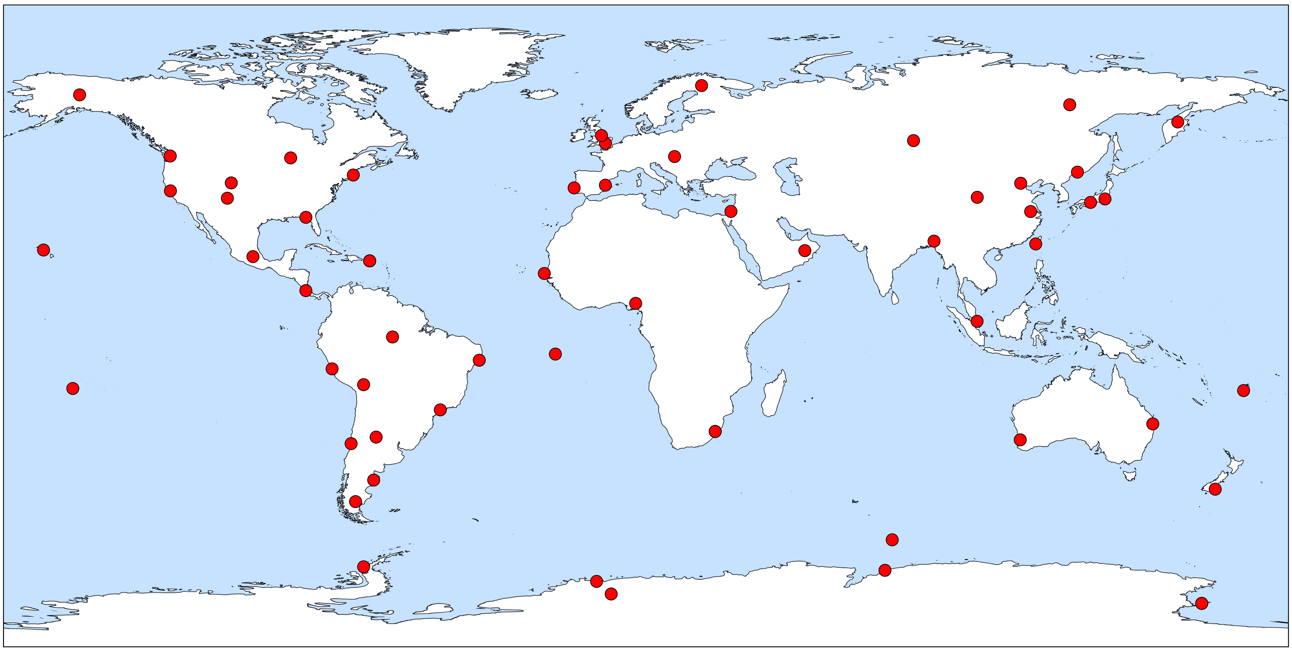

Figure S1. Location map of the WWLLN detector stations.

