

**Synergy of satellite- and ground-based aerosol optical depth measurements
using an Ensemble Kalman Filter approach**

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Figures S1 to S5.

Introduction

This file contains supplementary FigureS1 to Figure S5. These figures are produced using exactly the same datasets as those in the analysis of the main text, including the 11 satellite monthly mean AOD datasets and AERONET monthly mean AOD data. Specifically, Figures S1 and S2 are calculated using the 474 member ensemble constructed using the 11 satellite datasets. Figure S3 shows the seasonal samples of AERONET data. Figure S4 and Figure 5 shows comparison between MODIS and AERONET data. The detailed description of each figure can be found in the figure captions.

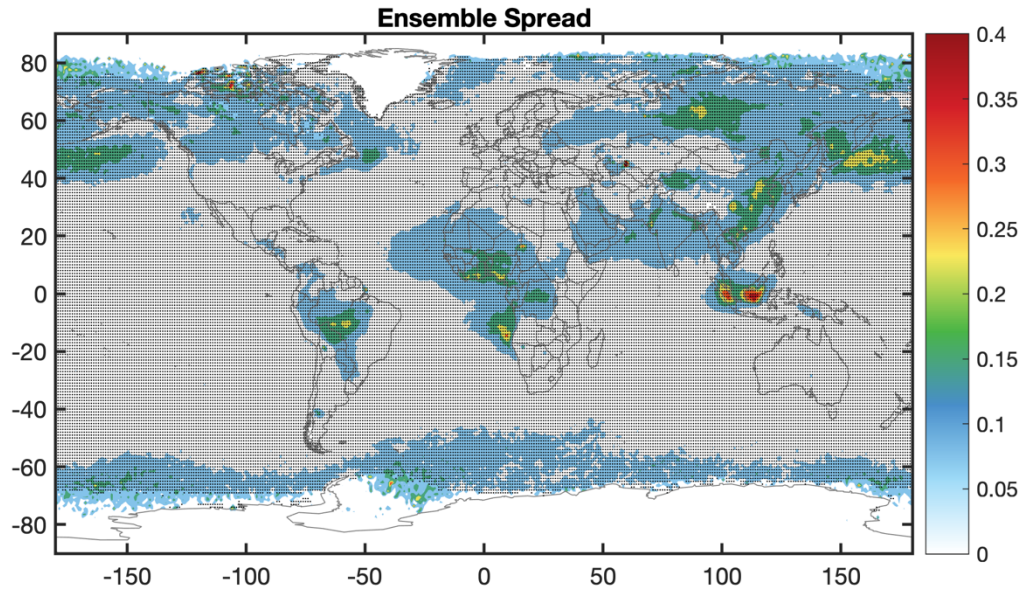


Figure S1. Spread of the global ensemble with 474 members, calculated as the standard deviation of the samples at each grid box. Area with gray indicates that samples at these grid boxes have passed the Kolmogorov-Smirnov test for normality at 95% significance level.

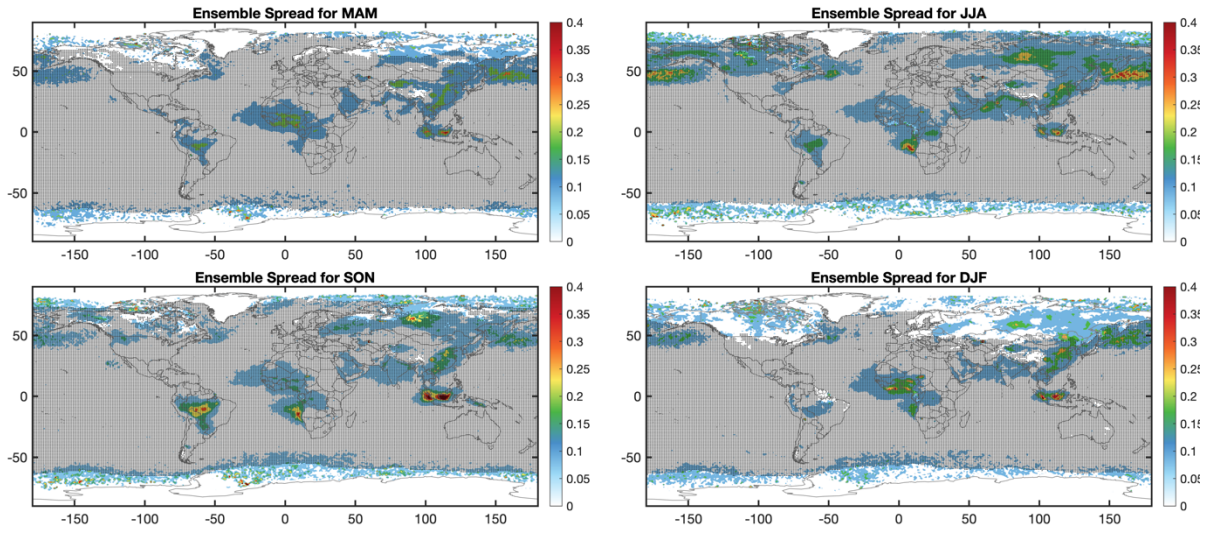


Figure S2. The same as Figure 1 but for seasonal ensembles with ~ 120 members for each season.

