Suppoting document

of

The spatiotemporal relationship between PM2.5 and AOD in China: Influencing factors and Implications for satellite PM2.5 estimations by MAIAC AOD

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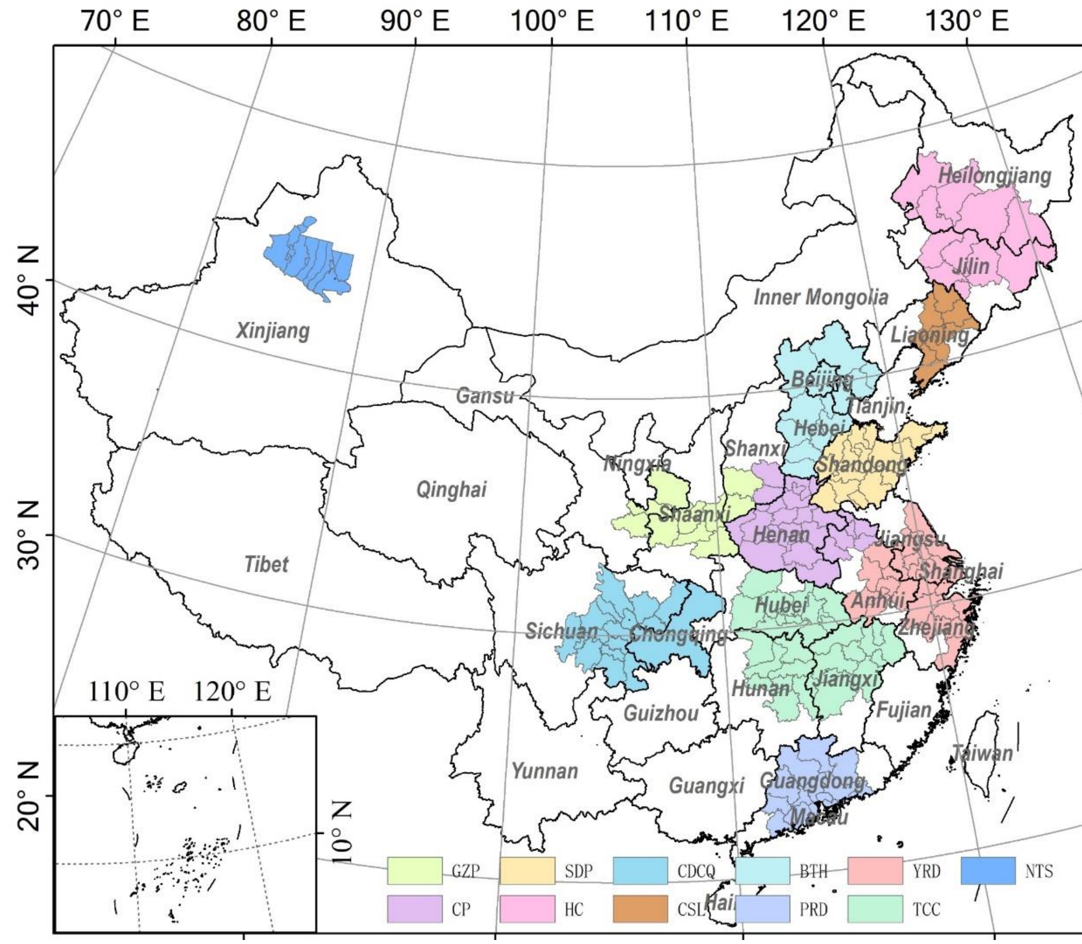

Figure S1. The study area and the eleven urban agglomerations.

