

Aircraft icing conditions at the ground and aloft at the Kiev vicinity

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Aircraft icing remains a significant hazard to aviation, particularly for small planes and helicopters where anti-icing and deicing equipment not be installed. Bernstein and McDonough (2000) found that when the aircraft flew in close proximity to surface observations of freezing precipitation, icing conditions occur in the lower atmosphere. Thereby the weather conditions near the surface may indicate that aloft the icing conditions may take place, and vice versa. Therefore, in this study 933 cases of aircraft icing found between October and March of 1988–1992 were examined on the basis of hourly weather observation, radiosounding and objective analysis. Frequency distribution of aircraft icing episodes as dependent on surface air temperature, wind and cloud form are obtained. The occurrence frequency of aircraft icing is maximum in December and January. The most cases (nearly 70 %) of aircraft icing are connected with the air-mass clouds such as St, Sc.

The radiosonde data are used to study the stratification of temperature and wind for the aircraft icing events. From the radiosonde data, it is found that the stratification with “warm” layer takes place relatively rare. In the most cases the “all cold” stratification dominates. It is important to emphasize that the results obtained for the freezing precipitation for Kiev, are similar. Almost all radiosonde

From the objective analysis data, relationships are studied between aircraft icing occurrence frequency and the grid-scale flow characteristics, including the surface pressure field curvature, baroclinicity, cold and warm advection.

On this basis, a relationship between the weather conditions near the surface and the aircraft icing conditions aloft may be found.