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BOOK OF ABSTRACTS



BERYLLIUM-7 IN SURFACE AIR - MULTIDECADAL MEASUREMENTS IN SERBIA AND SLOVENIA

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Beryllium-7 is a natural radionuclide produced in spallation processes in the upper troposphere and lower stratosphere. Descent through the atmosphere brings this isotope to the lower altitudes and its abundance at the surface is a result of an interplay between transport and removal processes, both of which are influenced by local meteorological parameters.

In this analysis we use the beryllium-7 specific activities measured in three locations to investigate spatial similarities and differences in the data sets. The measurement sites are: Belgrade, the capital of Serbia; Ljubljana, the capital of Slovenia, located around 500 km west of Belgrade; and Krško, a town in eastern Slovenia, located around 400 km west of Belgrade. The beryllium-7 measurements in Serbia and Slovenia started in 1991 and 1988, respectively. The specific activities were determined by standard gamma spectrometry at the Vinča Institute (Serbia) and Jožef Stefan Institute (Slovenia).

The annual cycles of the beryllium-7 specific activity at the three measurement sites show maxima occurring in the spring-summer season. The Belgrade site exhibits the earliest maximum which takes place in May, and is followed by a July and August maximum in Krško and Ljubljana, respectively. All of the sites show a December-January minimum in the annual cycle. The calculated Spearman's correlation coefficients are 0.69, 0.59 and 0.32 for the measurement pairs Ljubljana-Krško, Belgrade-Ljubljana and Belgrade-Krško, respectively.

Further, at each measurement site, the beryllium-7 time-series is significantly correlated with the monthly mean temperature, cloud cover and relative humidity. The correlation with the temperature records is positive, with the correlation coefficient of 0.65, 0.74 and 0.59 for Belgrade, Ljubljana and Krško, respectively. Correlations of similar strength, but negative, are obtained when the beryllium-7 data are correlated with cloud cover and relative humidity. In contrast, no statistically significant correlation between the beryllium-7 specific activity and mean monthly precipitation are obtained.

Our results show relatively strong similarities in the beryllium-7 activity concentration in surface air across a zonal distance of around 500 km. This consistent behaviour implies a large-scale driving mechanism which is dominant in the region over a time-scale of one month.

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