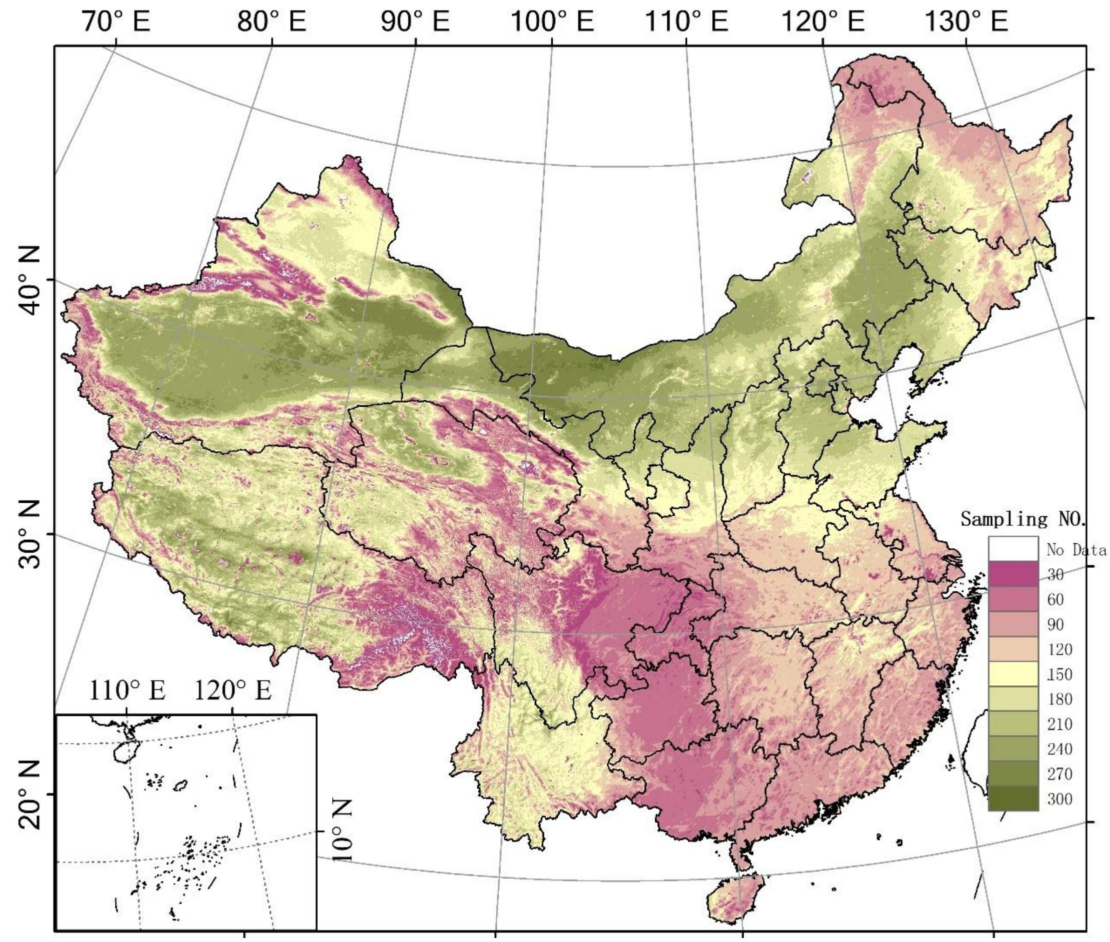

Figure S2. Spatial distribution of multi-year mean values of AOD data availability for each pixel in 2019 over the mainland China.