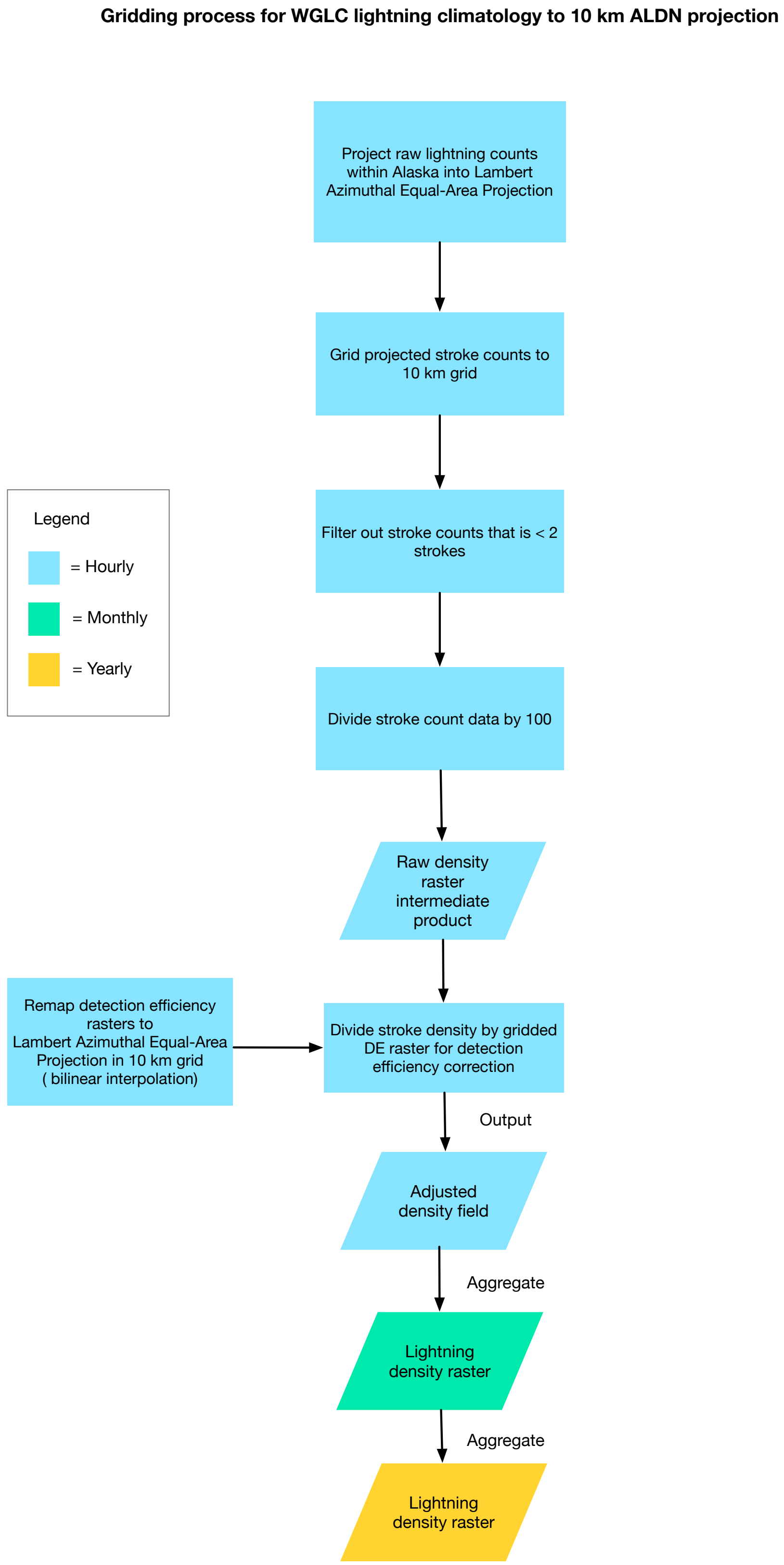

Figure S2. Flowchart of the gridding process for WGLC and ALDN stroke counts on to the 10 km equal-area grid for Alaska.

