Daily AOD Percentile During 11-25 June 2015
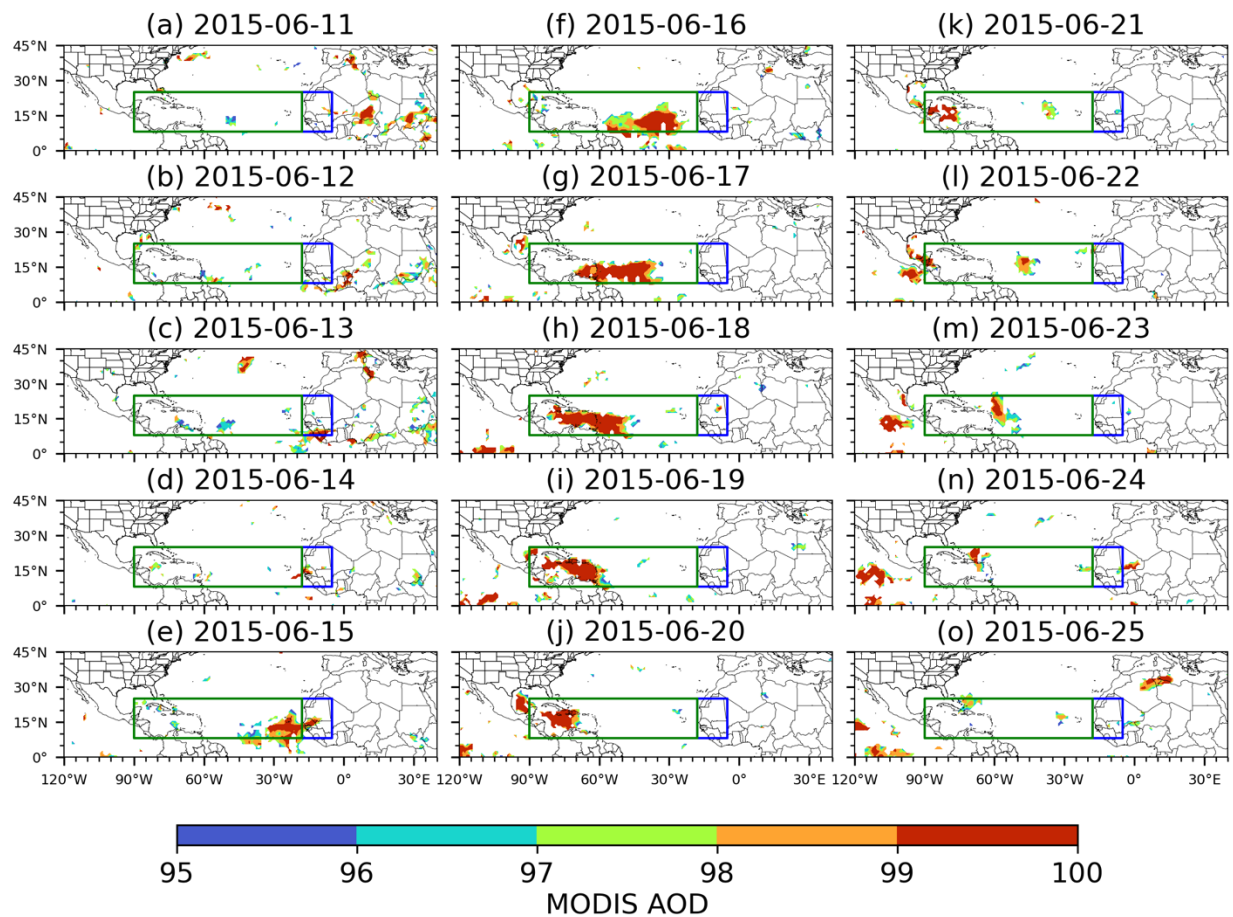
Figure S1. Daily AOD percentile above the 95th, with reference to daily MODIS AOD in JJA from 2003 to 2022 at each grid point. The green and blue boxes correspond to the averaging areas over the tropical North Atlantic and western North Africa, respectively.
