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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Ozone prediction based on meteorological variables: a fuzzy inductive reasoning approach" *by* A. Nebot et al.

Anonymous Referee #2

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This paper discusses the prediction of urban ozone (in Mexico City) based on a fuzzy logic statistical methodology. The technique makes ozone forecasts based on time of day, previous ozone and meteorological parameters. The authors explore the use of this technique for monthly and seasonal forecasts, and claim substantial skill at predicting ozone. However, I do not think substantial forecast skill is demonstrated, and I think there are several fundamental problems with this analysis (detailed below). I do not recommend this paper for publication in ACP.

1. Much of the variance in the monthly and seasonal ozone forecasts (Fig. 1) is simply the diurnal variation (consistent afternoon maximum), which is captured in the statistical model by the time of day parameter. The occurrence of an ozone

diurnal cycle is well known, and there is little useful model skill in including this in the overall variance estimates; rather it is the deviation from the average daily cycle that is most interesting. I suggest subtracting the average daily cycle and focusing on predictability of residual variability.

2. The overall methodology used here is not well explained. The key variables for ozone at a particular hour include the ozone at a previous hour, plus contemporaneous meteorological variables. If one initial value of ozone is used, plus forecast meteorological variables, to make the forecasts, I think this system would lose any practical skill very quickly (by practical skill, I mean ability to predict variations about the regular daily cycle, as discussed above). I would be surprised if there is any skill for a forecast of one week. I suggest the authors quantify this skill as a function of forecast time.

3. The section on investigating specific days (4.3) made no sense to me. The one day forecasts are much improved over the monthly forecast, but this is simply because the initial conditions are improved, and perhaps the meteorological forecast is better for one day. But these details are not explored or explained, and there is no key result. Also, Figs. 3-4 and 5-6 are completely redundant.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 12343, 2008.