

Comment on hess-2022-58

Anonymous Referee #2

Referee comment on "Quantifying overlapping and differing information of global precipitation for GCM forecasts and El Niño–Southern Oscillation" by Tongtiegang Zhao et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-58-RC2>, 2022

This manuscript develops a novel Set Operations of Coefficients of Determination (SOCD) method to explicitly quantify the overlapping and differing information for GCM forecasts and ENSO teleconnection. The proposed method and its case study are interesting and well presented. I have some comments, especially concerning the conclusions derived from the case study.

- This study derives the patterns from CFSv2 forecasts and observations. However, we should note that the forecast skills of GCMs are of high uncertainty in different models. The ability of GCMs in capturing ENSO-related climate dynamics are different. Therefore, the results and conclusions may be different when other GCMs are used. The authors should have a more detailed discussion on this issue.
- Another issue is that the lagged relationship between ENSO and seasonal precipitation that always matters. The lagged climate indices have been widely used as predictors in previous studies. In this study, the concurrent relationship between ENSO and seasonal precipitation is analyzed. We suggest that the lagged relationship should also be discussed.
- The SOCD method uses three classic simple linear regression models to account for the information of observations in forecasts and nino3.4 index. However, this assumption may not be sufficient. The linear regression may lose some important information, especially for extreme seasonal precipitation events. This should be discussed in the discussion section as well.