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1960—2012年西安地区雾霾日数与气象因素变化规律分析

The changes of mist and haze days and meteorological element during 1960—2012 in Xi' an

关键词: [轻雾](#) [霾](#) [时空分布](#) [西安](#)

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摘要: 利用1960—2012年西安区域7个气象站的历史地面观测资料, 统计分析了西安区域能见度介于1~10 km的雾霾天气现象的长期气候变化及空间分布特征. 结果发现, 能见度介于1~10 km的雾霾日发生数存在准7~9年周期震荡, 每7~9年形成一个峰型. 同时还分析了能见度介于1~10 km的雾霾天气时的气象要素变化规律及相关关系. 研究表明, 53年来西安区域雾霾现象日数的波动性增加趋势非常明显; 雾霾现象各月日数年内基本呈单谷型分布, 雾霾现象最多出现于冬季, 夏季出现概率较小; 随着雾霾持续日数的递增, 雾霾天气过程出现次数呈幂函数形式迅速递减; 西安区域雾霾现象日数分布呈城区多发, 近郊次之, 远郊最少的特征; 随着日均相对湿度的逐渐增大, 西安市雾霾天气的出现几率呈先增大后减小的趋势; 西安市出现的能见度介于1~10 km的雾霾现象中, 仅有10.7%属于轻雾, 其余的均为霾; 气温越低, 日平均风速越小(静风或风速 $\leq 2.0 \text{ m} \cdot \text{s}^{-1}$), 14时出现负压或正变温, 连续不降水日数越长时, 越有利于雾霾天气的形成.

Abstract. The spatial and temporal distribution characteristics of mist and haze days, defined as visibility between 1~10 km, were analyzed based on the surface observation data at seven stations in Xi'an area from 1960 to 2012. Variation of and correlation between various meteorological factors during mist and haze days were also investigated. There was a periodic oscillation of number of mist and haze days and it peaked every 7~9 years. Results show that the number of mist and haze day increased obviously in the 53 years. Variations of mist and haze days in a particular year displayed a "single valley" type, which had maximum in winter and minimum in summer. The occurrence of mist and haze days declined quickly with the form of power function while the duration increased. The number of mist and haze days was the most in urban areas and the least in rural areas. The occurrence probability of mist and haze days increased in the early stage and decreased in the late stage while the relative humidity increased gradually. The proportion of mist only accounted for 10.7% of the mist and haze days in Xi'an. The most favorable conditions for the occurrence of mist and haze are low temperature, wind velocity under $2.0 \text{ m} \cdot \text{s}^{-1}$, decreased pressure or increased temperature at 14:00, and long period of non-precipitation.

Key words: [mist](#) [haze](#) [spatial and temporal distribution](#) [Xi' an](#)

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