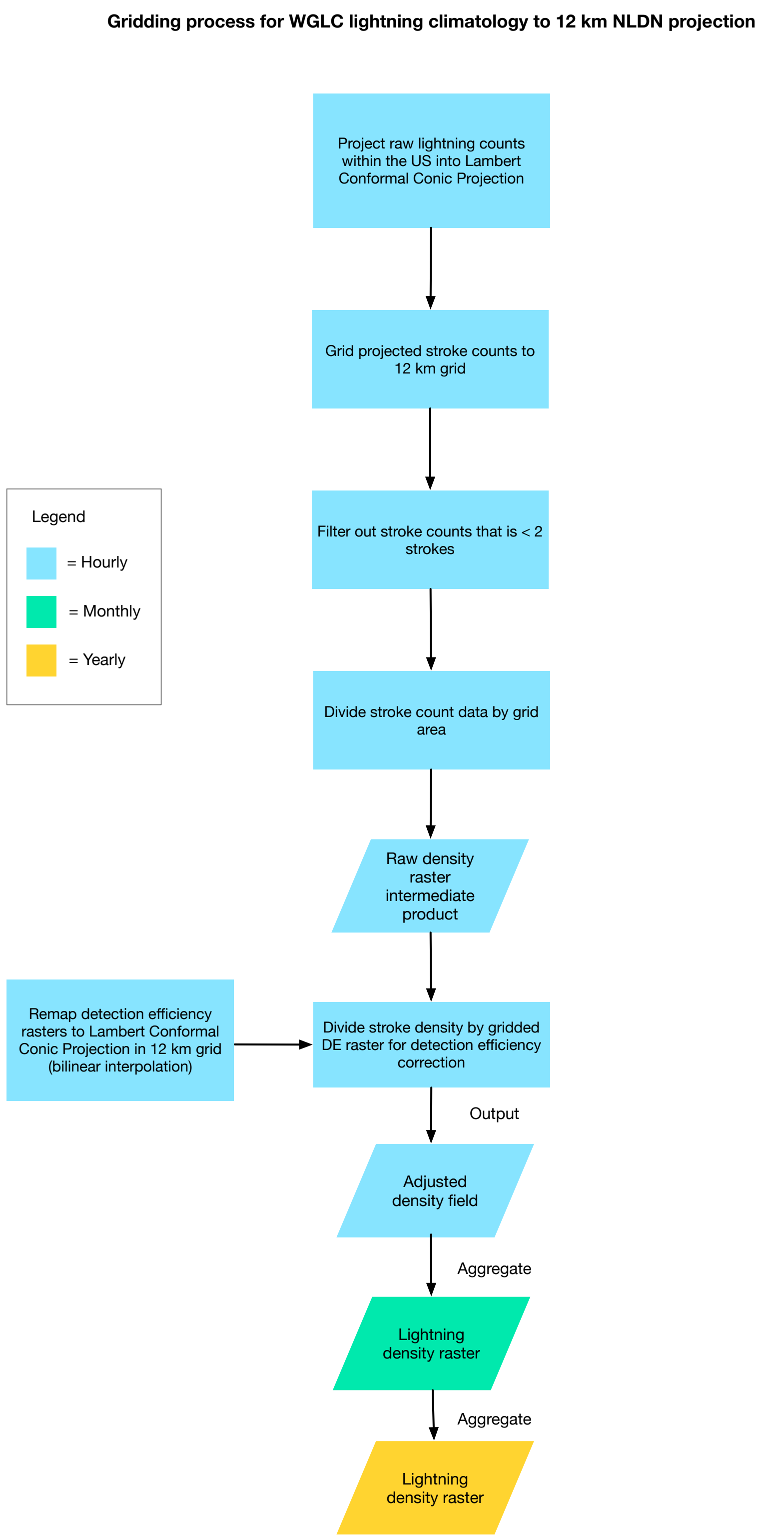

Figure S3. Flowchart of the gridding process for WGLC stroke counts on to the 12 km NLDN CMAQ grid

