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HISTORICAL EMISSIONS AND FUTURE MITIGATION OF PRIMARY AIR POLLUTANTS FROM INDUSTRIAL BOILER IN CHINA

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Abstract

Industrial boilers are recognized as a significant anthropogenic emission source of primary air pollutants in China. By using specific and detailed statistical data and comprehensive time-varying dynamic emission factors (EFs), we calculated the temporal-spatial emission characteristics of total suspended particulate (TSP), SO_2 and NOx from industrial boilers during 1980 to 2016 for the first time. Further emission trends from 2016 to 2030 were also forecasted based on the current atmospheric action policy. Our results showed a generally decreasing trend of the annual EFs for TSP, SO_2 and NOx due to implementation of stricter local emission standards, application of advanced emission control technologies, and elimination of small and inefficient boilers. In 2016, national TSP, SO_2 and NOx emissions from industrial boilers were estimated at 5.43, 6.99, and 2.47 million tons (Mt), respectively. The higher emissions of primary air pollutants from coal-fired industrial boilers (CFIBs) were concentrated in northeast and eastern China, while NOx emissions from gas-fired industrial boilers (GFIBs) were mainly concentrated in the Beijing-Tianjin-Hebei region and its surrounding areas. Under a series of current action plans, it would be successful in abating emissions of TSP, SO_2 and NOx by 95%, 94% and 71% in the year of 2030. More attention should be paid to the whole process control of industrial boilers in the future polices making, such as introducing clean fuels for persistent emission reduction at source, strengthening the operation, maintenance and management of pollution control technologies to ensure the best control effect.

Keywords: dynamic emission factors, future mitigation, historical emission, industrial boiler, primary air pollutants

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