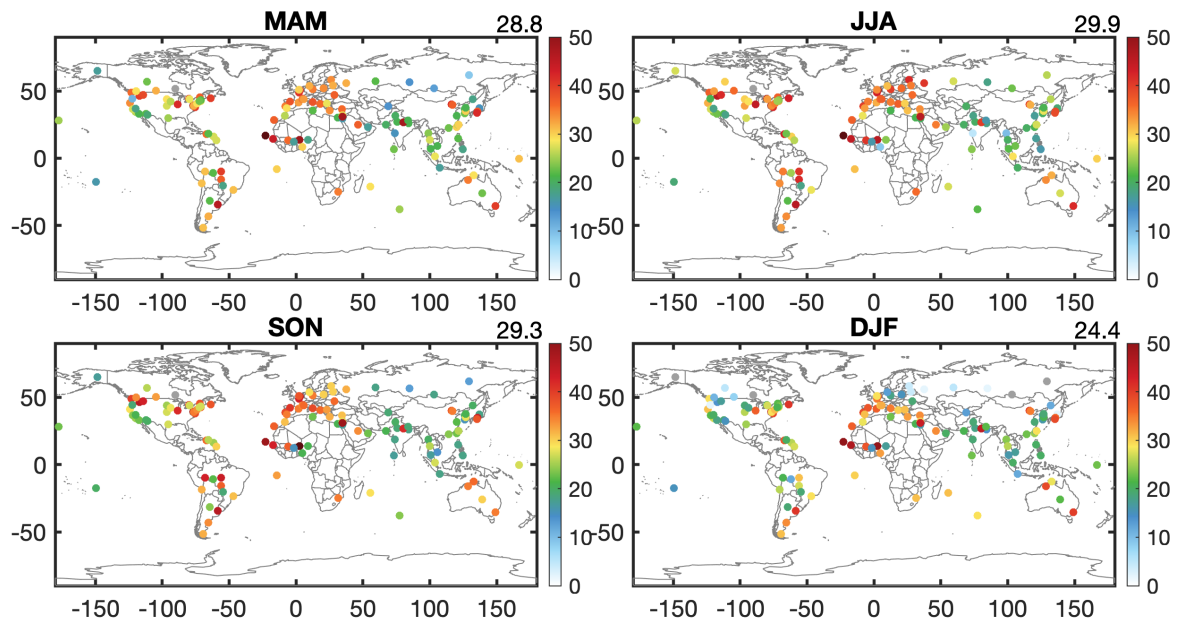


Figure S3. Samples used for each season when calculating the seasonal statistics. The numbers on the top right corner of each panel indicate global averages values.

