

Interactive comment on “Estimation of nocturnal ^{222}Rn soil fluxes over Russia from TROIKA measurements” by E. V. Berezina et al.

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The authors thank the anonymous referee #2 for his/her comments and corrections. They are very important.

Page 5779, line 3: The instrument used is not a radon monitor but a radon daughter monitor. Therefore, the data can give an estimation of the radon concentration, based on some assumption, but it is not a result of measurement and absolute error measurement cannot be given for radon concentration. This apparatus running in a 10 min average is not suitable to measure correctly such a low radon concentration.

Reply: The LLRDM was constructed for low level ^{222}Rn concentration observation as well. The measurement range of the instrument is 0.1 - 100 Bq/m³, which is
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convenient for atmospheric radon observations. The measurements are founded in sampling of aerosol-attached radon daughters and the analysis of the alpha-spectrum of ^{222}Rn and its decay products. The instrument uses a mathematical calibration method. Therefore, no radon chamber or comparison with other WL (Working Level) meters is necessary. The collection and the decay of the filter activity are simulated during the measurement. The microcomputer of the LLRDM integrates in real time the differential equations for 20 different initial sets of the radon daughters activity concentrations in the air. The calculated α -counts of radon daughters for each of the 20 sets are compared with the real α -counts seen by the detector. The ratio of the air activities which fits best is taken to calculate the calibration factors for the calculation of the potential α -energy (PAEC), the radon daughters and radon gas concentrations. The activity of the nuclides at the surface of the sampling filter increases during sampling. Therefore, the calibration factor of the instrument changes continuously too. The method of the radon gas concentration estimation from its daughters measurement was also used in low level radon gas observations by Guedalia et al., 1974; Heiman et al., 1989; Kataoka et al., 1998; Levin et al., 2002. Furthermore, the LLRDM was convenient for continuous measurements aboard the moving platform. The instrument allowed us to carry out ^{222}Rn observations above the immense Russian territory from Moscow to Vladivostok.

Page 5780, line 1: radon daughter removal by sedimentation cannot be neglected because rain put those particles down.

Reply: The data obtained in the rainy days of the expeditions were excluded from the analysis.

Page 5780, line 3: Higher aerosol concentration make also higher radon daughters concentration

Reply: It is taken into account by the evaluation software of the measurement device.

Page 5780, line 5: 10th, 50th and 90 th are very hard to distinguish page 14554,line 22

: It seems that you are talking about table 3, please indicate the number page 14555, line 8 : lack of precision, are you talking of the highest radon concentration or of the highest mean.

Reply: Agreed. It is corrected.

Page 5780, line 8: Revise table 3 as mean and max are equal in Autumn. I do not think it is possible. An min and mas are referred to what?

Reply: You are right. It is an unfortunate misprint which is corrected. Min and max are referred to daytime radon concentrations.

Page 5780, line 10: figure 1: two small, the legend is invisible figure 2 : 10th, 50th and 90th cannot be distinguished

Reply: Agreed. We tried to improve the figures.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 14545, 2013.