Figure S1. Time-series of WSI June for 2003–2017 in Seoul. This index is calculated from the MERRA-2 reanalysis dataset. WSI is unitless.
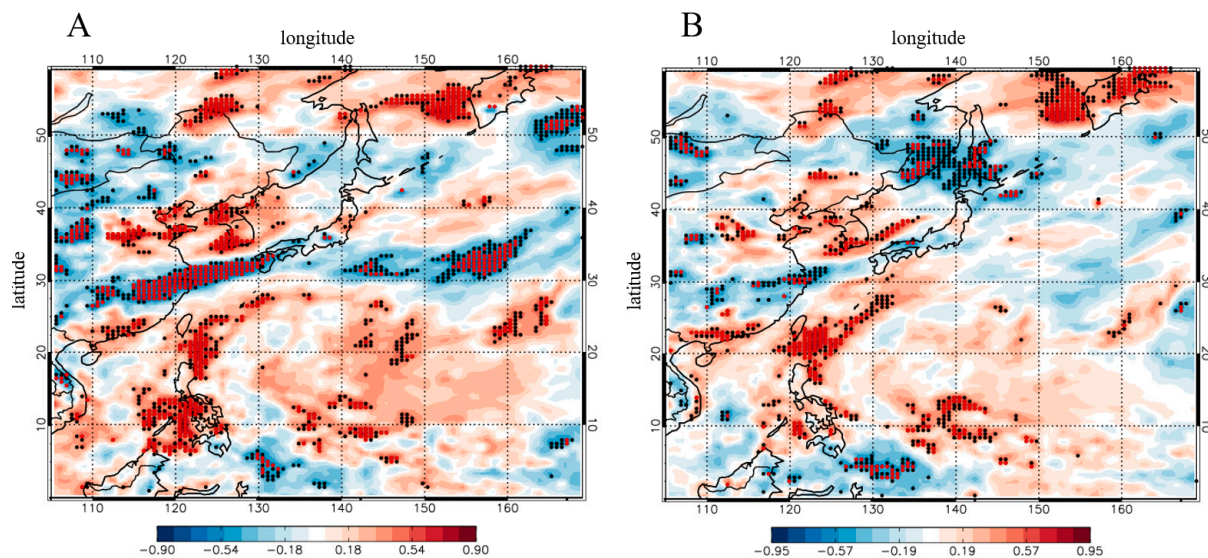
Figure S2. Regressed normalized PM and AOD in Seoul against meteorological indices at each grid in the month of June for 2003–2017. (A) and (B) are regressed PM concentration and AOD in Seoul against PREI at each grid. Black dots indicate statistical significance at the 90% level and red dots indicate statistical significance at the 95% level. Normalized PM concentration and AOD are from station observation and MODIS. Meteorological indices are calculated from MERRA-2 reanalysis dataset. All variables are unitless.