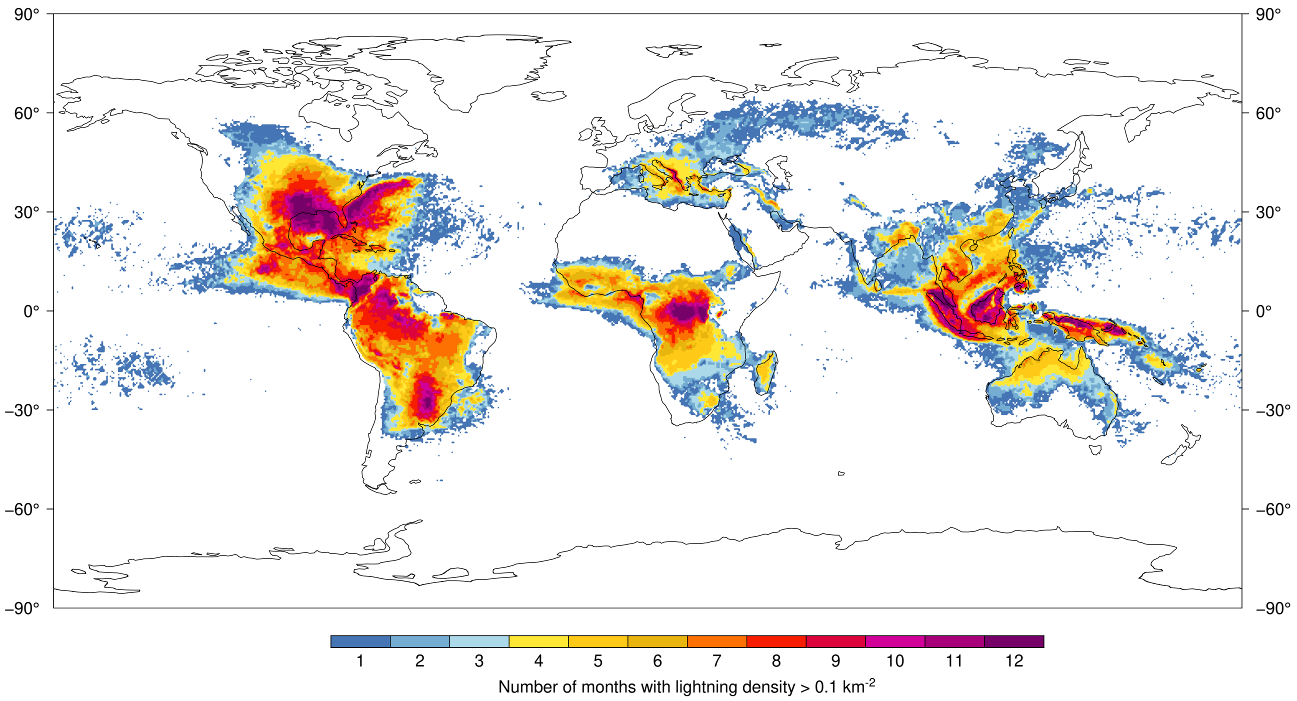

Figure S4. Number of months with lightning density greater than 0.1 km^2

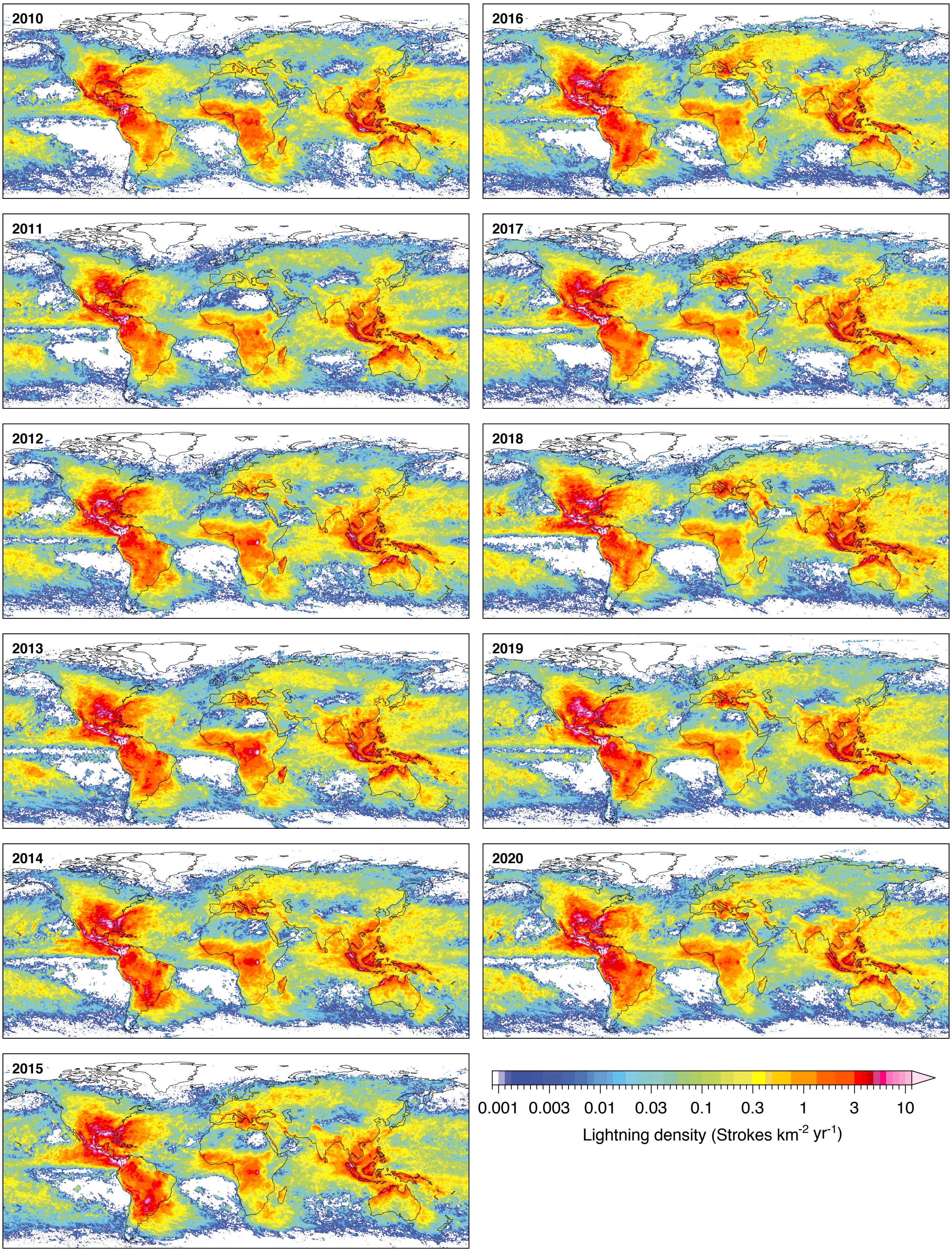

Figure S5. WGLC annual lightning density maps (2010-2020)