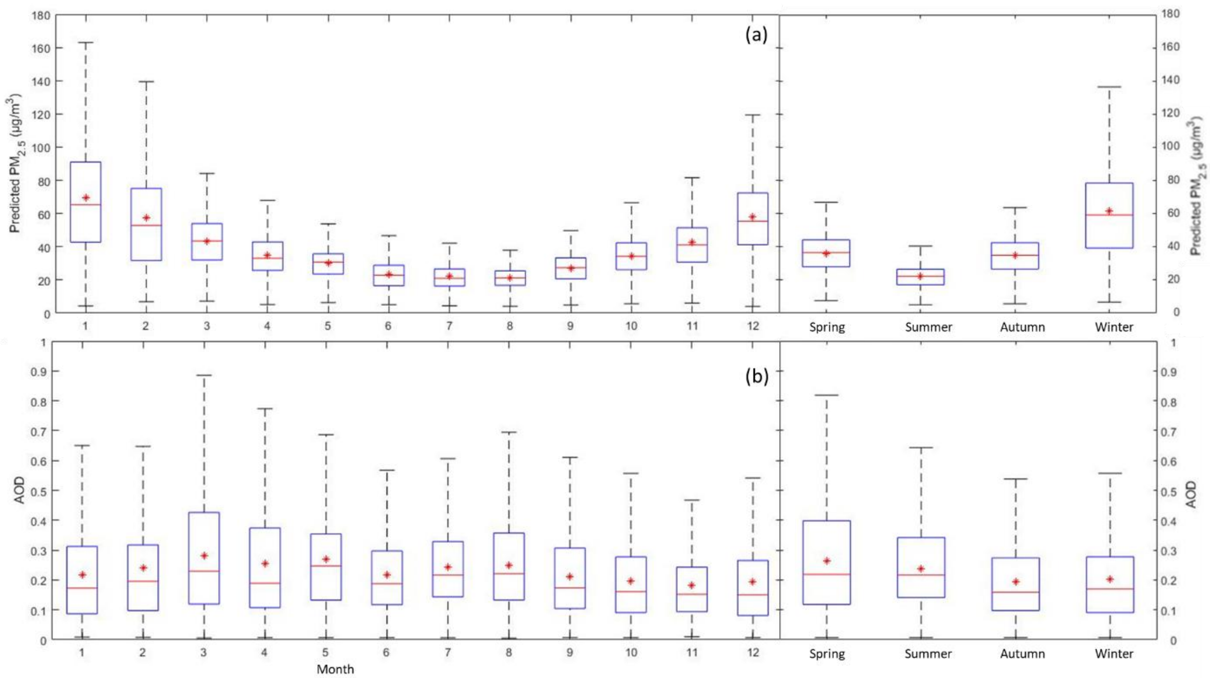

Figure S3. Boxplot of monthly variations of (a) mean $PM_{2.5}$ concentration and (b) AOD in the study period. The boxplot uses the first and third quartiles grouped by month, and the red asterisk in the box represents the mean values in each month.

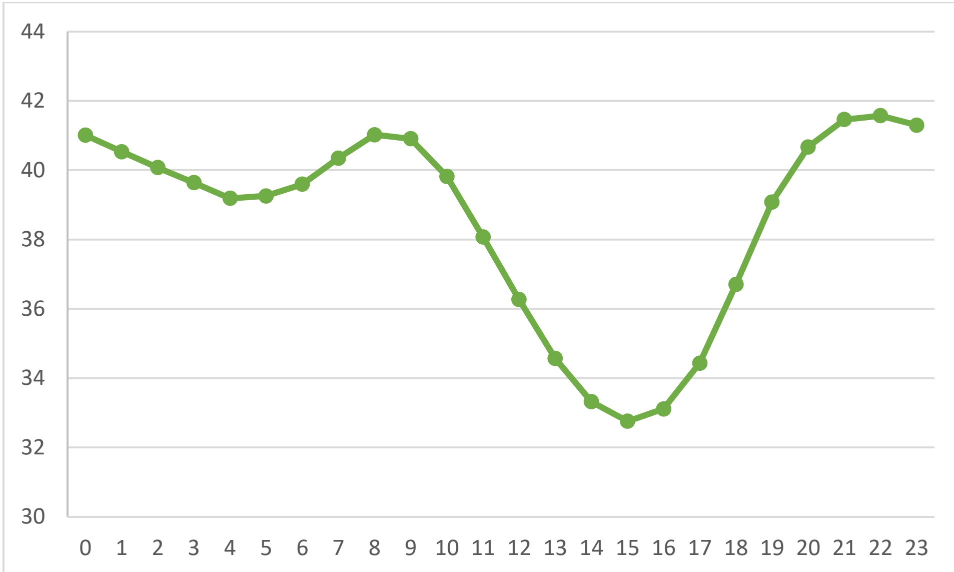

Figure S4. Diurnal variations in $PM_{2.5}$ concentrations during 2019 throughout China.

