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Interactive comment on "Seeking for the rational basis of the median model: the optimal combination of multi-model ensemble results" *by* A. Riccio et al.

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First of all we thank you for the interest you have shown for our work. Your objection is legitimate, and in principle correct, but not completely.

The ensemble treatment in the form of BMA or median model (which are the two methodologies adopted by us in so far) may indeed be viewed as interpolation methods, but they are not. BMA is definitely not in the sense that the weighting of the models is not a blindfolded application of a polynomial combination but is its an educated weighting that takes into account the process development and the way in which the models catch it to the extent the measurements reveal it to us. Therefore in the presence of monitored maxima the model that will forecast them will prevail in the weighting

on the others.

Less sophisticated, but equally efficient, is the median methodology according to which the median value of the model distribution is selected in every point in space and instant in time at which the forecast is available. This also does not penalize the heterogeneity of the forecasts in space and time. It excludes outliers, evident outliers, but preserve the spatial and time variability of the forecast, as no operation intervenes in modifying the data (the median value is the model result extracted from the distribution).

BMA is preferable in the presence of data, the median in the presence of only forecasted solutions. The issue addressed with any of these ensemble procedures is to minimize the model uncertainty, which in the case of forecasted concentrations cannot be addressed by means of a single alleged-deterministic model. There is a price to pay in doing that, i.e. an impression of smoothing the data. However both BMA and the median model do preserve to the best extent all relevant features of the model, and do not interpolate to the extent that the definition implies. At the same time, by basing the answer on several model predictions, they produce a much more robust and in principle reliable answer. We can say that they retain a 'conservative', rather than 'smoothed', solution, i.e. a solution which tries to preserve important features of the models while trying to reduce the uncertainty intrinsically associated with individual results.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 5701, 2007.