



Thermal advection role in fog formation process

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The inflow of warm air masses over areas where temperature is lower than the dew point of the inflowing air is a factor favouring formation of advection fog and strengthening atmosphere stability.

The range of temperature changes caused by advection at the time preceding fog formation at two of main Polish airports, Warsaw-Okecie and Cracow-Balice, was analysed in order to examine the impact of thermal advection on fog formation process. The 30-years data set from 1973-2002 was used. Hourly SYNOP data were considered as well as NCEP reanalyses. Thermal advection at 1000hPa, 925hPa, 850hPa and 500hPa was determined based on grid data. Then the correlation between thermal advection value and fog formation was examined. Statistically significant positive linear correlation was found between fog and warm advection at 950hPa and 1000hPa isobaric levels. At levels higher than 950hPa the correlation remained positive but with much lower values (0.4).

It might be concluded that thermal advection at 950hPa and 1000hPa isobaric levels, thus up to 1000m above airport level, exerts the biggest influence on fog formation. Further analysis was dedicated to examine the role that thermal advection below 1000m plays in cyclones and anticyclones respecting also the direction of inflowing air masses.