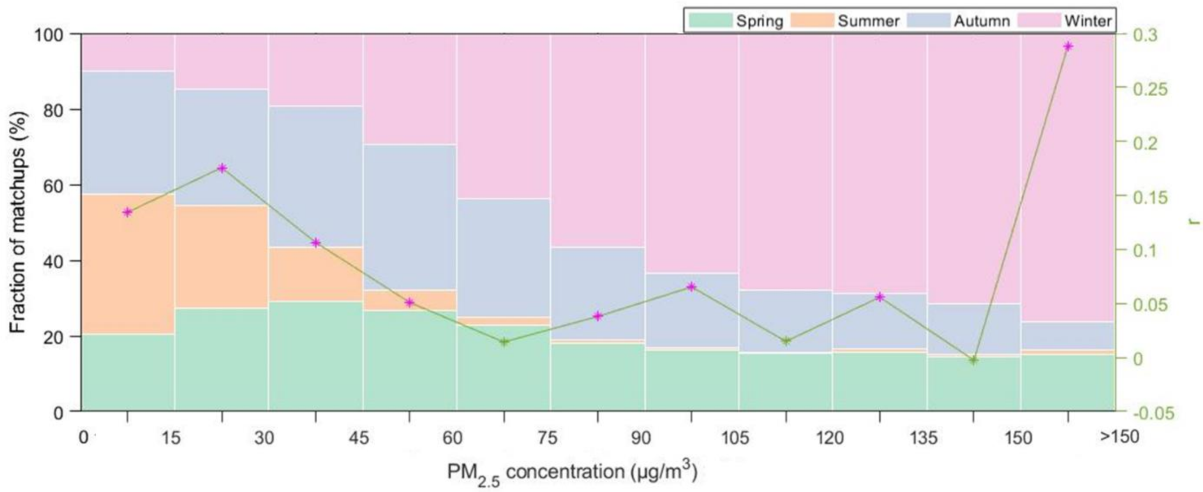

Figure S5. Overall correlation coefficient r (right axis) and fraction of matchup pairs in each season (left axis) at different $PM_{2.5}$ levels. The matchup pairs are separated into 11 bins along with ground-level $PM_{2.5}$ concentrations starting from 0 with the interval of 15 μg/m^3. The magenta asterisk stands for statistically significant r with p level<0.05.

