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Correlation between Low-level Jets and Fog Events in Tianjin

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Abstract

Fog and low level jet (LLJ) greatly affect aviation. Both of them are cared more, while not for their relationship. In this study, the relationship between the LLJs and fog are studied using the observational hourly wind profile data and the automatic meteorological observation data from Xiqing in 2016. The results show that LLJs play an important role in the fog events. The fog events tend to occur frequently with the occurrence of LLJs, especially in spring and summer, which suggest the LLJs seem to be more important for triggering advection fogs. In addition, the relationship between LLJs and fog events occur simultaneously and one, two and three days after the occurrence of LLJs are compared, and a pronounced relation are observed between LLJs and fog events one day after, a lag effect of LLJs on fog events is verified. For the condition that the LLJ and fog event occur on the same day, the differences of specific humidity between the occurrence of LLJs and fogs. In the case that the occurrence of LLJ is prior to fog, persistent southwest wind support the fog formation. While the differences of specific humidity between the occurrence of LLJs and fogs, in the case that the occurrence of LLJ is posterior to fog are always larger or close to

zero, and the prevailing wind direction is north wind, which suggest that the main contribution of LLJs to fog is leading to fog dissipation and short duration in this condition. For the condition that the occurrence of LLJ one day prior to fog event, a pronounced negative correlation between the height of LLJs and the duration of fog is observed.