



## **Lightning climatology in the Congo Basin: detailed analysis**

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The lightning climatology of the Congo Basin including several countries of Central Africa is analyzed in detail for the first time. It is based on World Wide Lightning Location Network (WWLLN) data for the period from 2005 to 2013. A comparison of these data with the Lightning Imaging Sensor (LIS) data for the same period shows the WWLLN detection efficiency (DE) in the region increases from about 1.70 % in the beginning of the period to 5.90 % in 2013, relative to LIS data, but not uniformly over the whole  $2750 \text{ km} \times 2750 \text{ km}$  area. Both the annual flash density and the number of stormy days show sharp maximum values localized in eastern of Democratic Republic of Congo (DRC) and west of Kivu Lake, regardless of the reference year and the period of the year. These maxima reach  $12.86 \text{ fl km}^{-2}$  and 189 days, respectively, in 2013, and correspond with a very active region located at the rear of the Virunga mountain range characterised with summits that can reach 3000 m. The presence of this range plays a role in the thunderstorm development along the year. The estimation of this local maximum of the lightning density by taking into account the DE, leads to a value consistent with that of the global climatology by Christian et al. (2003) and other authors. Thus, a mean maximum value of about  $157 \text{ fl km}^{-2} \text{ y}^{-1}$  is found for the annual lightning density. The zonal distribution of the lightning flashes exhibits a maximum between  $1^{\circ}\text{S}$  and  $2^{\circ}\text{S}$  and about 56 % of the flashes located below the equator in the  $10^{\circ}\text{S} - 10^{\circ}\text{N}$  interval. The diurnal evolution of the flash rate has a maximum between 1400 and 1700 UTC, according to the reference year, in agreement with previous works in other regions of the world.