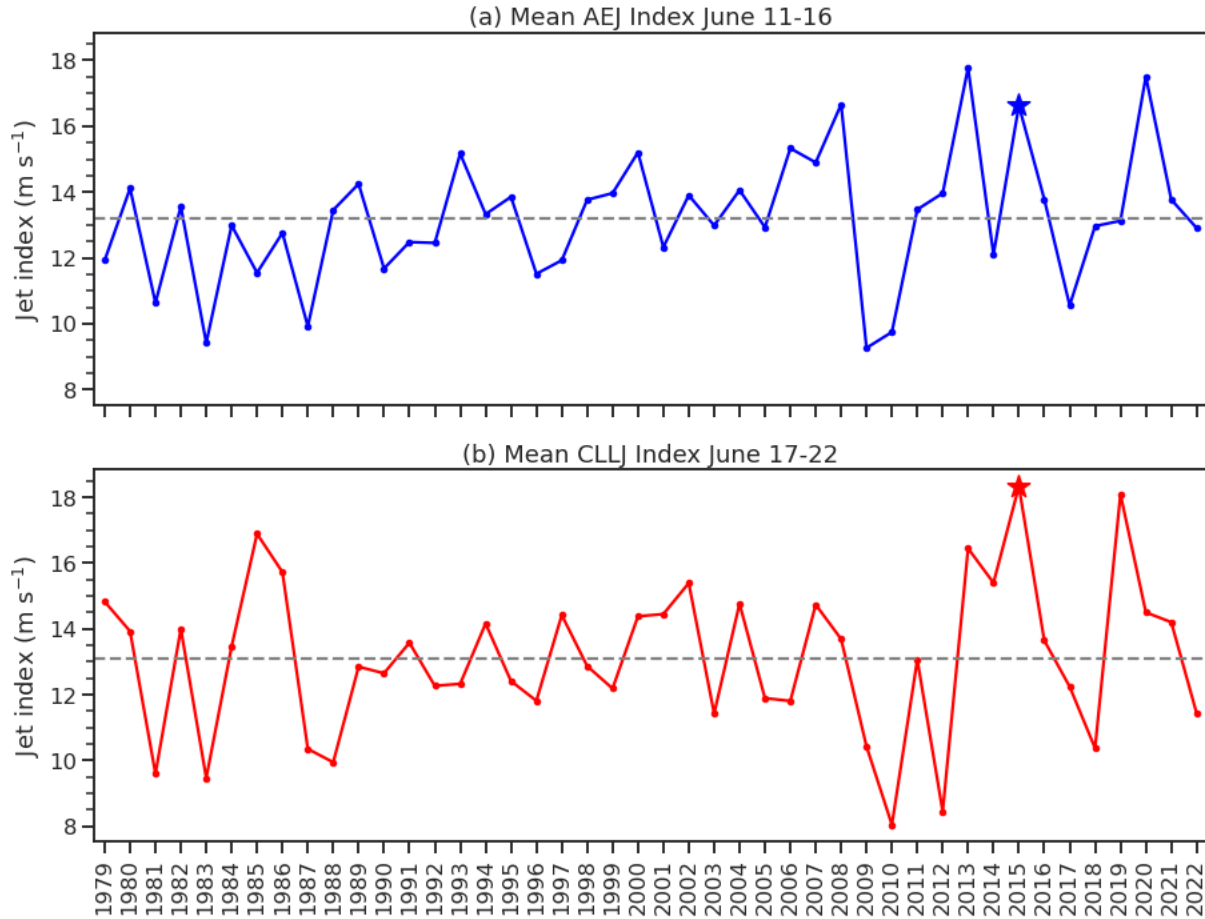
Figure S2. Six-day average of the AEJ (blue) and CLLJ jet (red) indices (see definition in text) from 1979-2022. Means of each index are shown as grey dashed lines. 2015 is marked with a star.