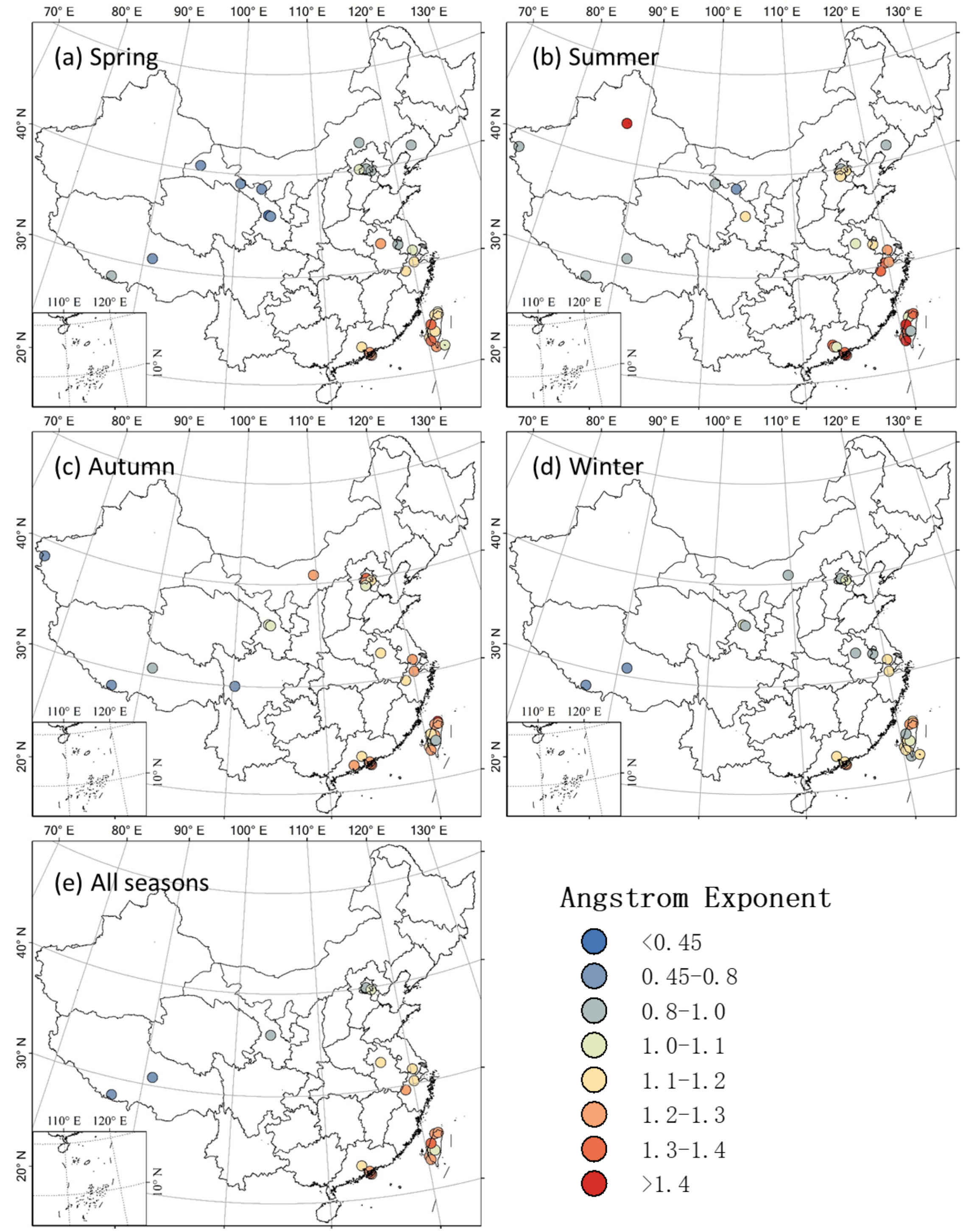

Figure S6. Spatial distribution of Angström exponent (AE or α) at different AERONET monitoring stations during (a) spring, (b) summer, (c) autumn, (d) winter and the whole period from 2001 to 2019. For figure e, only stations with AE values in all four seasons are remained. Generally, AE ranges from 0 to 2.0, and the larger AE value indicates a smaller aerosol particle size.

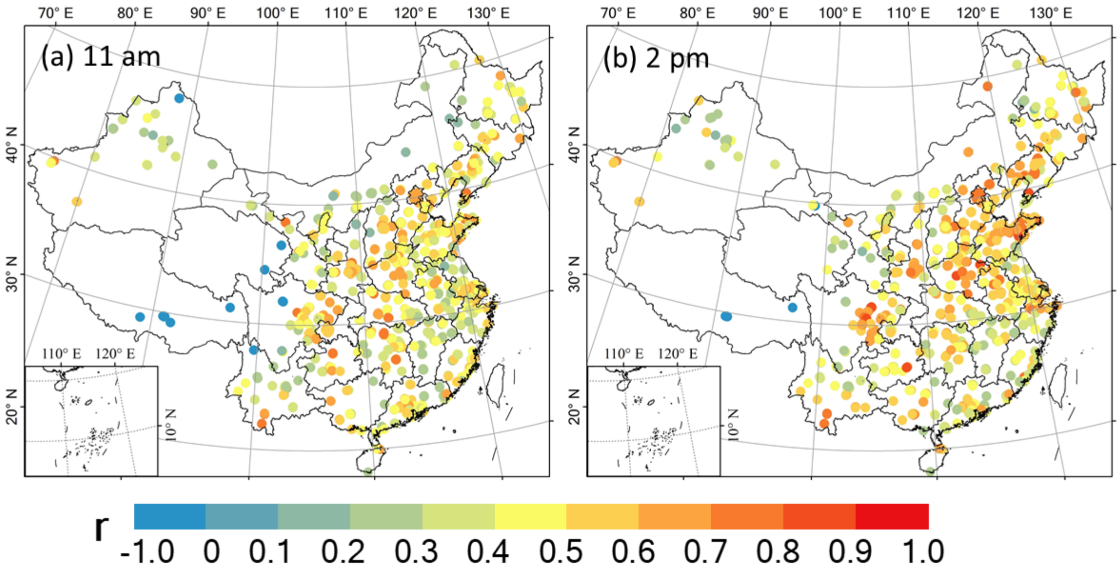

Figure S7. Spatial distribution of relationship between hourly $PM_{2.5}$ measurements and Terra/Aqua AOD at the satellite overpass time of (a) 11 am and (b) 2 pm in 2019.

