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PAPER TITLE Ventilation Model for Elevated Radon Decay Product Levels Indoors

AUTHOR(S) NAME(S) R. Rolle, H. Lettner, and W. Hofmann

SUBMITTING AUTHOR

LAST NAME Rolle FIRST NAME Rainer TITLE Dr.

AFFILIATION Institute of Physics and Biophysics, University of Salzburg TEL 0043-662-8044-5709/2

STREET Hellbrunner Str. 34 FAX 0043-662-8044-5704

CODE A-5020 CITY Salzburg COUNTRY Austria

PRESENTING AUTHOR (IF DIFFERENT)

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ABSTRACT (See instructions overleaf)

Indoor concentrations of short-lived radon decay products (Rn-d) can reach levels over 1000 times that of outdoor levels and such elevated levels pose a significant risk of fatal lung cancer. High Rn-d levels indoors are generally dominated by ingress of soil gas of high Rn concentration and by ventilation characterized by poor outdoor air exchange - building materials and water making only minor contributions (with recognizable exceptions).

When considering the buildup of Rn and Rn-d in a building the source is Ra-226 in a soil-gas compartment which is successively (serially) connected to compartments of the building. There are losses from each compartment to the outdoor air which acts as a sink and to surfaces which act as sinks for the Rn-d; in the soil-gas compartment surfaces remove the Rn-d quantitatively.

The ventilation fluctuates and can coarsely be categorized into 'stagnant' situations and into wind activated situations. Modelling these situations, and changeovers thereof, provides an insight into the relative importance of the various parameters, such as the effect of the (?poorly known) soil-gas compartment.

Stagnant situations generally provide the higher concentrations whereas changeover situations can produce peak concentrations of short duration. Accurate short-term measurement of the activity ratios of Rn and individual Rn-d can indicate what ventilation situation prevails.

Applications of modelling are the more accurate prediction of longterm exposures from short term measurements, ventilation analysis and assessment of the potential for remedial action.