A Project to Improve Forecasts of Radiation Fog at Elmira, New York

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One of the primary missions of the National Weather Service (NWS) is to support the nation's commerce and transportation industries. As such, accurate forecasts of conditions which impact aviation operations are critical.

The Weather Forecast Office in Binghamton, NY (WFO BGM) is responsible for issuing Terminal Aerodrome Forecasts (TAFs) for six different sites in Central New York and Northeastern Pennsylvania. One of these airports is located in Elmira, NY (KELM). KELM is located within the Chemung River Valley, which is a favored location for radiation fog formation, and thus frequent episodes of Low Instrument Flight Rules/Instrument Flight Rules (LIFR/IFR) conditions. This presentation will detail work done at WFO BGM to improve forecasts of LIFR/IFR conditions associated with radiation fog at KELM.

Statistics were compiled on parameters associated with the occurrence of fog at KELM during a 2 year period (2001-2002), based on both observational and archived data from model soundings. The study determined that critical parameters that control the development of radiation fog at KELM include boundary layer wind speed (above the surface), departures between observed temperature and the previous day's cross-over temperature (from the "UPS Technique"), and river/air temperature gradients.

The results from this study are being incorporated into operations by utilizing a locally developed application that compares current forecast data to a database of historical radiation fog events. The application works by identifying historical events that are most similar to current expected conditions, based on the similarity of certain key parameters associated with the events. The parameters compared in this presentation are those that correlate most strongly with fog occurrence, based on results from the aforementioned study. After the most similar historical events are identified, the application returns information on these events, including event minimum visibility, and the duration of associated LIFR/IFR conditions. This information helps forecasters anticipate upcoming conditions, based on the assumption that current events will most likely produce conditions that are similar to their historical analogues.