



Fog forecasting based on complex analysis of meteorological conditions and atmospheric circulation

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Climatological research, including grouping specific meteorological elements favouring fog formation (cluster analysis), was the base to create a fog forecasting method for two Polish airports, Warsaw-Okecie and Cracow-Balice.

The method considers synoptic conditions from the past. Chosen meteorological elements and their values were ranged according to the probability of fog event they were connected to. The following elements are taken into account: wind speed and direction, general cloud coverage, low clouds amount, low clouds gender (Stratus, Stratocumulus, Cumulus, Cumulonimbus), weather phenomenon at three hours before fog formation (fog, haze, precipitation and its type), snowfall (snow is considered separately because of snow cover's impact). Additionally, synoptic situation type is taken into account based on the classification made for Poland by Professor T. Niedzwiedz.

A computer program PROFOG was created to help forecasters carry out an objective analysis of meteorological conditions in respect of possible fog formation. Present weather conditions expressed in values of the chosen meteorological elements are compared with the 30 years data base in order to find corresponding situations in the past and check if they were followed by fog formation. The output is given as a probability of fog formation within 3-hours periods up to 24 hours. It is worth to mention that the user is able to introduce the precise instantaneous value of each parameter or to widen its range in order to analyse more cases. The program analyses situations only from a corresponding year season in the past. A default period is 15 days before and after the present day of the year. This also might be change by the user.

PROFOG application is currently in operational use at Warsaw and Cracow airports. It can be also used as a tool for climatological research of fog or other meteorological

elements.

PROFOG uses an SQL data base based on FIREBIRD server. Such a program's architecture enables full intervention into the application: changing analyzed elements or their values as well as easily making statistical calculations and showing the results in numerical and graphical form.