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## Intraseasonal variation and future projection of atmospheric diffusion conditions conducive to extreme haze formation over eastern China

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Future projection of diffusion conditions associated with extreme haze events over eastern China is of great importance to government emission regulations and public human health. Here, the diffusion conditions and their changes under future warming scenarios are examined. The relative strength of haze events in the Northern China Plain region increase from 150% during 2006–15 to 190% during 2090–99 under RCP8.5 scenarios, induced by a stronger and longer-lasting anticyclone anomaly in eastern China. The strengthened anticyclone anomaly is mainly induced by increased northern wave train convergence emanating from the Barents–Kara Sea, and the longer duration of the anticyclone anomaly is mainly induced by stronger local feedback that can extract more energy from the basic state to maintain the anticyclone anomaly in eastern China. Aerosol reduction is found to play a dominant role in strengthening the upstream wave train near the Barents–Kara Sea and the downstream anticyclone in eastern China, while the effects from increased greenhouse gases are small. The results of this study indicate that future aerosol emissions reduction can induce deteriorating diffusion conditions, suggesting more stringent regulations on aerosol emissions in China are needed to meet air quality standards.