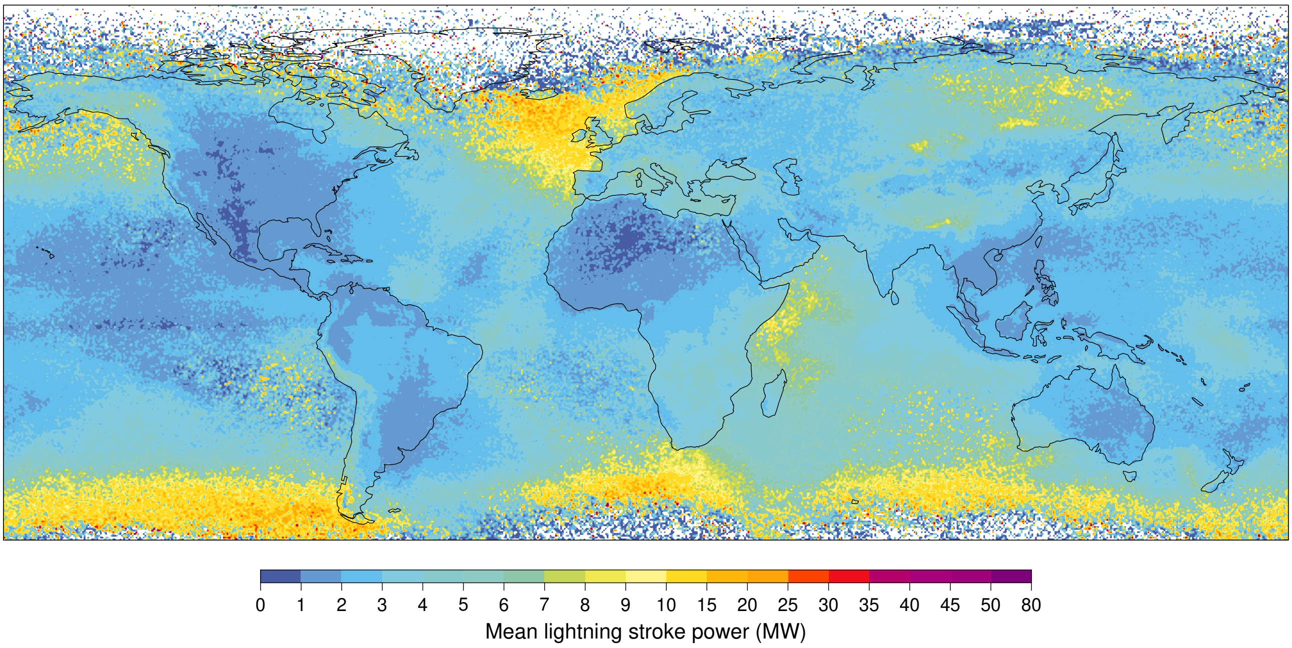

Figure S6. Climatological annual mean of the *mean* lightning power-per-stroke.

