ENVIRA 2021

6th International Conference on Environmental Radioactivity, ENVIRA 2021

Fukushima Accident – 10 years of Environmental Investigations, and New Challenges in Environmental Radioactivity Studies

6th-10th December 2021

Thessaloniki, Greece

Book of Abstracts

Editors: Prof. Alexandra Ioannidou, Prof. Pavel Povinec, Eleftheria Ioannidou

Welcome

We are glad to welcome you to the 6th International Conference on Environmental Radioactivity, ENVIRA 2021: Fukushima Accident – 10 years of Environmental Investigations, and New Challenges in Environmental Radioactivity Studies which will take place on-line, from December 6th to 10th, 2021.

The ENVIRA 2021 conference is assembling people from different scientific fields, from Europe and the rest of the world, dealing with similar issues. Invited plenary keynote talks by leading experts and world renowned scientists, a big variety of special sessions, panel discussions aligned with the most pressing issues in the field of Environmental Radioactivity, as well as informative technical sessions, poster sessions, and social functions will be organized during the Conference.

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INTERNATIONAL CONFERENCE ON ENVIRONMENTAL RADIOACTIVITY, ENVIRA2021

PROGRAM
(online)

Hours are given in the Central European Time (CET) Zone

Honolulu (-11) - Los Angeles (-9) - New York, Ottawa (-6) – Rio de Janeiro (-4) - London (-1)
CET (Paris, Berlin, Vienna,…)
Athens (+1) - Moscow (+2) – Dubai (+3) - New Delhi (+4.30) – Beijing (+7) – Tokyo (+8) – Sydney (+10)

		Monday 6/12/2021
8.00-8:30		**Conference Opening** *Chair: Alexandra Ioannidou, Pavel Povinec*
8.00		**WELCOME**

Tuesday 7/12/2021		
Terrestrial radioactivity *Chair: D. Patiris, A. Ioannidou*		
13:30-14:30	Antonio Oliver Ramon *Unversity of the Baleric Islands, Palma*	Underground water natural radioactivity in Mallorca (Spain)
13:30-14:30	Itzhak Orion *Ben-Gurion University of the Negev, Beer-Sheva*	Thorium and Radon Radioactive Half-Life Affected by Solar Flares
13:30-14:30	Prasoon Raj *Emirates Nuclear Technology Center (ENTC), Khalifa University, Abu Dhabi*	Determination of soil-to-plant transfer factors in UAE vegetables, artificially spiked with salts of caesium-133 and strontium-88 – a pilot study.
13:30-14:30	Andrey Panitskiy *Institute of Radiation Safety and Ecology, of National Nuclear Center of Kazakhstan, Kurchatov*	Nature of distribution of radionuclides in the vertical soil profile of Semipalatinsk Test Site
13:30-14:30	Assiya Kunduzbayeva *Institute of Radiation Safety and Ecology, of National Nuclear Center of Kazakhstan, Kurchatov*	Research into the vertical distribution of 137Cs, 241Am speciation in soils of test places of radiological warfare agents.
13:30-14:30	Sixuan Li *Department of Physics, Peking University, Beijing*	Level and distribution of plutonium in surface soils cross China: a review
13:30-14:30	Zhao Huang *Xi'an AMS Center, Institute of Earth Environment, Chinese Academy of Sciences, Xi'an*	Sources and transmission of uranium isotopes in surface soil in Northeast China
13:30-14:30	Pavel Krivitskiy *Branch 'Institute of Radiation Safety and Ecology' RSE NNC RK, Kurchatov*	Current radiological situation at venues of nuclear tests of 'Sary-Uzen' site
13:30-14:30	N.V. Larionova *Instit. Pf Radiation Safety and Ecology, Kurchatov*	Transfer factors of artificial radionuclides to plants for conventionally 'background' areas at the Semipalatinsk test site
13:30-14:30	Qiaoyan Jing *School of Physical Science and Technology, Guangxi University, Nanning*	Responses of moss to air radioactive pollution in karst landform of Leye, GuangXi
13:30-14:30	Shenzhen Wang *School of Physical Science and Technology, Guangxi University, Nanning*	Source and migration of plutonium isotopes in the West Lao-Ye-Ling Mountain, Northeast China
13:30-14:30	Krzysztof Gorzkiewicz *Institute of Nuclear Physics Polish Academy of Sciences, Krakow*	Gamma-ray emitting isotopes in ground level air at Marambio and Aboa, Antarctica
13:30-14:30	Ivana Vukašinović *Univ. of Belgrade Faculty of Agriculture, Belgrade*	Analysis of 238U, 226Ra and 210Pb transfer factors form soil to the leaves of broadleaf tree species
13:30-14:30	Chrysoula Betsou *Aristotle University of Thessaloniki, Thessaloniki*	In-situ and laboratory gamma spectrometry measurements for the radiological characterization of a contaminated area near a coal power plant in Northern Greece
13:30-14:30	Ping Xu *University of Science and Technology of China, China*	Analysis for Radioactivity of Negative Ion Powder

