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One year of ^{222}Rn concentration in the atmospheric surface layer

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Abstract. A one-year time series of ^{222}Rn measured in a rural area in the North of Italy in 1997 is analyzed. The scope of the investigation is to better understand the behavior of this common atmospheric tracer in relation to the meteorological conditions at the release site. Wavelet analysis is used as one of the investigation tools of the time series. The measurements and scalograms of ^{222}Rn are compared to those of wind-speed, pressure, relative humidity, temperature and NO_x . The use of wavelet analysis allows the identification of the various scales controlling the influence of the meteorological variables on ^{222}Rn dispersion in the surface layer that are not visible through classical Fourier analysis or direct time series inspection. The analysis of the time series has identified specific periods during which the usual diurnal variation of radon is superimposed to a linear growth thus indicating the build up of concentration at the measurement level. From these specific cases an estimate of the surface flux of ^{222}Rn is made. By means of a simple model these special cases are reproduced.

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