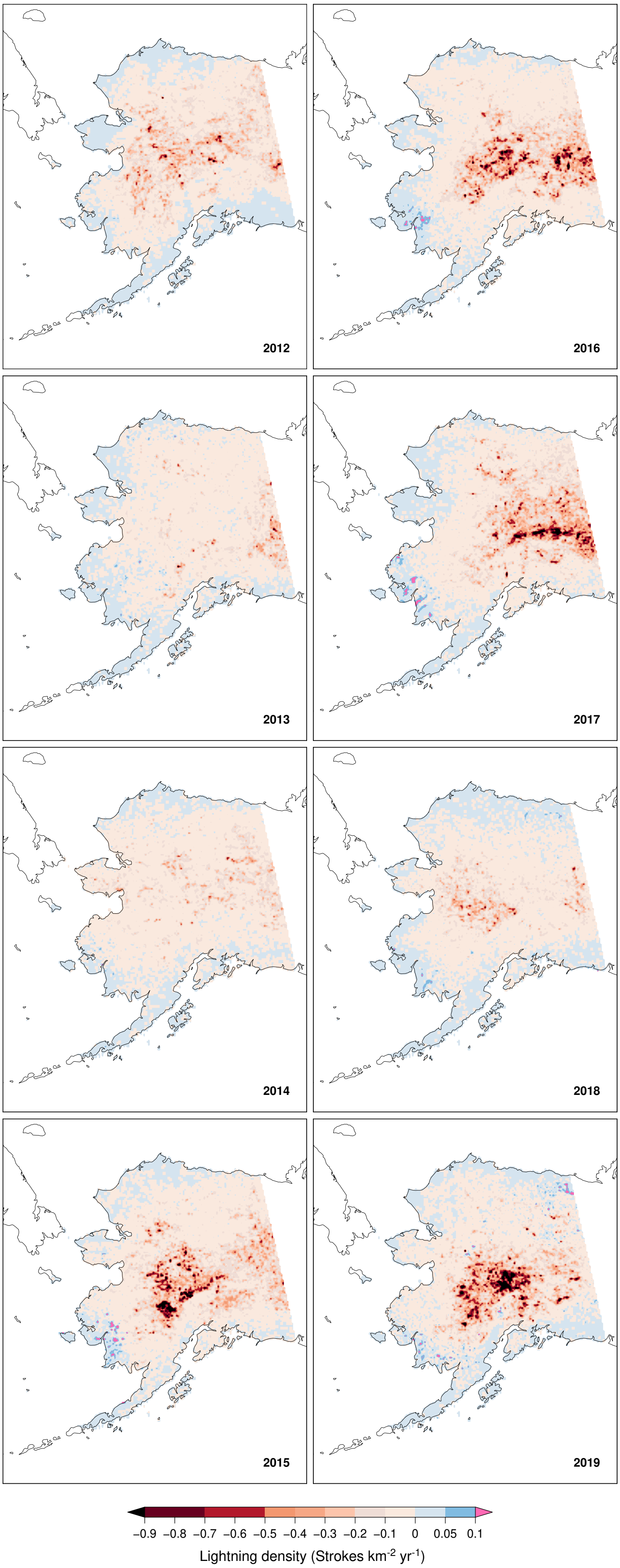

Figure S7. Differences in lightning stroke density between WGLC and ALDN. Red: ALDN > WGLC. Blue: WGLC > ALDN.

