Book of abstracts

ENVIRA 2017

4th International Conference on Environmental Radioactivity: Radionuclides as Tracers of Environmental Processes

29 May – 2 June 2017 Vilnius, Lithuania

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Welcome to the ENVIRA2017 Conference

Dear Colleagues,

We welcome you to the ENVIRA2017, the International Conference on Environmental Radioactivity organized by the Centre for Physical Sciences and Technology (Institute of Physics) in Vilnius, Lithuania from Monday, May 29 to Friday, June 2, 2017. The venue and the Conference topics of the ENVIRA2017 which will be focusing on "Radionuclides as Tracers of Environmental Processes" were agreed on by the International Advisory Committee and confirmed at the closing session of the ENVIRA2015 conference held in Thessaloniki (Greece) in September 2015.

Following traditions of previous ENVIRA conferences, the ENVIRA2017 will consist of invited talks on relevant environmental radioactivity and radioanalytical topics, given by prominent representatives of the field, as well as by oral and poster contributions on various environmental radioactivity aspects. The conference will highlight the new scientific knowledge on the application of natural and anthropogenic radionuclides and isotopes in tracer studies in the terrestrial (atmosphere, hydrosphere, biosphere, pedosphere, etc.) and marine (seawater, marine biota, sediments, etc.) environments. The latest technological innovations in low-level radioactivity detection techniques including radiometric and low-energy and high-energy mass spectrometry methods, in situ measuring techniques, continuous monitoring systems, and other recent analytical developments will be included in the conference program as well. Radioecological topics, protection of the total environment against radiation including Chernobyl and Fukushima impacts on the environment, waste management and remediation actions on contaminated territories will be also covered.

Additionally, conference attendees and accompanying guests are invited to participate in our events: welcome reception, gala dinner, trip to Trakai.

If you have questions during the event, ENVIRA2017 committee staff will be available to assist you or you can contact envira2017@ftmc.lt and visit http://envira2017.ftmc.lt/ at any time.

Thank you for attending ENVIRA2017 and please enjoy the conference!

Analysis of beryllium-7 variability in northern Europe

J. Ajtić[1,2], V. Djurdjevic[3], D. Sarvan[1], E. Brattich[4], M. A. Hernández-Ceballos[5]

[1]Faculty of Veterinary Medicine, University of Belgrade, Belgrade, 11000, Serbia
[2]Institute for Research and Advancement in Complex Systems, Belgrade, 11000, Serbia
[3]Institute of Meteorology, Faculty of Physics, University of Belgrade, Belgrade, 11000, Serbia
[4]Environmental Chemistry and Radioactivity Laboratory, Department of Chemistry "G. Ciamician", Alma Mater Studiorum University of Bologna, 40126, Bologna (BO), Italy
[5]European Commission, Joint Research Centre, Institute for Transuranium Elements, Nuclear 7 Security Unit, Ispra (VA), 21027, Italy
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Presenting author email: erika.brattich@unibo.it

This work presents an overview of the results obtained in an analysis of the ^{7}Be activity concentrations recorded in surface air in Helsinki, Finland, over a 25-year period (1987-2011), and stored in the online Radioactivity Environmental Monitoring (REM) database.

First, lagged linear correlations of the ^{7}Be specific activity with several meteorological variables: tropopause height (TPH); mean, minimum and maximum temperature; precipitation (Prec); atmospheric pressure (Press); potential vorticity (PV) at 300 hPa and 200 hPa; solar zenith angle (SZA); and sunspot number are analysed (Tab. 1). The time lag in the correlation calculations is allowed to vary between 0 and 7 days for TPH, meteorological parameters and PV, and between 0 and 31 days for SZA and sunspot number. The correlations are calculated for the total set of measurements as well as for different seasons.

Table 1. Maximum correlation coefficients (m.c.c.) and number of days (n.d.) on which they are observed between ^{7}Be and meteorological variables. Empty cells indicate non-significant correlations.

Variable	Total set		Autumn		Winter		Spring		Summer	
	m.c.c.	n.d.	m.c.c.	n.d.	m.c.c.	n.d.	m.c.c.	n.d.	m.c.c.	n.d.
TPH	0.32	1	0.38	2	0.20	1	0.31	1	0.47	1
Mean T	0.41	0	0.33	0			0.40	0	0.48	1
Min T	0.37	0	0.34	0			0.33	0	0.39	0
Max T	0.44	0	0.31	0			0.42	0	0.50	1
Prec										
Press	0.29	2	0.29	2	0.31	3	0.34	2	0.43	2
PV (300 hPa)										
PV (200 hPa)										
SZA	0.48	0	0.3	0	0.20	0	0.34	31	0.08	15
Sunspot N										

Our results (Tab.1) indicate weak to moderate correlations for ^{7}Be with TPH, temperatures, and atmospheric pressure. The strongest relationship is observed in summer, when it is accompanied by a short time lag (within two days). The absence of significant correlations with PV is probably due to the fact that stratospheric intrusions are not located directly above Helsinki.

In the second part of our analysis, we looked into the ^{7}Be extremes, defined as events with the ^{7}Be surface concentrations above the 95th percentile. Even though the ^{7}Be annual cycle is characterised by a maximum during the warm season and minimum during the cold period, 10% of the extreme events occur during cold months, between October and March. These "cold extremes" are analysed in more detail, and depending on their persistence, they are classified as "bursts" or "episodes". Three representative episodes and one burst are analysed looking for common features. Our results imply that, in general, these events are characterised by anomalies in PV, sea level pressure, temperature and precipitation patterns over Europe and the North Atlantic. We further notice that the Scandinavia (SCAND) teleconnection index is above the 75th percentile during all the months in which the cold episodes are observed (Fig.1). This finding suggests a potential use of SCAND as a predictor of these events in the Scandinavian region.

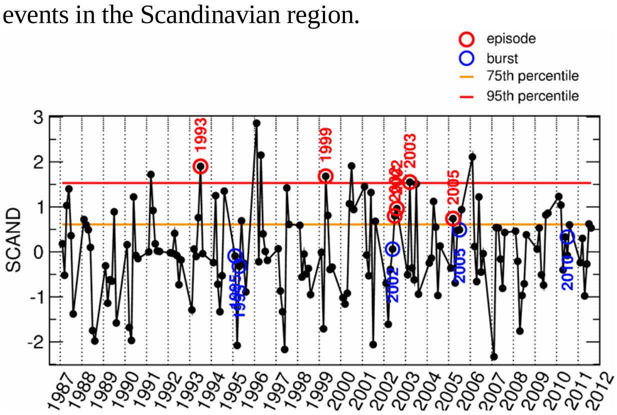

Figure 1. Monthly values of the SCAND index (black). In each year, six values, representing the cold months, are given. Red and blue circles annotate months when the cold episodes and bursts, respectively, are recorded. Orange and red lines are the 75th and 95th percentile thresholds for the SCAND distribution.

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