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Review on:

De praeceptis ferendis: good practice in multi-model ensembles

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Specific comments

Page 8 lines 17-18 (remark in brackets): in principle the models can have different distributions. No such an assumption is needed to obtain formulas in Table 1. Actually the only assumption made is that the models are treated as random variables with known variances (distributions doesn't have to be known and can vary from model to model).

Page 11 line 2: while selecting the subset theoretically optimal sequence is obtained if the models are ordered starting from the one with the smallest variance and the ensemble is built by adding step by step the next with smallest variance. This is however theoretical as it works for independent models – nevertheless one can consider this also as a possible approach. This procedure could be extended to the case of correlated models by making use of eigenvalue analysis.

Page 23 lines 21-24, 30-31 and page 29 lines 9-12: the fact that static weights applied for the entire ensemble based on analytical optimization outscore other products is really noticeable. In my opinion there are several reasons for that:

- analytical optimization, in principle, relies on good statistics (as it optimizes average behavior described by the mean square error) which can be obtained in the considered case after using enough long period; on the other hand in case of dynamic weights the period is shorter thus it has worse statistics, which in case of the whole ensemble is more sensitive and the ensemble behavior can be easier worsen by few models;
- for subset of the ensemble it is still the chance that applying dynamic weights can give good results provided this subset is properly chosen. Hence the difficulty is shifted to the optimal selection of the ensemble subset, which can be cumbersome;
- theoretically the whole ensemble with proper treatment (bias corrections, good estimate of variance and covariance) should always provide minimum error provided – again – that enough good statistics exists.

Page 27 line 24: as I understand correctly the model's variance correction is made by using multiplicative factor. Could you shortly explain on what grounds this is based ? For bias corrections there are techniques based – in general – on statistics, however the role of variance is different, and it can be treated as a kind of measure of model's uncertainty. Hence, variance correction would mean also uncertainty correction which sounds for me a bit suspiciously.

Technical remarks:

Page 12 line 4: abbreviation JJA is not explained in the text.

The quality of the figures could be improved - in pdf version they are not sharp – this concerns, first of all, the following pictures: 3, 7, 11, 14.

Table 2: There are no definitions of *MME**, *R* and e_m^*.