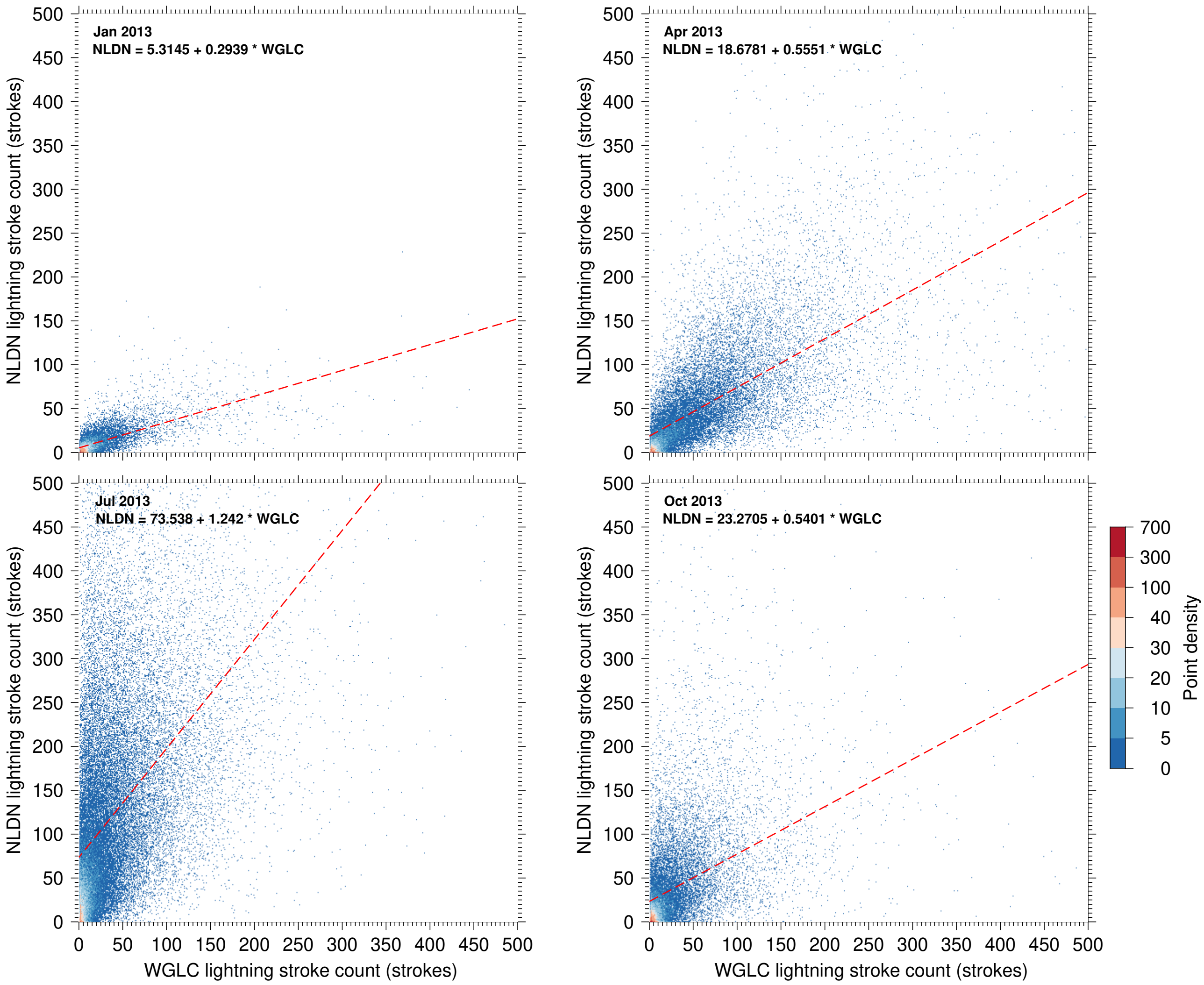

Figure S8. Examples of the relationship between WGLC and NLDN lightning stroke count in January, April, July, and October, 2013. The slope of the linear regression (red dashed line) shows the correlation between the two climatologies. WGLC generally records greater lightning density than NLDN outside of the peak season, with 1.8 times more lightning in April and October and 3.4 times during January.

