



Impact of Crop Residue Burning on Air Quality over China based on satellite data

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Emissions of fine aerosol particles and gaseous pollutants from biomass burning, including forest/savanna fires and crop residue burning, significantly contribute to the severe degradation of regional air quality, the change of global climate, as well as human health. As a large agricultural country, China faces large-scale burning of crop stubble in the field during the harvesting, post-harvesting and pre-harvesting periods. In China, especially in recent decades, straw burning played a noticeable role in the sudden and extreme haze episodes that combined with the primary and secondary pollutants derived from the industry pollution, engine exhausts and coal combustion. the spatio-temporal variation characteristics of crop residue burning over China for a long time were investigated. Because air quality data in China began to be monitored in 2012 only in important regions, such as the Jing-Jin-Ji region, the Yangtze River Delta Region, the Pearl River Delta Region and provincial capitals. Daily air quality data since 2012, including PM_{2.5}, PM₁₀, O₃, NO₂, SO₂ and CO, were obtained from China's National Environmental Monitoring Center (CNEMC). The Kriging method was applied for analyzing the spatial distribution of PM_{2.5}, PM₁₀, O₃, NO₂, SO₂ and CO. Finally, the daily crop residue burning and air quality data were used to analyze their spatial and temporal relationships. Our results showed that crop residue burning is close related to PM_{2.5} change in summer, China's middle-east and autumn-winter, China's northeast, they showed a spatial consistency during these two periods. In autumn-winter, crop residue burning can effectively induce the PM_{2.5} increase in China's northeast, and it is more obvious than summer crop residue burning because of the special weather condition, different crop residue and other sources of PM_{2.5}.