EGU2020-18226
https://doi.org/10.5194/egusphere-egu2020-18226
EGU General Assembly 2020

Identification of moisture source region based on trajectory model analysis and isotopic composition of the precipitation in Debrecen, Hungary

Elemér László[1], László Palcsu[1], and Ádám Leelőssy[2]
[1]Isotope Climatology and Environmental Research Centre (ICER), Institute for Nuclear Research, Debrecen, Hungary (laszlo.elemer@atomki.hu)
[2]Department of Meteorology, Eötvös Loránd University, 1117 Pázmány Péter sétány 1/A., Budapest, Hungary

In this study, we focus on the relationship between the water vapor source region and the isotopic composition of the precipitation. The change of isotope characteristics of precipitation depends on the moisture source region. Long-term stable isotope ($\delta^{18}O$, $\delta^{2}H$) measurements of precipitation were performed in Debrecen, Hungary, between 2001 and 2014. The long-term isotope time series and trajectory modeling are suitable for determining moisture source regions. Backward trajectory analysis was carried out using the Lagrangian Raptor model based on ERA5 atmospheric data. Hourly backward trajectories were calculated for Debrecen for the days with precipitation in the period between 2001-2014.

Based on the study three source regions were identified. Of these, 60% represented the Carpathian Basin, which is where most of the moisture evaporated from near the surface. The remaining 40% of the northwest and southwest were represented by moisture source regions. This means that the isotopic composition of precipitation significantly determines the local and continental effects, i.e. the moisture evaporated from the continental surface contributes significantly to the spatial and temporal variation of the precipitation isotope composition.