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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Satellite-driven downscaling of global reanalysis precipitation products for hydrological applications" *by* H. Seyyedi et al.

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We would like to thank Anonymous Referee #3 for his/her helpful comments and suggestions. Herein we provide brief answers to his/her comments but, during the final phase, we will be providing a more extensive response.

Major: Given the reviewer's comment, it seems that our explanation about the SREM2D calibration and validation in section 3 needed improvement. Below is revised text from section 3 "First, GLDAS error correction and downscaling SREM2D parameters were determined over the calibration datasets of each season using TRMM3B42V7 precipi-

tation as reference. Then, SREM2D was applied to the GLDAS data during the validation period to produce downscaled and error adjusted GLDAS precipitation, which was evaluated against the independent Stage IV gauge adjusted radar-rainfall fields."

This is also depicted on the revised flow chart of figure 3 (attached in this response). During calibration (left panel) TRMM3B42V7 precipitation at 25 km provides the reference precipitation for evaluating SREM2D parameters; we used TRMM3B42V7 product because it can potentially be applied to derive SREM2D parameters for GLDAS error correction at global scale. In the right panel of the flow chart we show the validation; namely, the calibrated SREM2D model was applied on the 100-km resolution GLDAS data to derive error corrected and downscaled GLDAS products. These GLDAS values were verified against independent stage IV radar rainfall data aggregated to 25 km. We hope this is now clearer.

Minor: 1- P. 9068, line 16-20, has been rephrased as bellow: "The statistical analysis consists of frequency and quantile plots as well as mean relative error and root mean square error statistics. The results demonstrated improvements in the precipitation and runoff simulation error statistics of the satellite-driven downscaled reanalysis dataset compared to the original reanalysis precipitation product." 2- P. 9071, line 26-28, the short answer is yes. The error correction in downscaling scheme will take care of random and systematic errors in resulted downscaled products. For instance in our methodology SREM2D does error correction based on the probability of rain, probability of no rain, and correlation length between reference and measured datasets. 3- P. 9085, line 24, it has been changed to "significant rainfall events". 4- Figure 2., We appreciate your comment about figure2. However since we discuss the effect of seasonality in our paper we would like to present CDF curves for each season. 5- Figure 4., We appreciate your comment about presenting real error instead of logarithmic error. The section is introducing the parameters we calculated and forced SREM2D to perturb reference like downscaled ensembles. Fpr consistency we would like to present in the figure the parameters as they are actually used in the model. 6- Figure

5 has been corrected to “four seasons”. 7- We never tested downscaling GLDAS using Stage IV. The ultimate goal of this research is to come up with a technique that would apply globally. In that sense Stage IV is not a relevant dataset so we did not consider it in our downscaling scheme. Instead, Stage IV was suitably used for verification of the downscaled/error adjusted GLDAS products.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 9067, 2014.

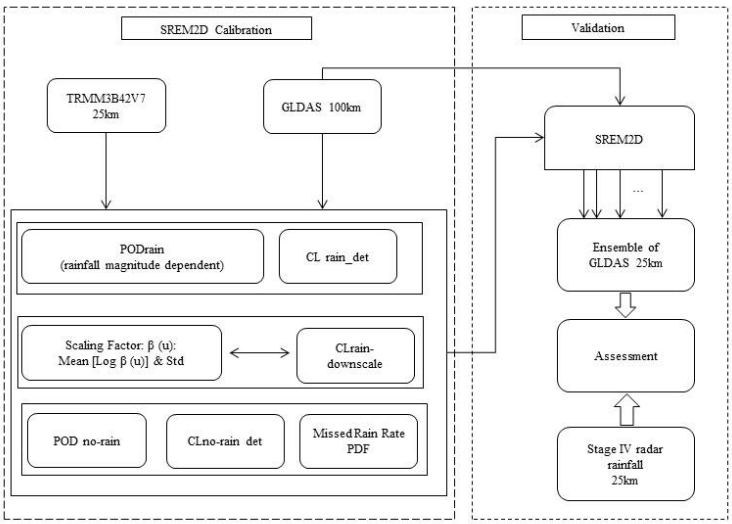

Figure3: SREM2D calibration (left panel) and verification (right panel) framework.

Fig. 1.