Figure S3. IMERG daily average precipitation anomaly (with reference to 2000-2019 monthly means). Cyan contour is the climatological location of June rainfall of 10 mm day^{-1}, and dots represent AOD ≥ 0.4
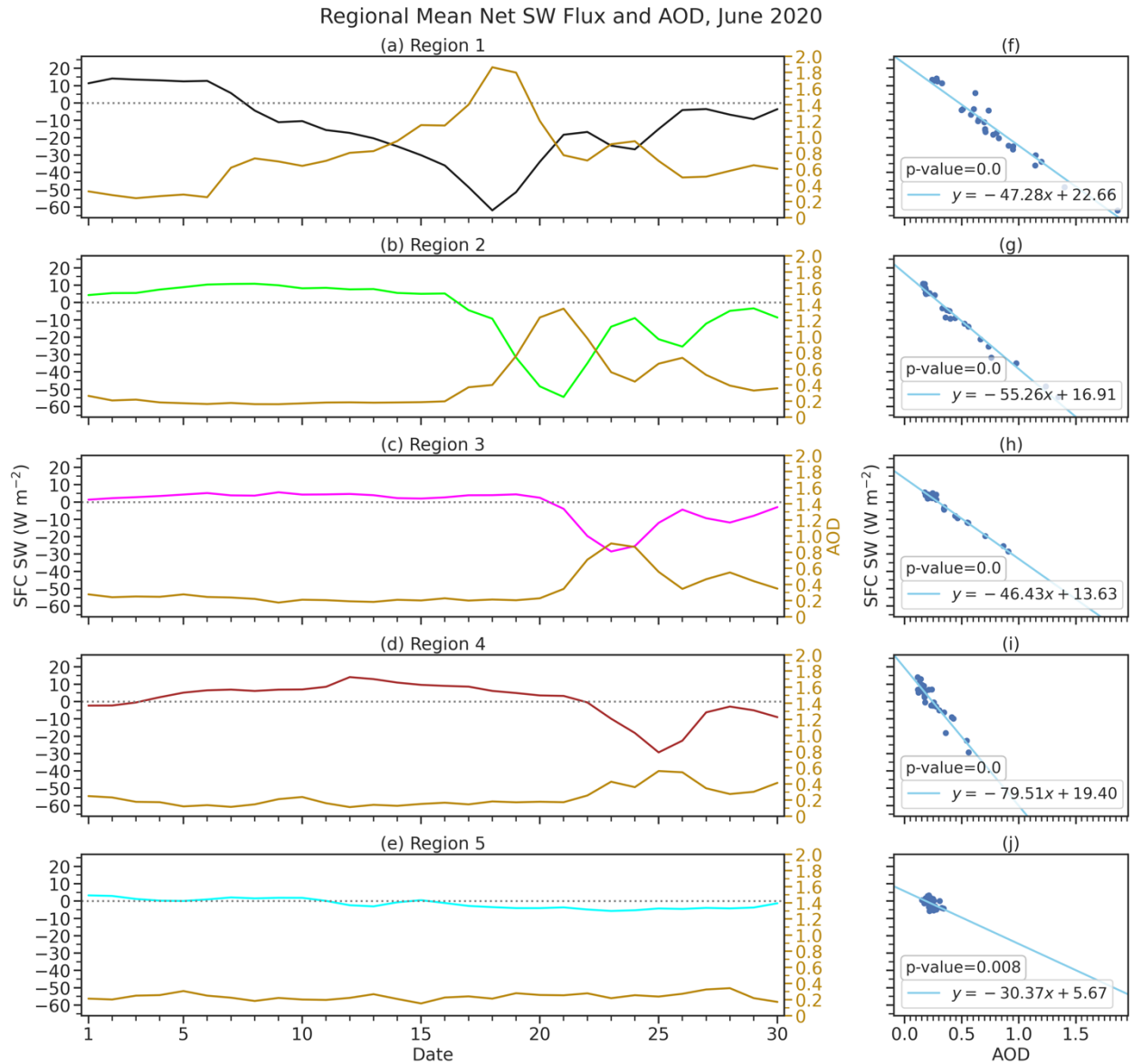
Figure S4. (a)-(e) Anomalies of CERES clear-sky surface shortwave flux (with reference to the 2003-2022 climatology in June; W m⁻²) over the tropical North Atlantic in Boxes 1-5 (see locations in Fig. 12) in June 2020. Black, green, magenta, brown, and cyan lines are regional mean surface net shortwave flux from Boxes 1–5. Golden lines correspond to regional mean AOD. (f)-(j) Scatterplots of regional mean MODIS AOD versus anomalies of CERES clear-sky surface net shortwave fluxes (W m⁻²) in Boxes 1-5.
