



Moisture sources of precipitation over Postojna (Slovenia) and implication of its oxygen isotope composition

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The source of moisture is an important part of the hydrological cycle that affects climate system. Potentially, moisture sources are important controls of the isotope composition of precipitation, but their studies in the continental mid- and low-latitudes are still scarce due to the complexity of general circulation models with integrated isotope modules. We identify moisture uptake locations of precipitation over Postojna (Slovenia) for period from 2009 to 2013. By using HYSPLIT trajectory model of NOAA we did 5-day reconstruction of air mass history for the days with precipitation and determination of moisture uptake locations along back trajectories. Moisture uptake locations were identified along each trajectory using HYSPLIT output data and standard equations for saturation humidity mixing ratio, saturation vapour pressure and specific humidity. Although NNE winds were prevailing during the period 2001-2014, our analysis showed that during this period around 45% of the precipitation over Postojna originated from Mediterranean and south Atlantic area, with majority of locations originated in the Adriatic Sea. On the other hand, 41% of precipitation originated from moisture recycled over continents, predominantly from Pannonian basin.

The comparison of monthly oxygen isotope composition of precipitation with the percentage of precipitation originated in different source regions shows a significant correlation only for the north Atlantic region. However, less than 7% of the variability of oxygen isotope composition of precipitation is associated with this moisture source. Multivariable analyses of source regions do not explain any additional variability of the oxygen isotope composition of precipitation over Postojna. This research shows that at this location, although significant, moisture sources are not important controls of the oxygen isotope composition of precipitation.