Geophysical Research Abstracts
Vol. 20, EGU2018-12462, 2018
EGU General Assembly 2018

Variability of Precipitation along an east-west Gradient in Corsica: A Case Study from early December 2017

Isabel Knerr, Katja Trachte, and Jörg Bendix

Philipps-Universität Marburg, Department of Geography, Laboratory for Climatology and Remote Sensing, Germany (isabel.knerr@geo.uni-marburg.de)

Within the framework of the DFG-funded project CorsiClimAte (part of the joint project PAK 927 CorsicArchive), the variability of precipitation in Corsica is analysed in order to investigate the relationship between local wind systems and large-scale circulation dependent on the structure and height of the planetary boundary layer (PBL), and to study the formation and distribution of precipitation in Corsica as a function of stratification stability and water vapour transport.
Large-scale synoptic circulation is expected to be strongly responsible for the variability of precipitation in Corsica. While in winter the western Mediterranean Sea is characterised by west weather conditions with frontal precipitation, in summer the region is mainly affected by high pressure weather conditions and trade inversion. In the transitional seasons, autochthonous frontal systems (Genoa cyclones) are accessory. Due to the distinct topography of the island, local wind systems are formed in the course of a day. They play a greater role in summer and usually form complex spatial patterns of convective precipitation.
In order to investigate the relationship between local wind systems and large-scale circulation automatic weather stations (AWS) were installed along a west-east elevation transect: two on the coast, two on the flanks (750 m and 1200 m) and one at 1700 m above sea level. By means of the AWS a possible increase of precipitation due to terrain characteristics or different heights of the PBL between western and eastern parts of Corsica can be investigated.
A principal component analysis (PCA) using ERA Interim MSLP data is applied to represent main large scale influences affecting the Corsican climate. Therefore long term in-situ measurements of temperature and precipitation on a seasonal basis are used to establish physical authenticity with the aim to record atmospheric circulation patterns that are responsible for synoptically induced precipitation variability.
Based on an extreme rain event in the period between 10th and 12th December 2017 large-scale synoptic conditions and the local precipitation behaviour are investigated and discussed. During this 3-day event the highest elevated AWS received over 350 mm within 48 hours, where 125 mm on average is normal for December (1981-2010).
The underlying mechanisms and atmospheric conditions are explored using the following methods and are presented on the poster. First MSLP data maps are used for large-scale circulation features to get an estimate of the predominant general synoptic situation. With in-situ measurements of different AWS an overview of the amount and intensity of precipitation is gained to analyse the spatial distribution of rainfall over Corsica. By means of the Weather Research and Forecasting (WRF) model the predominant atmospheric environmental conditions as well as local-scale circulation mechanisms are investigated., Finally, back-trajectories obtained from HYSPLIT are used to determine the origin and atmospheric transport pathways of the water vapour.