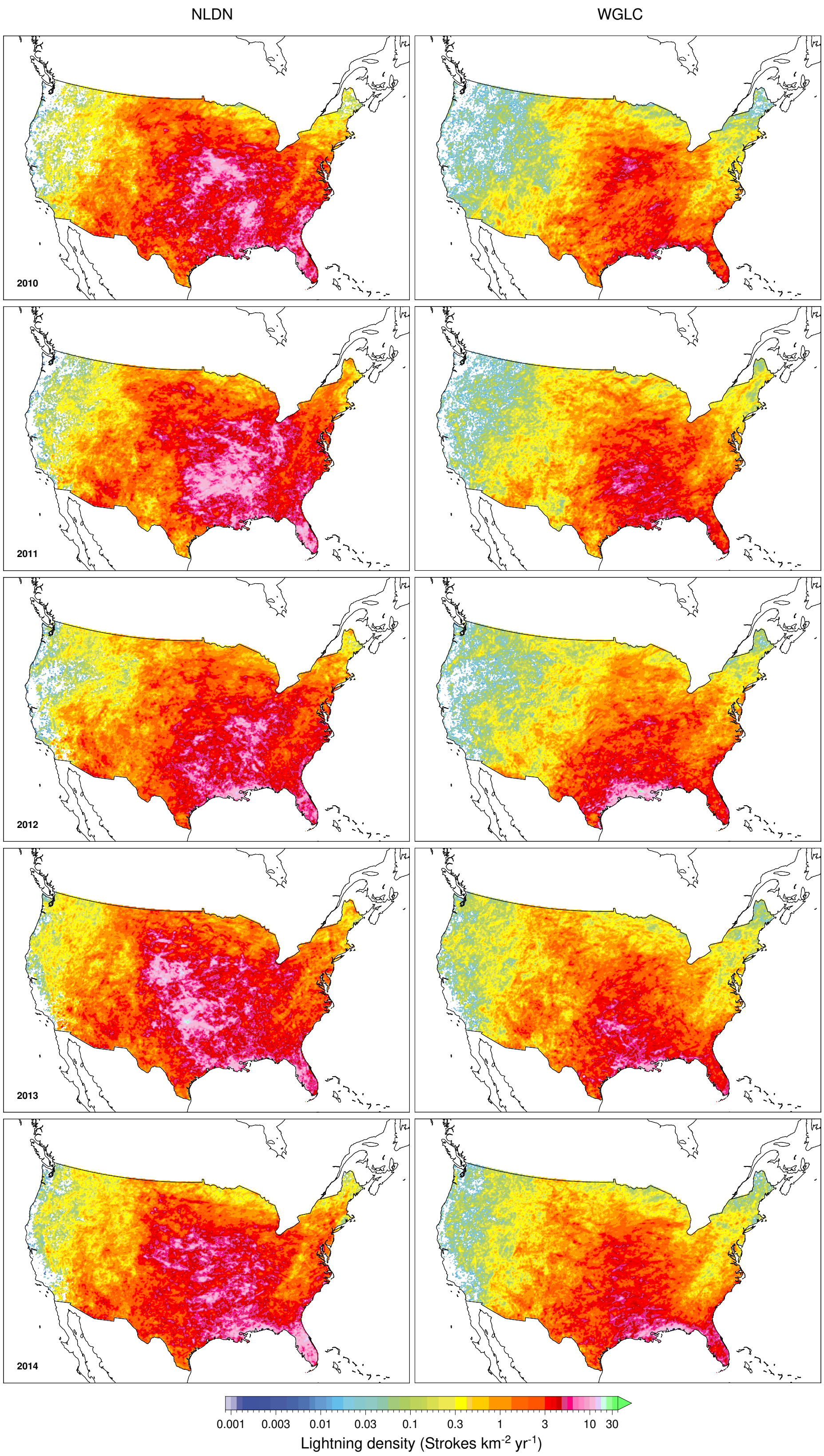

Figure S9. Annual mean lightning density in NLDN cloud-to-ground strokes (left column) and WGLC (right column) over the conterminous United States from 2010 to 2014 (12 km CMAQ grid).

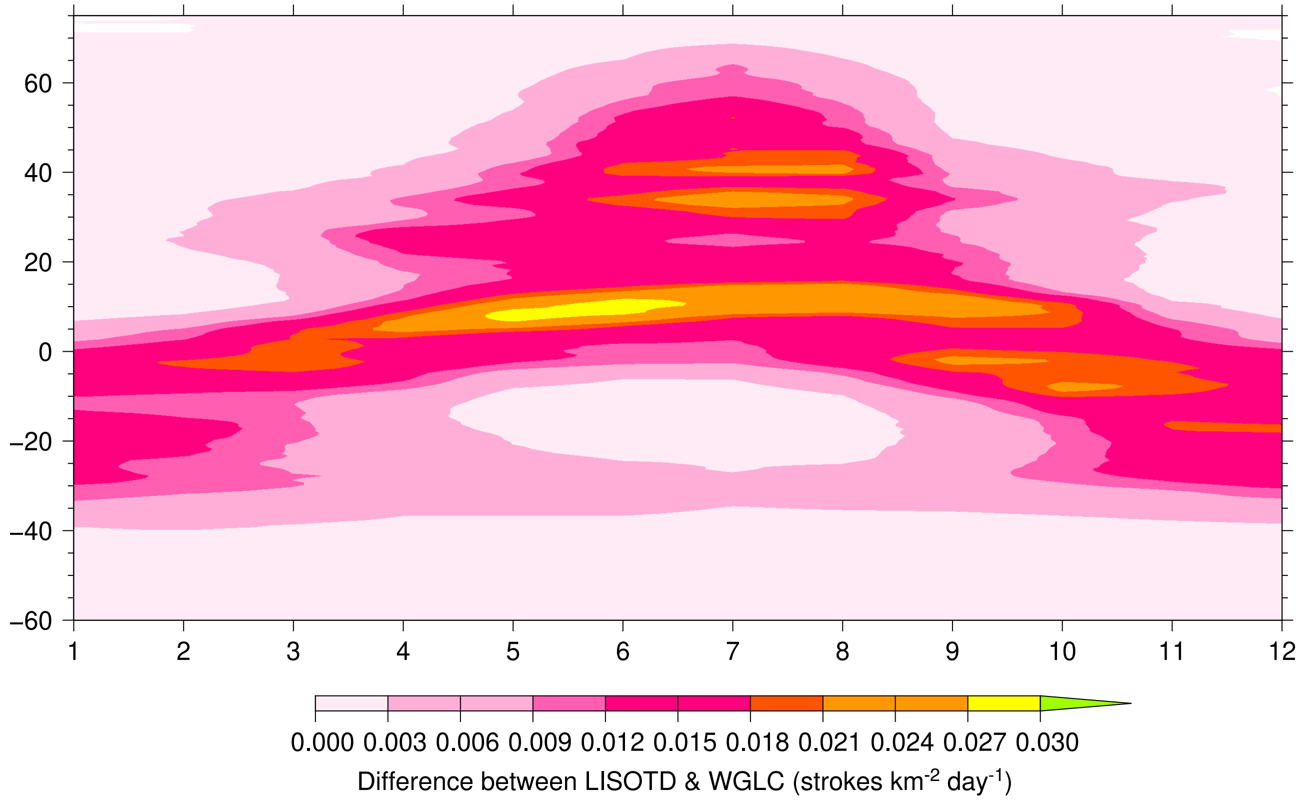

Figure S10. Temporal difference between LIS/OTD and WGLC. The largest differences are seen just north of the equator in May and June, just south of the Equator from September to December, and in the northern mid-latitudes in July and August.