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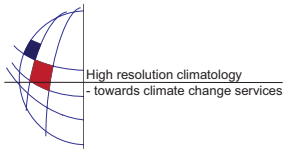

Extreme fog events in Poland with respect to circulation conditions

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Fog is a phenomenon which belongs to a group of so-called hydrometeorites and, according to the different dictionaries, it is a suspension of water droplets or ice crystals in the ground layer of the air that impairs visibility in the horizontal direction below 1 km. The phenomenon of fog, although much less dynamic or violent than other extreme phenomena, such as thunderstorms or hail, is equally dangerous and brings about huge social and economic complications. Land and air transportation suffer and fog may sometimes leads to a complete crippling of the whole economy in an area where fog occurs.

The main objective of the study is determination of the circulation types bringing extreme fog events in Poland. The duration of fog at each meteorological station was considered as the main input data originated from 54 synoptic stations located across the country. The mentioned data series cover the period of 56 years (1951-2006).

The occurrence of fog depends on meteorological conditions caused to a large extent by a given synoptic situation and local terrain conditions. In this study, according to its objectives, only circulation conditions are taken into consideration. These have been described by 5 different circulation classifications (Grosswetterlagen, Litynski, Osuchowska-Klein, Niedzwiedz and Ustrnul).

Situations when this phenomenon occurred across a large part of the country were taken into detailed consideration. Special attention was paid to fog coverage during 24-hour periods. In this work, in light of certain doubts about the homogeneity of the observation material available, the intensity of fog was not included, as it requires additional and very tedious analysis.

In the first step all cases of fog during the 1966-2006 study period which lasted 24 hours at more than 10 of the considered weather stations, i.e: at least 5 stations have been considered. As expected, in most cases, either a centre of a classical high pressure system or a high pressure wedge prevailed over Poland. In many cases, the dominance of baric patterns with advection from the eastern or southern sectors can be observed. Only in a few cases does a type with advection from the western sector come into play. In summary, it can be stated that intensive extreme fog of long duration occurred first of all in high pressure non-advective situations or along with weak advection, mainly from the southern or eastern direction. This statement, however, is not revolutionary. It simply confirms that the most troublesome of fog types is the radiation type, and can cover all of Poland at the same time and last up to several days.
The study contains detailed meteorological-synoptic analyses of the most extreme events during the whole investigated period.