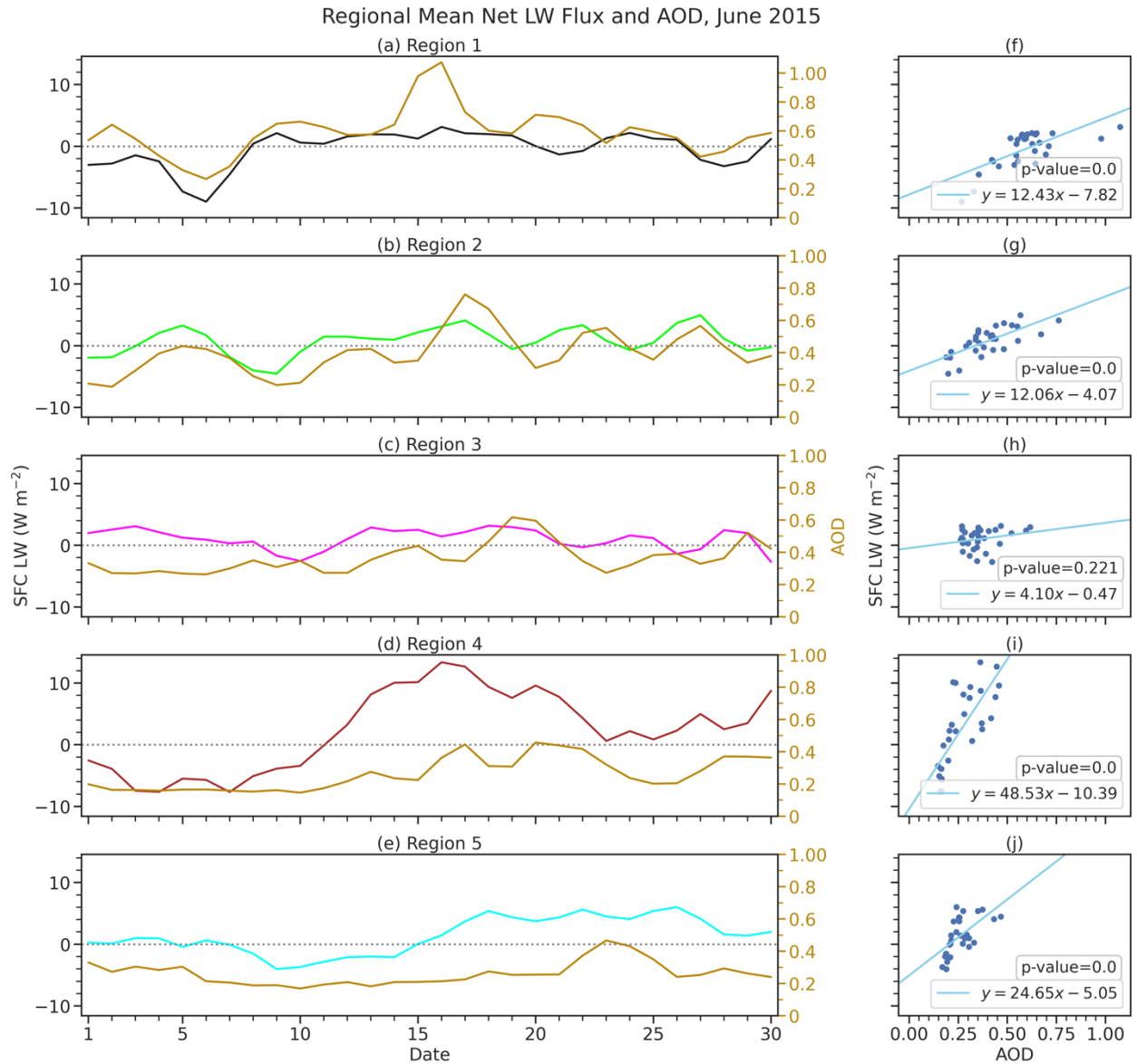
Figure S5. (a)-(e) Anomalies of CERES clear-sky surface longwave flux (with reference to the 2003-2022 climatology in June (W m⁻²)) over the tropical North Atlantic in Boxes 1-5 (see locations in Fig. 12) in June 2015. Black, green, magenta, brown, and cyan lines are regional mean surface net longwave flux from Boxes 1–5. Golden lines correspond to regional mean AOD. (f)-(j) Scatterplots of regional mean MODIS AOD versus anomalies of CERES clear-sky surface net longwave fluxes (W m⁻²) in Boxes 1-5.
