Research brief
Africa's greenhouse gas emissions exceeding its sink capacity

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Abstract

Rising greenhouse gas (GHG) emissions in Africa is a cause for concern. With a growing population and its associated requirements for energy, food and socio-economic development, climate change impacts will further exacerbate the current trend. A recent greenhouse gas budget for Africa synthesised the most current and comprehensive modelling and observational data available for the period 2010-2019 (Ernst et al. 2024), showing that the continent has likely become a net carbon source to the atmosphere. In this Research brief, the key findings of the GHG budget for Africa is highlighted.

The most recent GHG budget for the African region, as part of the Regional Carbon Cycle Assessment and Processes Phase II project (RECCAP2) aimed to interrogate the most recent GHG flux estimates using bottom-up approaches and reconciling these estimates with top-down atmospheric inversion estimates. This synthesis improved on the previous budget through incorporating novel methodologies, new African-specific data sets and including improved estimates of the contributing component fluxes. The components with improved estimates included (among others) geological and aquatic fluxes, emissions from termites, peatland loss rates, fire emission estimates and lateral fluxes, but the final estimates highlighted that emissions from land use change (1.7 (0.8/2.7) $PgCO_2eq\ yr^{-1}$) and fossil fuels (1.74 (1.53/1.96) $PgCO_2eq\ yr^{-1}$) were the most influential components impacting the budget.

Despite terrestrial ecosystems continuing to support a large CO_2 sink of an average of 0.8 billion tons of carbon (~20% of the global land CO_2 sink), land conversion in the form of agricultural expansion and intensification has increased substantially. As this key component is expected to contribute significantly into the future and is still associated with high uncertainty, it will require directed effort to improve categorisation of land use and land cover data at finer spatial and temporal resolutions, and increased field observations to verify satellite products.

Closely associated with the land component, emissions from wildfire (46% and 65% contribution to the global fire emissions) decreased over the period, but the authors point out that land conversion for agricultural purposes and increasing methane emissions from livestock (0.48 (0.248/0.585) $PgCO_2eq\ yr^{-1}$) could substitute the estimated decrease. Importantly, fuelwood burning has increased over the period and is expected to continue to grow while African countries struggle to meet energy demands.

The updated GHG budget is key to identify the most important aspects for mitigation and management. Shifts to carbon neutral energy sources can possibly remove up to 30% of the current fossil fuel emissions, but emissions from land use change are more challenging to reduce. For Africa to meet its own climate responsibilities and unlock potential from the increasing international carbon trade demand (e.g. Jones, 2023; Yang et al., 2023), the continents' development trajectory will have to move swiftly towards carbon-neutrality. This will however require policy development and implementation, as well as global commitment for financial and technical support to address the socio-economic challenges that hinder climate mitigation progress. Coupled with this, the uncertainties in the budget highlight the need for the expansion of the GHG observation network across Africa, intensifying field observations and empirical studies, development of models specific to the African context and enabling more consistent reporting in national data inventories.

References

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