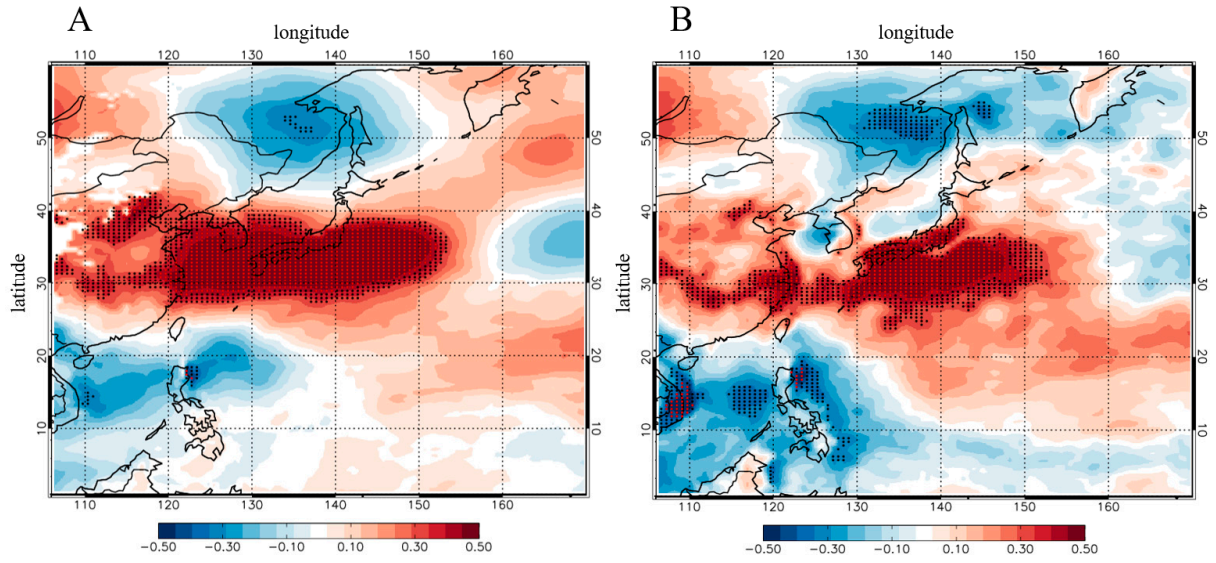
Figure S3. Regressed normalized temperature at (A) 850 hPa and (B) 10 m for each grid against normalized EASMI in the month of June for 1980–2017. Black dots indicate statistical significance at the 95% level and red dots indicate statistical significance at the 99% level. Normalized EASMI and temperature are calculated from MERRA-2 reanalysis dataset. All variables are unitless.
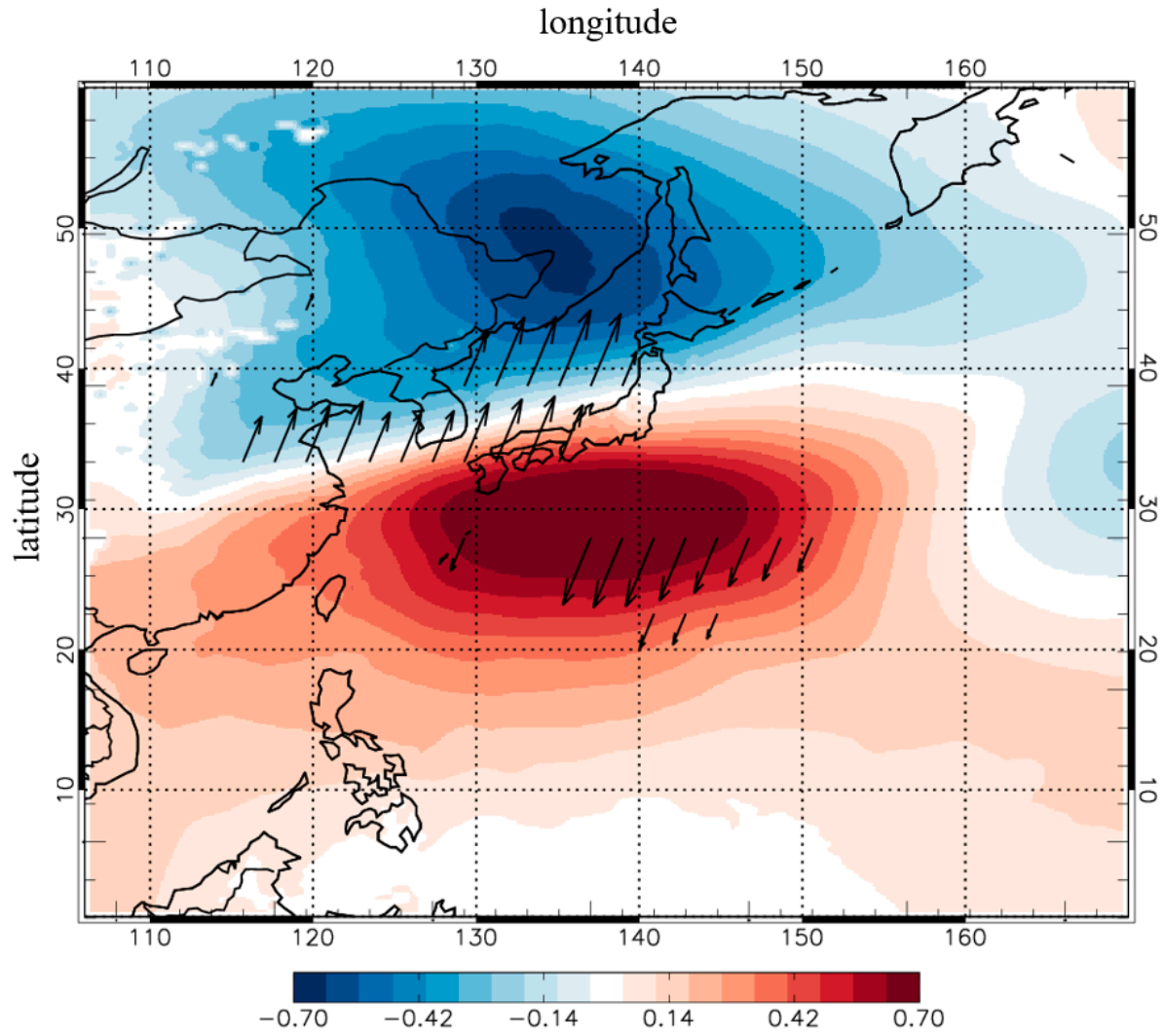
Figure S4. Regressed normalized wind vector (zonal wind; meridional wind) and normalized surface pressure (shading) at each grid against EASMI in the month of June for 1980–2017. Expressed wind vectors indicate statistical significance at the 95% level. Unit of wind vector is m s^{-1}. Normalized EASMI, wind vector, and surface pressure are calculated from MERRA-2 reanalysis dataset.
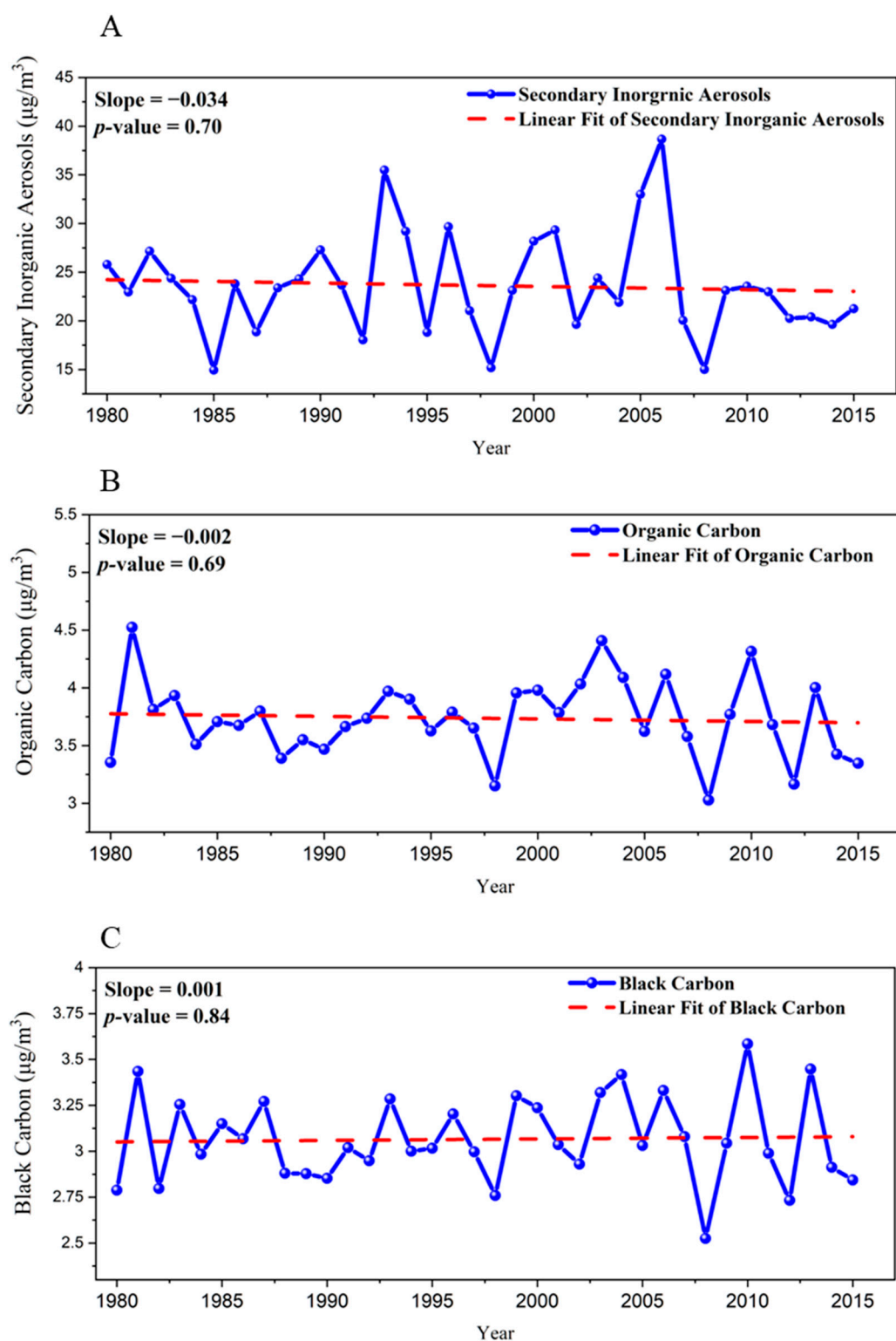
Figure S5. (A) Time series of the secondary inorganic aerosols (SIA), (B) organic carbon (OC), and (C) black carbon (BC) using MERRA reanalysis dataset at Seoul in the month of June for 1980–2015. Red lines indicate linear regression lines of each index. The unit of aerosol concentration is μg m^{-3}.
