ДРУШТВО ЗА ЗАШТИТУ ОД ЗРАЧЕЊА
СРБИЈЕ И ЦРНЕ ГОРЕ

ЗБОРНИК РАДОВА

XXVIII СИМПОЗИЈУМ ДЗЗСЦГ
Вршац
30. септембар - 2. октобар 2015. године

Београд
2015. године

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XXVIII СИМПОЗИЈУМ ДЗЗСЦГ
30.09-2.10.2015.

ANALYSIS OF DYNAMICS OF BERYLLIUM-7 SPECIFIC ACTIVITY IN SURFACE AIR

Darko SARVAN[1], Đorđe STRATIMIROVIĆ[2,3], Suzana BLESIĆ[3,4] and Jelena AJTIĆ[1,3]

1) *University of Belgrade, Faculty of Veterinary Medicine, Belgrade, Serbia,darko.sarvan@vet.bg.ac.rs, jelena.ajtic@vet.bg.ac.rs*
2) *University of Belgrade, School of Dental Medicine, Belgrade Serbia, dj.stratimirovic@gmail.om*
3) *Institute for Research and Advancement in Complex Systems, Belgrade, Serbia*
4) *University of Belgrade, Institute for Medical Research, Belgrade, Serbia, suzana@imi.bg.ac.rs*

ABSTRACT

The dynamics of the ^{7}Be specific activity in surface air is analysed using wavelet transformations and time-dependant Hurst exponent. The investigated^{7}Be specific activity database contains more than 4000 measurements conducted in Helsinki, Finland,over 1987–2011. The chosen methods of analysis offer information on periodicities and long-range correlations in the ^{7}Be specific activity time series. Since the temporal resolution of the measurements varied, two data subseries are interpolated: one containing weekly, the other containing daily data. The analysis of the dynamics is performed on both subseries for comparison. Wavelet transformations show an existence of characteristic times in both subseries. Four periods are found: 30 days corresponding to a monthly cycle, 80 days corresponding to a seasonal cycle, 360 days corresponding to an annual cycle, and 1100 days that correspond to a three-year cycle.Time-dependant Hurst exponent analysis further shows the strongest positive correlation in the three-year period, followed by weaker positive correlations in the annual and seasonal periods. The increase in Hurst exponent with an increase in the duration of the characteristic period indicates that the longer periods are influenced by large-scale mechanisms not prone to changes. A decrease over 1993–2003 in the positive correlation in the three-year period is found.