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## **Study on meteorological conditions for heavy air pollution and its climatic characteristics in “2+26” cities around Beijing-Tianjin-Hebei region in autumn and winter**

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**Based on surface observation meteorological data during 1961-2017 and ERA-interim reanalysis data, an evaluation method of different meteorological conditions for heavy air pollution (MCHAP) was set up by using atmospheric self-cleaning ability index (ASI). Through analyzing the historical variation characteristics of MCHAP of Beijing-Tianjin-Hebei region in autumn and winter, the results were as follows. During 1961-2017, the frequency and extremity of MCHAP in Jincheng of Shanxi province ranked the first. MCHAP occurred more frequently in Beijing, Langfang of Hebei province and Zhengzhou of Henan province and more extremely in Baoding, Shijiazhuang and Hengshui of Hebei province. MCHAP had occurred in “2+26” cities around Beijing-Tianjin-Hebei region in history since 1961, but which were more common in recent years and caused much more severe air pollution events. During the period of 2013-2017, MCHAP occurred the least frequently in 2017 in “2+26” cities around Beijing-Tianjin-Hebei region except Beijing. However the extremity of MCHAP in 2017 receded a lot in Beijing. Both in the 1980s and the period of 2010-2017, MCHAP in the Beijing-Tianjin-Hebei and its surrounding areas took place the most frequently, which was affected by both the cold air intensity and the change of large-scale air stagnation condition. To some extent, the development of urbanization also plays a role in the decadal change of MCHAP.**