

# **Spatial and temporal distribution of precipitation in the Vosges mountain range area**

## **Abstract**

The aim of this work is to study the climatology of atmospheric precipitation in the studied area situated in the Northeastern France. Factors, e.g. the global circulation of the atmosphere, that influence the spatial and temporal distribution of precipitation in the mid-latitudes, especially in Western Europe and in mountainous regions, are discussed from the macro- to micro- scale in the first part. The term “ombric continentality” is clarified and a description of the physical geography of the studied area is performed, e.g. upward and windward asymmetry of Vosges slopes and contrasts between the mountain range and the Upper Rhine Plain. Secondly a demonstration is made that the Vosges mountain range affects, due to its position, the spatio-temporal distribution of precipitation at a regional scale. This is carried out by computing the daily rainfall on 14 meteorological stations out of the period 1951-2011. Three categories of stations were determined according to their annual precipitation repartition: (i) mountain stations with the winter precipitation maximum, (ii) leeward slope stations with two precipitation maxima, i.e. in winter and summer and (iii) leeward stations located in the Upper Rhine Plain East of the Vosges with a summer precipitation maximum. Quantitative methods of ombric continentality demonstrate that the Vosges represent a limit between oceanic and a more continental climate. The paper concludes on the complexity of spatio-temporal distribution of precipitation.

**Keywords:** climatology, precipitation variability, ombric continentality, leeward effect, Vosges