

Merging of satellite precipitation products: A quantile based Bayesian model averaging approach

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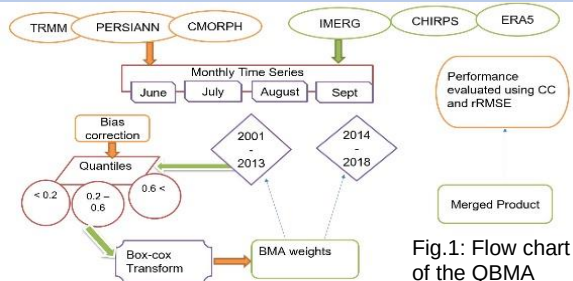
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Introduction

- Satellite Precipitation Products (SPP) suffers from lack of accuracy ...
- Merging of datasets from different sources could be an alternative
- We proposed a Quantile Bayesian model averaging (QBMA) approach for merging of SPP

Methodology

- Dynamic Bayesian Model averaging considers only hit cases thereby, disturbing the temporal continuity of the datasets.
- We sampled the training data based on three quantiles (<0.2, 0.2-0.6, 0.6<).



- Different trials conducted to find the merging member resulting in higher CC and lower rRMSE.
- Bias corrected (LS and LOCI) products were also considered for QBMA

How to Read Abbreviation in Maps

Group1: TRMM, PERSIANN, CMORPH

Group2: IMERG, CHIRPS, ERA5

BMA(t/p/c/l/ch/era5) => QBMA merged product by using quantile threshold at the TRMM/ PERSIAN/ CMORPH/ IMERG/ CHIRPS/ ERA5

BMA(LS/LOCI)(t/p/c/l/ch/era5)=> QBMA merged products using either Linear scaling or Local Intensity scaling Bias corrected individual products and using quantile thresholds at the product indicated by small letters

Results

Fig.3: Correlation Coefficient of all SPP at grid points

SPPs have less correlation coefficient (CC) with ground based IMD data

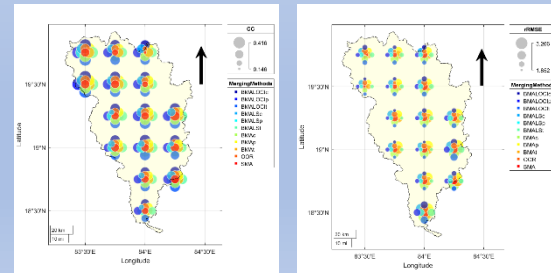
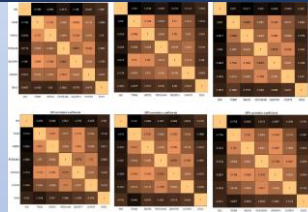


Fig.3: CC and rRMSE of the merged members using different combinations for Group1 Products at the Vamsadhara Basin

Results

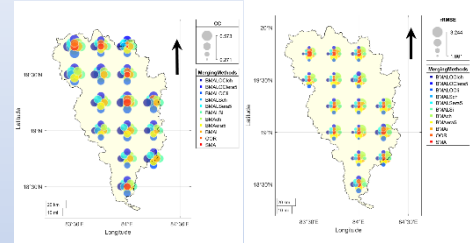


Fig.4: CC and rRMSE of the merged members using different combinations for Group2 Products at the Vamsadhara Basin

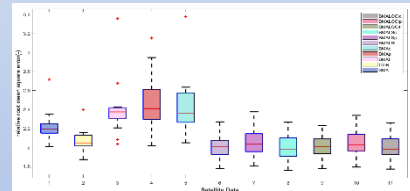


Fig.5: Boxplot showing reduced rRMSE of the Bias corrected merged product

Conclusion

- Except for BMALSc, all the merging combinations performed relatively better than SMA and OOR at all the grid points during the calibration period for both the cases.
- Both the bias correction methods reduces rRMSE.
- QBMA with linear scaling bias correction method results in reduced relative root mean square error in all the cases

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