TRMM LIS Climatology of Thunderstorm Occurrence and Conditional Lightning Flash Rates

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Lightning Flash Rate products include Mean Annual Flash Rate (the first map below, labeled HRFC_LIS_FR), Mean Annual Cycle (monthly and daily), Mean Diurnal Cycle (hourly), combined Annual Diurnal Cycle (2-hourly means for each day of year), and Time Series (smoothed daily and monthly values sequentially from 1998-2013). Cecil et al. (2015b) describe additional fields to be added to the lightning climatology grids after QC is complete for 2014-15, besides the mean flash rate that is already included:

• Fraction of Overpasses With Lightning (i.e., fractional thunderstorm occurrence for a grid box). LIS views a location for about 90 seconds during an overpass.
• Conditional Mean Flash Rate (mean flash rate excluding the times that have zero lightning)

All images on this poster use TRMM LIS data from 1998-2013. These and others are shown in Cecil et al. (2015b; Climate; open access at: http://dx.doi.org/10.1175/JCLI-D-15-0124.1).

Above: Mean Annual Flash Rate, 0.5° grid. The highest value (188 Flashes km⁻² yr⁻¹) is over Lake Maracaibo, Venezuela. Central Africa (far eastern Dem. Rep. Congo) ranks close behind. At coarser grid scales, Central Africa has the highest flash rates. Other regions with very high values (~100 Flashes km⁻² yr⁻¹) include other parts of Central Africa and the Northern Andes, Northern Pakistan (foothills of the Hindu Kush Mountains), and the Cameroon-Nigeria border.

Below: Fraction of TRMM Overpasses With Lightning (fractional thunderstorm occurrence for a 0.5° grid box). The far eastern DRC has thunderstorms most often (about 10% of TRMM overpasses), followed by Lake Maracaibo and the Northern Andes, and the Malacca Strait between Malaysia and Sumatra. More generally, tropical land regions and mountain chains stand out with high frequency of occurrence for thunderstorms.

This research benefits from over two decades of work by past and present members of the lightning team originally developed by Dennis Boccippio. Sponsorship and support for the OTD and LIS data is from the NASA Earth Observing System and the Tropical Rainfall Measuring Mission. LIS and OTD data, including the gridded climatologies produced here, are distributed by the NASA EOSDIS Global Hydrology Resource Center DAAC, Huntsville, AL, USA, http://lightning.nsstc.nasa.gov.