A LAGRANGIAN ANALYSIS OF THE MOISTURE SUPPLY FROM THE MEDITERRANEAN SEA DURING THE DROUGHT EPISODES OCCURRED OVER THE CENTRAL EUROPE DURING 1980-2015

Milica Stojanovic*, Anita Drumond, Raquel Nieto and Luis Gimeno
EPhysLab (Environmental Physics Laboratory), Facultade de Ciencias, Universidade de Vigo, Ourense, Spain.
mstojanovic@uvigo.es

During the 20th century, the climate in Central Europe has been characterized by an overall temperature increase, and the beginning of 21st century is marked by intensified severe and prolonged drought events. The purpose of this work is to analyze possible variations in the moisture supply from Mediterranean Sea (MDS) during the meteorological drought episodes occurred over the Central Europe (CEU) in the last three decades. The boundary of the region are defined in 5th Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC). We first identified the drought episodes occurred over CEU in the period 1980-2015. The meteorological drought episodes and their respective indicators including duration, severity and intensity have been computed through the one-month Standardized Precipitation Evapotranspiration Index (SPEI-1). This index was calculated using monthly CRU (TS3.24.01) precipitation and potential evapotranspiration data set. We identified 51 drought episodes on the SPEI-1. After the identification of the episodes, they were ranked according to the severity, intensity and duration. A Lagrangian forward in time analysis was then performed in order to investigate possible changes in the moisture supply from Mediterranean Sea (MDS) into the Central Europe during these drought episodes. This method uses the outputs of the FLEXPART model integrated with 1º horizontal resolution and 60 vertical levels ERA-Interim data set produced by the European Centre for Medium-Range Weather Forecasts. Investigating the variations in the moisture supply may contribute to justify and explain the role of the Mediterranean Sea (MDS) during the drought episodes.

Keywords: Moisture transport, Lagrangian method, Central Europe, Drought, SPEI.