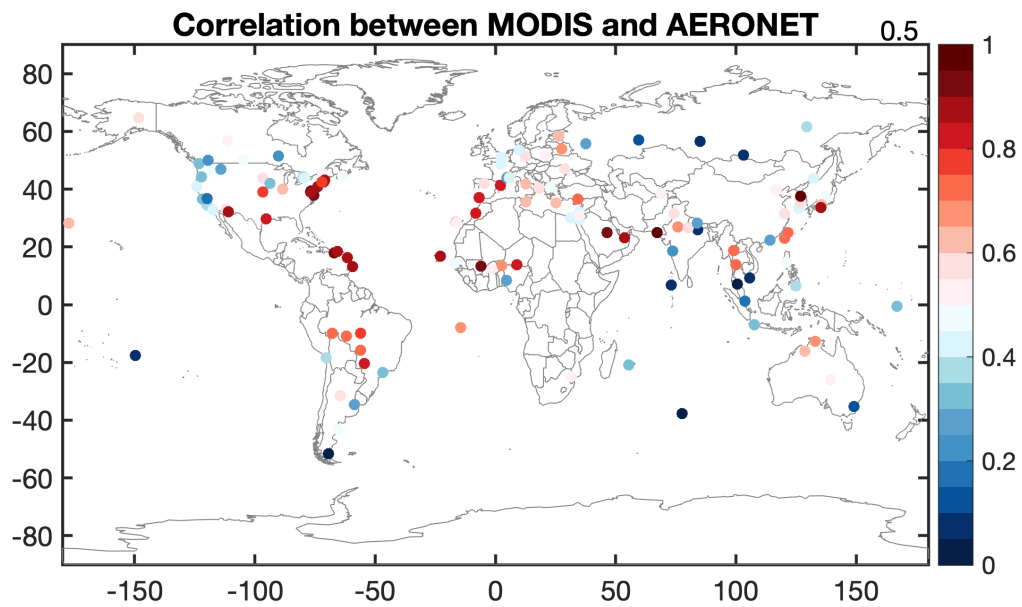


Figure S4. Correlation between monthly mean MODIS and AERONET AODs calculated using all data.

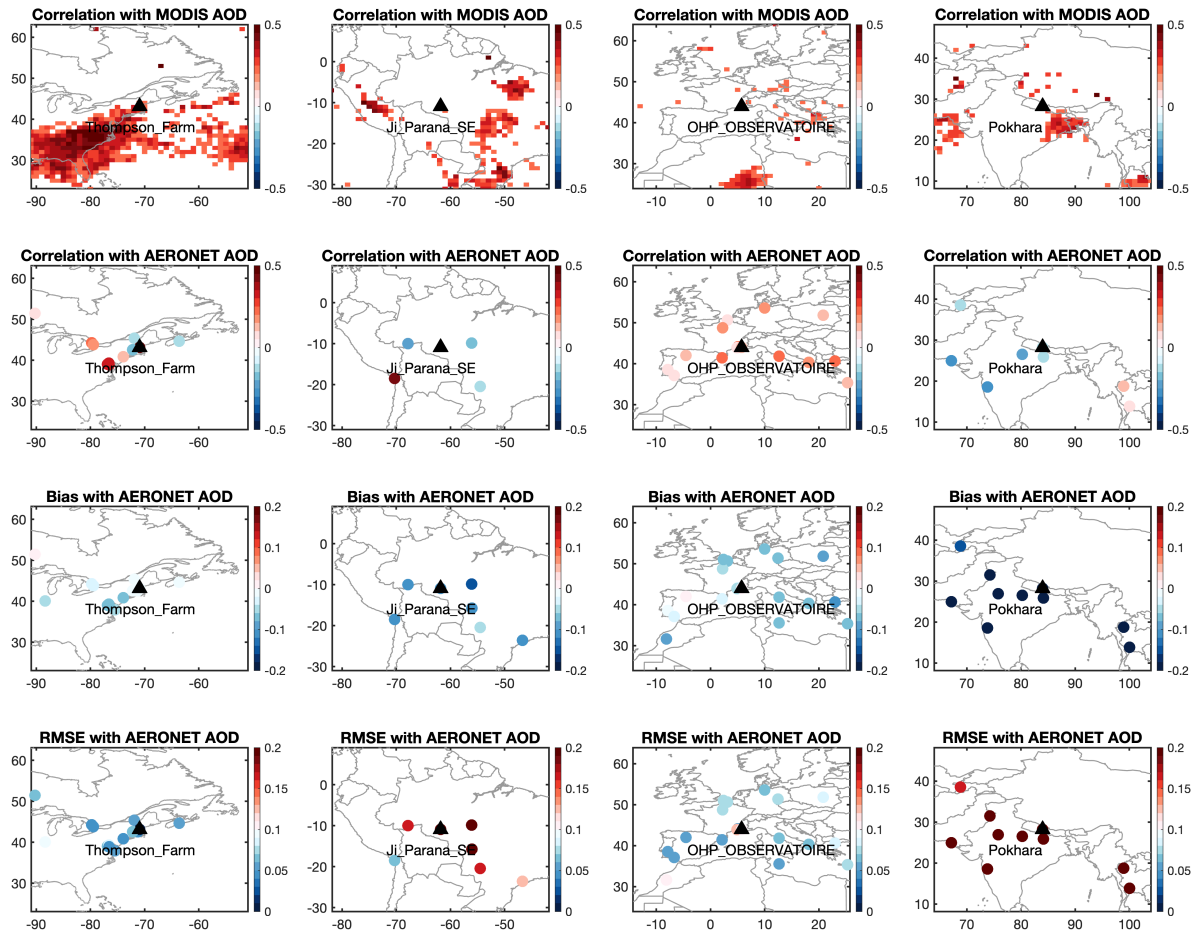


Figure S5. Correlation with MODIS AOD (first row from top), correlation with AERONET AOD (second row), bias with AERONET AOD (third row) and RMSE with AERONET AOD (bottom row) for the four sites where results deteriorated after assimilating AERONET data.