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Interactive comment on "From R-squared to coefficient of model accuracy for assessing "goodness-of-fits"" *by* Charles Onyutha

Ulrich Schumann

ulrich.schumann@dlr.de

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I am not an expert in statistical measures for "goodness of fits", but I found the paper by C. Onyutha interesting and useful. Therefore, I provide this comment.

I coded the Coefficient of Model Agreement (CMA), introduced in this paper, and compared the outcome to other measures, including Pearson's correlation coefficient (R2) and the Index of Agreement (IoA), both as described in this paper. I also evaluated the often-used Taylor skill score S, see Taylor (2001), Eq. (4). I applied the CMA together with the other measures for an application on which I am working presently (contrail cirrus modelling, in extension of work described earlier (Schumann 2012; Schumann and Graf 2013; Schumann and Heymsfield 2017), further details could be made available

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Discussion paper

on request). Here I report some related experiences, just for discussion.

My goal is to assess the "goodness" of combined cirrus-contrail model images approximating satellite observation images of cirrus optical thickness and top-of-atmosphere radiances. The simulated and observed contrail features are mostly small-scale structures compared to horizontal cirrus scales, and the model results are sensitive to small wind errors causing contrail displacements at scales comparable to contrail widths. The observations show cirrus properties with both systematic and random deviations from the cirrus model, e.g., because of small-scale processes difficult to treat accurately in any cirrus model (such as turbulence, humidity variability, ice particle habit variability, etc.)

In agreement with the results shown in Figure 2 of this paper, I found low values of CMA for cases with high values of IoA, R2 and S. So, it seems that high values of CMA are obtained only when the model is nearly perfect in representing the observations. I think, it is difficult to achieve high values of CMA when the observations contain random errors, and when the model-observation agreement "goodness" is sensitive to small shifts in small-scale structures. So I found it demanding to find an optimum criterion for "goodness" in this application.

Some technical remarks:

The method uses a count of how many times a data point x(i) appears in observed series x, see line 497. In praxis, data may occur with small round-off errors so that x is nearly equal to a set of values in the observations. How can one account for such a near-equality?

I suggest that the author also compares to the Taylor skill score, as given in Eq. (4) of Taylor (2001).

Finally, I ask the author to make sure that all abbreviations used in the text are defined (I missed: IoA).

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