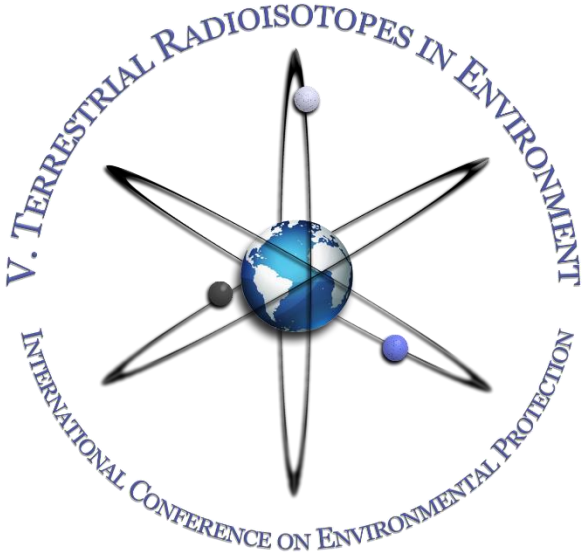
V. TERRESTRIAL RADIOISOTOPES IN ENVIRONMENT

International Conference on Environmental Protection



VESZPRÉM

2016

Social Organization for Radioecological Cleanliness

Organizers:

University of Pannonia, Institute of Radiochemistry and Radioecology
Social Organization for Radioecological Cleanliness
Hungarian Biophysical Society, Section of Radioecology

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ISBN 978-963-12-5537-9

DOI 10.18428/TREICEP-2016

Published by the Social Organization for Radioecological Cleanliness

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SPACE DISTRIBUTION OF AIR IONS, THORON AND RADON IN INDOOR AIR

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Air ions in indoor air are generated mostly by MeV-energy α-particles produced in radioactive transformations of radon (^{220}Rn and ^{222}Rn) and its short-lived descendants. Since the intensity of all other air ionizing sources is significantly lower and mostly constant in time, air ions may serve as confident indicator for spatial and temporal distribution ^{222}Rn and ^{220}Rn concentrations indoors. Example of vertical gradients of ^{220}Rn & ^{222}Rn activity concentrations measured above earthen floor in the basement at house in Sokobanja is presented.

Measurements were performed in Sokobanja region (Serbia), where ^{220}Rn concentration in soil and building materials is relatively high, and in Slovenia in villages Gorisnica and Rakitna, where ^{222}Rn concentrations are much higher than ^{220}Rn. Following equipment was used for the measurements: 2 x Rad7 (Durridge company, USA), RTM 1688-2 Radon/Thoron Monitor (Sarad, Germany) and three Gerdien-type air-ion CDI-06 detectors.

During the ^{220,222}Rn measurements, inlets of measuring devices were fixed at 1 cm, 20 cm and 40 cm above the floor while air ion detectors were positioned at 10 and 85 cm above the floor. During measurements, switching of the air ion detectors places was performed in order to test their quality of operation.

Air ion concentration at the height of 85 cm was 37% lower than at 10 cm while in the case of thoron reduction was 75% after 40 cm. At the same time, moderate but still clearly measurable decrease of air ions concentration with height (gradient) was measured. Thoron and radon gasses are decaying with similar energy of α-particle and thus creating similar number of air ion pairs. Gradient of air ion concentrations from the floor would be probably much higher if it is not “diluted” with ions generated by radon and its decay products. Also, life time of air ions in relatively clean air is about 100 s which is twice as Tn so that ions can move for longer distances from point of origin than thoron.

During the survey, measurements of the mentioned parameters were also carried out at different distances from walls and have shown either linear or exponential pattern depending on microclimatic ambient. Many measurements of air ions were impossible to conduct due to electrostatic field of the walls that strongly influenced on ions.