Geophysical Research Abstracts
Vol. 15, EGU2013-5453-1, 2013
EGU General Assembly 2013

Continuous observations of atmospheric ^{222}Rn concentration at Lutjewad – analysis of 5 years of data

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Accurate representation of the turbulent physics and dynamical processes in the atmospheric boundary layer (ABL) and also the influence of meteorological conditions on the atmospheric compounds pose a huge challenge on the modeling community as many models fail to represent or even take into account of these processes properly. Continuous atmospheric observations of a radioactive tracer like radon (^{222}Rn) combined with observed meteorological parameters can provide much valuable information about the large diurnal and seasonal variability of the ABL and the meteorological effects associated with it and also can be used for evaluation of transport schemes in regional and global circulation models.

We report on the results of five years of radon time series at our atmospheric measurement station Lutjewad in The Netherlands (6° 21 E, 53° 21 N, 1 m asl, air intake at 60 m above ground). Two major periodical variation in atmospheric ^{222}Rn concentration will be discussed in detail (i) seasonal variation with a maximum in late autumn and minimum in spring: (ii) diurnal variation, that is strongest during summer and almost non-existent during winter. In addition, the influence of different observed meteorological parameters (such as atmospheric pressure, humidity, temperature, wind direction and velocity) will also be discussed. Lastly, first results of model simulations of atmospheric ^{222}Rn concentrations for one year using the Hybrid Single Particle Lagrangian Integrated Trajectory Model (HYSPLIT) and a newly created ^{222}Rn flux map will be presented.