



Lightning climatology in the Congo Basin: methodology and first results

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The global climatology of lightning issued from space observations (OTD and LIS) clearly showed the maximum of the thunderstorm activity is located in a large area of the Congo Basin, especially in the Democratic Republic of Congo (DRC). The first goal of the present study is to compare observations from the World Wide Lightning Location Network (WWLLN) from the Lightning Imaging Sensor (LIS) over a 9-year period (2005-2013) in this 2750 km × 2750 km area. The second goal is to analyse the lightning activity in terms of time and space variability. The detection efficiency (DE) of the WWLLN relative to LIS has increased between 2005 and 2013, typically from about 1.70 % to 5.90 %, in agreement with previous results for other regions of the world. The mean monthly flash rate describes an annual cycle with a maximum between November and March and a minimum between June and August, associated with the ICTZ migration but not exactly symmetrical on both sides of the equator. The diurnal evolution of the flash rate has a maximum between 1400 and 1700 UTC, depending on the reference year, in agreement with previous works in other regions of the world. The annual flash density shows a sharp maximum localized in eastern DRC regardless of the reference year and the period of the year. This annual maximum systematically located west of Kivu Lake corresponds to that previously identified by many authors as the worldwide maximum which Christian et al. (2013) falsely attributed to Rwanda. Another more extended region within the Congo Basin exhibits moderately large values, especially during the beginning of the period analyzed. A comparison of both patterns of lightning density from the WWLLN and from LIS allows to validate the representativeness of this world network and to reconstitute the total lightning activity in terms of lightning density and rate.