Analysis of ^{238}U, ^{226}Ra and ^{210}Pb transfer factors form soil to the leaves of broadleaf tree species

I. Vukašinović[1]

[1]Faculty of Agriculture, University of Belgrade, 11080 Belgrade, Serbia
Keywords: natural radionuclides, soil-to-leaves transfer factors, broadleaf trees.
Presenting author email: ivanavu@agrif.bg.ac.rs

The analysis of ^{238}U, ^{226}Ra and ^{210}Pb transfer factors (TFs) from soil to the mature leaves of broadleaf trees was done by using available data from a few published studies performed at sites modified by uranium presence for *Quercus pyrenaica*, *Quercus ilex rotundifolia*, *Populus* sp. (Charro and Moyano 2017), *Eucalyptus botryoides* Sm. (Galhardi et al. 2017) and *Quercus ilex*, *Quercus suber*, *Eucalyptus camaldulensis* (Blanco Rodriguez et al. 2010) and at site of background radioactivity level for *Tilia* spp. and *Aesculus hippocastanum* L. (Vukašinović et al. 2019). Activity concentration datasets for ^{238}U, ^{226}Ra and ^{210}Pb in soil in the range (Bqkg^{-1}): 22–6606 (n=15), 38–7700 (n=14) and 37–7500 (n=14), respectively and in the leaves (Bqkg^{-1}): <mdc–138 (n=10), 2.6–134 (n=14) and 27–77 (n=14), respectively indicated no significant departure from normality after log-transformation. Values of measured basic soil parameters of pH, total Ca, percentages of sand fraction and silt+clay fraction could also be retrieved.

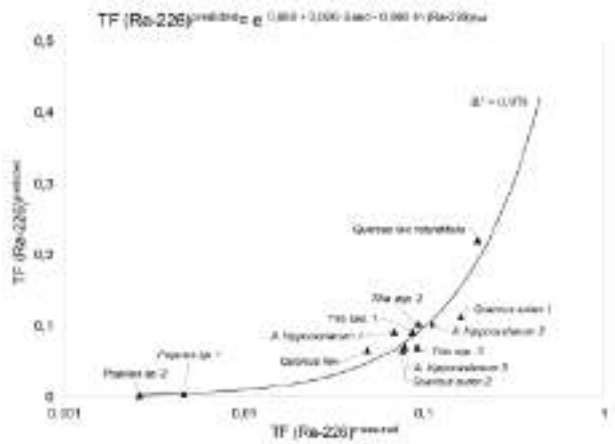

Figure 1. The predicted TF values vs measured TF values for ^{226}Ra from soil to the leaves of examined broadleaf species.

It was examined whether there were any differences between soil-to-leaves TFs found at affected sites compared to the background site. Differences at the 95% confidence level were not found between TF values for ^{238}U and ^{226}Ra, while ^{210}Pb TFs were found significantly higher at background site. Additionally, prediction of ^{238}U, ^{226}Ra (Figure 1) and ^{210}Pb TF values was performed based on the available data using multiple linear regression. Results indicated that differences between examined broadleaf species had lesser influence on transfer of investigated radionuclides from soil to tree leaves compared to the impact of basic soil parameters, especially activity concentrations in soil.

The research was supported by The Ministry of Education, Science, and Technological Development of the Republic of Serbia (Grant No. 451–03–9/2021–14/200116).

Charro, E., Moyano, A. 2017. Soil and vegetation influence in plants natural radionuclides uptake at a uranium mining site. Radiat. Phys. Chem. 141, 200-206.

Galhardi, J.A., García-Tenorio, R., Bonotto, D. M., Francés, I. D., Motta, J. G., 2017. Natural radionuclides in plants, soils and sediments affected by U-rich coal mining activities in Brazil. J. Environ. Radioact. 177, 37-47.

Blanco-Rodríguez, P., Vera Tomé, F., Lozano, J. C., Fernández, M. P. 2010. Transfer of ^{238}U, ^{230}Th, ^{226}Ra, and ^{210}Pb from soils to tree and shrub species in a Mediterranean area. Appl. Radiat. Isot. 68, 1154-1159

Vukašinović, I., Todorović, D., Krneta–Nikolić, J., Rajačić, M., Životić, Lj. 2019. Seasonal variations of naturally occurring radionuclides and ^{137}Cs in the leaves of deciduous tree species at sites of background radioactivity levels, Rom. J. Phys. 64, 812