, (3) Department of Atmospheric Sciences, National Taiwan University, Taipei, Taiwan, (4) Department of Landscape Architecture, National Chiayi University, Chiayi, Taiwan

Our study is to examine the "holiday effect", defined as the difference in air pollutant concentrations between holiday and non-holiday periods, and associated factors controlling the strength of holiday effect in Taiwan. This holiday effect can be applied to other countries with similar national or cultural holidays. Daily surface measurements of six major air pollutants from fifty-four air quality monitoring stations of the Taiwan Environmental Protection Administration (TEPA) during the Chinese New Year (CNY) and non-Chinese New Year (NCNY) periods of 1994-2008 are used. The air pollutant concentrations are significantly different between the CNY and NCNY periods, in almost all the Taiwan area, except CO in the eastern part which is a relatively less-developed area. The strengths of holiday effects of $NO_x, CO, NMHC and O_3$ are larger in the north than in the south, and those of SO_2 and PM_{10} are larger in the south than in the north. Factors controlling the strength of holiday effect such as the degree of urbanization and anthropogenic sources are examined. The population number and motor vehicle number rather than the population number density and motor vehicle number density have a significantly positive relationship with the strengths of holiday effects of $NO_x, CO and NMHC$.

The strengths of holiday effects of $NO_x and CO are mainly contributed from mobile sources and those of SO_2$ and PM_{10} are from stationary sources and that of NMHC is from both mobile and stationary sources.