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## Relating observations of contrail persistence to numerical weather analysis output

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**Abstract.** The potential for using high-resolution meteorological data from two operational numerical weather analyses (NWA) to diagnose and predict persistent contrail formation is evaluated using two independent contrail observation databases. Contrail occurrence statistics derived from surface and satellite observations between April 2004 and June 2005 are matched to the humidity, vertical velocity, wind shear and atmospheric stability derived from analyses from the Rapid Update Cycle (RUC) and the Advanced Regional Prediction System (ARPS) models. The relationships between contrail occurrence and the NWA-derived statistics are analyzed to determine under which atmospheric conditions persistent contrail formation is favored within NWAs. Humidity is the most important factor determining whether contrails are short-lived or persistent, and persistent contrails are more likely to appear when vertical velocities are positive. The model-derived atmospheric stability and wind shear do not appear to have a significant effect on contrail occurrence.

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