EMS Annual Meeting Abstracts
Vol. 10, EMS2013-570, 2013
13th EMS / 11th ECAM

Foehn winds in the Polish Carpathians according to synoptic situation conditions

Z. Ustrnul (1,2) and A. Wypych (1)

(1) Jagiellonian University, Krakow, Poland , (2) Institute of Meteorology and Water Management, Poland

The main aim of the study is to examine the synoptic situations favorable for foehn winds occurrence in the area of the Polish Carpathians. It attempts to present the temporal distribution of these winds taking into account their quantitative spatial distribution. Long term variability of foehn winds including intensity and dynamism of the foehn effects will also be examined.

The investigated area includes the northern slopes of the Carpathians (i.e. situated in Poland), and the nearest foreland. That territory is distinguished by the highest variability of the altitude in Central Europe as well as the most differentiated landforms. The altitude varies from about 200 m a.s.l. in the Vistula Valley to over 2500 m in the Tatra Mts.

The study attempts to consider only the classical foehn winds which occur on the northern slopes of the Polish Carpathians. The basic determinant for the wind occurrence and later for the foehn effect is the airflow perpendicular to the mountain barrier. In case of the Polish Carpathians, the airflow is from the southern directions. As the background of research atmospheric circulation conditions have been applied and studied. Taking into consideration experience and the availability of particular classifications, it has been decided that information about circulation types grouped according to 5 different classifications: Grosswetterlagen, Litynski, Osuchowska-Klein, Niedzwiedz and Ustrnul was used. Analyses showed that only few circulation situations are responsible for foehn winds and mesoscale classifications are much better to determine these conditions. During the analyzed 60 years period (1951-2010), over 3000 situations characterized by so called the potential conditions for the foehn winds occurrence were recorded. Multi-annual and seasonal variability of foehn occurrence was studied, together with the phenomenon's long-term frequency trends. Additionally, extreme cases of the mentioned phenomena were studied in detail.