**Atmospheric
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Interactive
Comment

Interactive comment on "One year of ^{222}Rn concentration in the atmospheric surface layer" by S. Galmarini

S. Galmarini

"One year of 222Rn concentration in the atmospheric surface layer" by S. Galmarini
Anonymous Referee #1

"Figure 2: The Fourier spectra of wind speed, temperature, humidity, pressure, Nox and radon show pretty clearly for most of them some peaks at 6, 8, 12, and 24 h (and much more for the temperature spectrum). These even values look like harmonic numbers due to FT. Do the author has an idea about the influence of that possible artefact?. In addition, I did not see any relevant information from the FT of precipitation and pressure in the study. The author should clarify this point and only use relevant figures, it will ease the reading of the paper."

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How can they possibly be harmonics? The FT has been performed taking into account the all the standard precautions to avoid the formation of spurious signals. Indeed the precipitation and pressure spectra do not show any significant information they were removed as suggested. Furthermore the wavelet analysis has clearly demonstrated the existence of energy peaks at all periods identified by the FT.

"Table 1 and p12899: I also found the arguments of the author on the wind speed and precipitation correlations with radon too short and somehow unconvincing. To me, there is almost no correlation between radon and precipitation whereas there is a weak negative correlation with the wind (similar to the temperature). For this point, I'd like the author to provide more explanations about the results of these correlation."

We agree with the reviewer on this issue the text has been rephrased, also considering whether the annual correlation would be the most appropriate parameter. This is particularly the case for precipitation that over the year shows few periods with non-zero values. We have added a plot on the monthly time evolution of the correlation coefficient which shows new feature for some variables but still nothing really meaningful for precipitation.

"p12903: I was confused about the normalization of the scalograms. The author presents the power of the signal calculated as the wavelet amplitude normalized by the global spectrum. The author should clearly define these two terms (wavelet amplitude and global spectrum). Why the author didn't normalize the time-series first by its variance before using the WT (as described by Torrence and Compo (1998)). In addition, I have two questions about the Figure 3: why sometimes the 95 % confidence isolines are not contouring the maximum of WT and sometimes are contouring some features in the COI which is an irrelevant area? In addition, by just looking at the time-series, it is clear that there is a daily timescale. The amplitude of the waves is maximum for this timescale, but why the values of the corresponding power spectrum (greenish areas) are not larger than those for fluctuations with lower periods (red areas)?. Is it due to the normalization? to me it is very confusing and the author must explain how

he constructed the scalogram."

The global scalogram is obtained by summing all wavelet contributions at all times. I cannot find anywhere in the paper the pre-normalization two which the reviewer refers, furthermore this practice was never implemented by T&C(98) as confirmed by Chris Compo through a personal communication. The COI and the confidence interval are two uncorrelated procedures and in particular the second rules out the first. Yes that is right, it is due to the normalization as the global spectrum increases with increasing period.

"Figure 4 and 5 and p12908: The author should reconsider the use of WT for such a time-series like the precipitation ones. There is no physical meanings because the WT of a sharp peak always gives a wide range of scales. For this reason, I don't understand the sentence "The inspection of the precipitation scalogram indicates .... time-series". In the same way, I also find confusing the WT applied to the wind speed with zero values because for each jump (from 0) the WT will reproduce again a wide range of scales without obvious physical meaning. I think these figures do not bring any useful informations, the scalogram of radon is already on figure 3 and the other scalograms have to be taken with cautiousness. An issue to this is maybe to only analyse the "windy" part of the time-series."

This is only partially true. A spike will indeed give contribution at all scales but yet they won't all necessarily be significant. In this specific case the contributions a re considered significant. A reason for that is that the precipitation event is not confined in the May case to the single intense precipitation event but starts earlier. The figure has been remade outlining the period of precipitation. This is why the contributions at larger scale are defined significant. We do agree with the reviewer that this is not a rock-solid result and it might be just case dependent but yet we wish to keep. Former Figure 5 has been removed.

"Concerning the second part, the author has to give the results of his model for the

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other cases. It looks like the model is just working for one case (Fig 11)."

Results were added for all the cases.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 12895, 2005.