Tropentag, September 11-13, 2024, hybrid conference

"Exploring opportunities …
for managing natural resources and a better life for all"

Filling gaps in landscape fires detection, emission and management in Africa

Boris Ouattara[1], Kwame Hackman[2]

[1] *Thünen Institute for Climate-Smart Agriculture, Germany*

[2] *West African Science Service Center on Climate Change and Adapted Land Use (WASCAL), Burkina Faso*

Abstract

Biomass burning plays a pivotal role in shaping ecosystems and influencing atmospheric dynamics. Access to accurate and current information on burned areas (BA) is essential for comprehending the root causes of fires and their subsequent impacts. Various countries have been experimenting with BA mapping products within diverse fire monitoring systems. However, a holistic approach to wildfire prevention has been hindered by the absence of standardised information on fires, particularly in West Africa. This study introduces two products from our fire information system tool aimed at addressing the gap in fire and emission measurement, monitoring, statistical analysis, and reporting. This system represents a comprehensive fire management solution leveraging Earth observation data, notably the Visible Infrared Imaging Radiometer Suite (VIIRS) remote sensing technology. The first product, VIIRS-BA, is a BA dataset generated at a 250 m resolution using the Google Earth Engine cloud computing environment. The second, VIIRS-EM, estimates fire-induced greenhouse gases and aerosols for 40 species employing the fire radiative power approach. Our emission inventory offers a spatial resolution that can be adjusted to a minimum of 375 m. Enhancements in input data, particularly through increased spatial resolution, hold promise for significantly improving the accuracy of fire activity detection and monitoring efforts, particularly for small fires often overlooked by current emission inventories. These delivered products, serving as climate and ecosystem services, align with the objective of empowering decision-making and policy development regarding fire monitoring, emissions, and mitigation strategies in the African region. These tools will be overseen by the West African Science Service Centre on Climate Change and Adapted Land Use (WASCAL) competence center. Case studies will be utilised to demonstrate their practical applications, potentially positioning WASCAL as a primary provider of wildfire and smoke-related services in Africa. For end-users, the outputs will be integrated into local to regional-level geographic information system formats. The findings derived from this research could prove invaluable in the planning and monitoring of prescribed burns, and they may also serve as a baseline for future fire mitigation projects.

Keywords: Biomass burning, climate, ecosystem services, earth observation, fire management, emissions, sub-Saharan Africa

Contact Address: Boris Ouattara, Thünen Institute for Climate-Smart Agriculture, Braunschweig, Germany, e-mail: boris.ouattara@thuenen.de