

Decades of ground-based climate monitoring reveal evidence of climate change in the Congo Basin

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This multi-decadal study published in *Climatic Change* in October 2023 (<https://link.springer.com/article/10.1007/s10584-023-03606-0>) presents the results of analyses of a unique set of digitised daily temperature and precipitation data from the Yangambi Biosphere Reserve, part of the UNESCO MAB network, covering the period 1960–2020 (61 years) and located in the heart of the Congo Basin, where ground-based data are not available for the last two decades (with a decline rate of $\pm 40\%$). To extend our results to the Congo Basin, we compared ground-based climate observations at Yangambi with monthly temperature and precipitation data generated by satellites. Our results indicate a marked shift in rainfall patterns towards a more seasonal climate, with longer dry seasons and shorter but more intense rainy seasons. The change in precipitation patterns is accompanied by a strong warming trend, with a rapid increase in the frequency of hot days and nights and a decrease in the frequency of cool days and nights. This shift towards a warmer, more seasonal climate could have major consequences for life in general (agriculture, agroforestry, water resources, health, etc.) and for the composition and functioning of Congo Basin forests in particular. Our results corroborate the long-term increase in temperature and temperature extremes (since at least 1960) recently reported across Central Africa, and confirm a significant trend towards a drier dry season and an intensification of the rainy season since the early 2000s. Our results have scientific and policy implications. Climate monitoring networks in Congo Basin countries are becoming increasingly weak as they lack stable long-term funding. There is also a need for a broader policy on access to reliable climate data to monitor, among other things, the evolution of climate variability and climate change, and probably their local and regional societal impacts. In particular, there is an urgent need for effective and coherent funding of climate research in Congo Basin countries to improve real-time monitoring of climate change at national and regional levels, with a view to improving policies and strategies for the sustainable management of forests and other strategic natural resources at national and regional levels. The results of climate science will enable policy makers and all actors in multi-sectoral development to better address questions related to adaptation and mitigation strategies for each sector of life in the face of climate change impacts. We therefore argue that this article provides important new information in the Congo Basin on (i) the importance of digitising archives and continuing to monitor ground-based climate observations, (ii) the modelling of drought and humidity based on meteorological indices, (iii) confirmation of the ongoing shift towards a warmer and more seasonal climate, (iv) the dynamics of climate change and climate variability and their impact on populations and natural resources at local, regional and continental levels, and (v) strengthening and improving international, regional and national negotiation strategies on climate economics. This information is likely to be of interest to a wide audience in the field of climate change and sustainable development.

Keywords

Climate change, Congo Basin, Warming, Precipitation seasonality, Station coverage