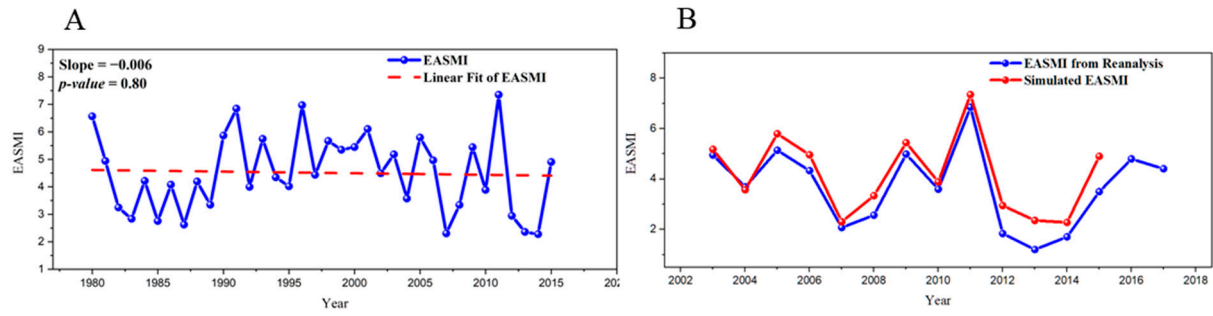
Figure S6. Time-series of EASMI at Seoul in the month of June. (A) is time series of the EASMI using the MERRA reanalysis dataset at Seoul in the month of June for 1980–2015. Red line is the linear regression line of the EASMI. (B) is time series of the EASMI using the MERRA reanalysis dataset at Seoul in the month of June for 2003–2015 (red solid line). Blue line is the time-series of EASMI using MERRA-2 reanalysis during the month of June for 2003–2017. All variables are unitless.