EMS Annual Meeting Abstracts
Vol. 9, EMS2012-52, 2012
12th EMS / 9th ECAC

Ice and snow accretion over the Ukraine

I. Khomenko

Odessa State Environmental University, Atmosphere Physics, Odessa, Ukraine (innchom@mail.ru)

Atmospheric icing is a generic term for all types of accretion of frozen water substance, generally belonging to two main categories: (1) precipitation icing that results in glaze, wet or dry snow and (2) in-cloud icing, which generates hard or soft rime. Both may cause severe damage to various types of infrastructures such as power lines, wind turbines, telecommunication towers or high masts, ski lifts etc.

In this study the various ice accretions, namely glaze, wet and frozen wet snow, from 2002 to 2009 over the Ukraine, are examined on the basis of the hourly weather observations of 185 stations. Statistical characteristics are presented of the atmospheric icing episode durations and of occurrence frequency dependences on surface air temperature, wind direction and speed. All types of the atmospheric icing occur from October to May with the maximum occurrences in December and January and strongly depend on local conditions and on regional atmospheric circulation features. The highest frequency of occurrence and the longest duration of atmospheric icing are obtained for mountainous terrain: the Donetsk ridge, the Crimean Mountains and the Carpathians.

The most glaze events (about 90%) are connected with the slightly negative temperature up to -4.0^{o}C. Approximately 90% of the wet snow cases are related with the -1.0...+1.0^{o}C temperature interval.

Statistics show that ice storms with the most severe consequences are those which cover large areas in space and extend over one or more week. That is why the statistical study of the temporal and spatial evolution of icing events is carried out.

Joint distribution of wind speed and air temperature during precipitation – icing events is derived. This distribution gives the approximate limits for the transition glaze, wet and frozen wet snow. These limits, if expressed by mathematical equations, can be successfully applied to recognizing and probabilistic forecasting the types of icing.