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Long-term Changes in Extreme Air Pollution Meteorology and Implications for Air Quality

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Climate change can significantly affect air pollution meteorology. Of particular concern is the changes in extreme meteorological events (such as heat waves, temperature inversion, atmospheric stagnation and lightning) that have important implications for air quality and public health. We analyze the observed long-term changes in air pollution meteorology based on global datasets for the past decades (ca. 1950-2010) to examine the possible trends in the context of global climate change. Statistically significant increasing trends have been identified for heat waves, temperature inversion and lightning activities over large areas around the world. Global models are combined with statistical analysis to help us understand these changes as well as their implications for atmospheric composition and air quality in the past and future decades.