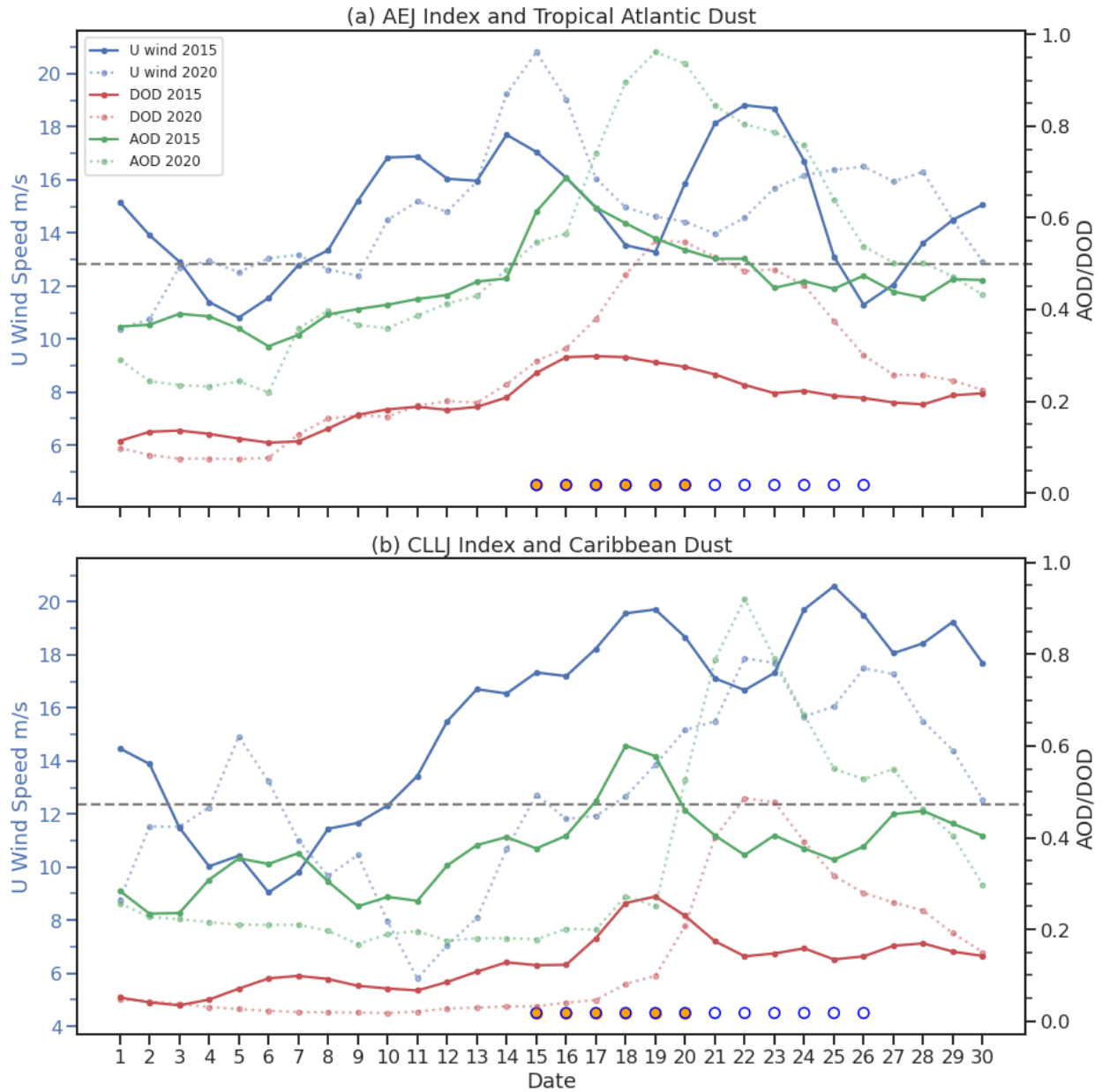
Figure S6. (a) Daily AEJ indices (blue) along with MODIS AOD (green) and MERRA-2 DOD (red) over the tropical North Atlantic (8°N – 25°N and 18°W – 90°W) and **(b)** the CLLJ indices (blue) with MODIS AOD (green) and MERRA-2 DOD (red) over the Caribbean Basin (8°N – 25°N and 50°W – 90°W) in June 2015 (solid lines) and 2020 (dashed lines). Dates of AEEs are indicated by solid orange (2015) and empty blue (2020) circles along each x-axis. Horizontal grey dashed lines denote the June mean value of the AEJ or CLLJ from 1979-2022.