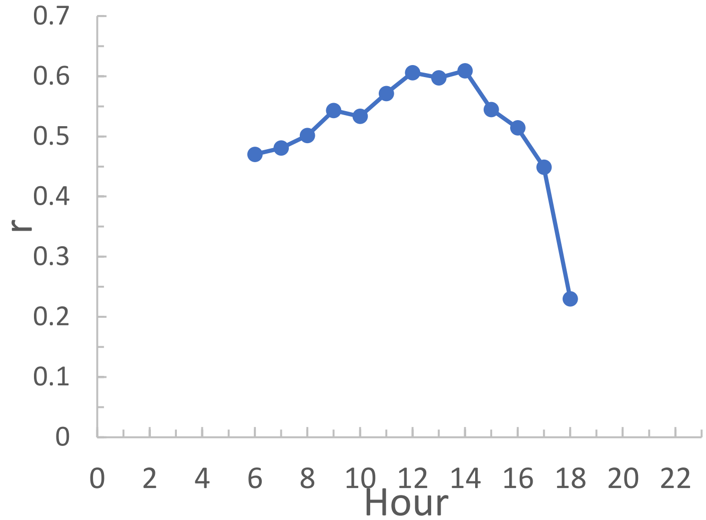

Figure S8. The diurnal variation of correlation coefficients between ground-level $PM_{2.5}$ measurements and the AERONET AOD observations.

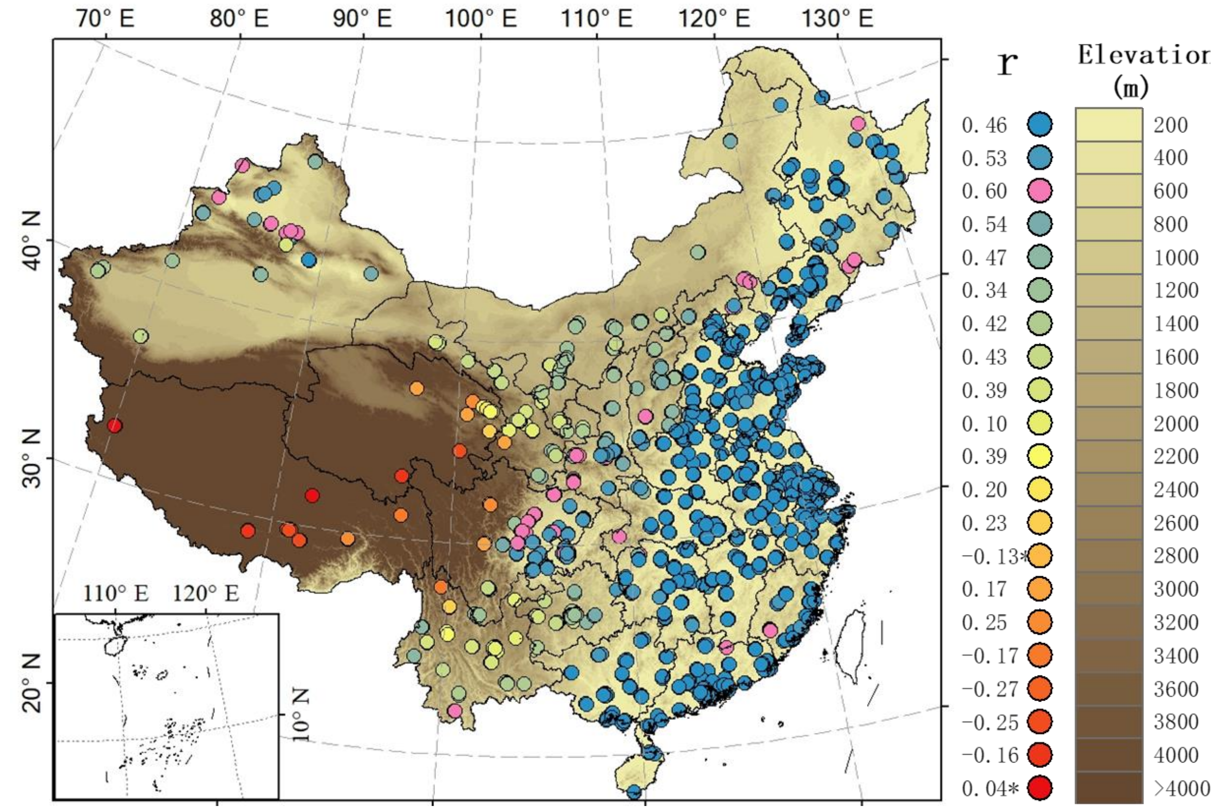

Figure S9. Spatial distribution of $PM_{2.5}$-AOD correlations at different elevations. Note that asterisk after the r value indicates it is not significant with $p<0.05$.