

Displacement Across the Continent: A Data-Driven Analysis of Conflict and Disaster Trends in Africa, 2008-2023¹

**Submitted in partial fulfillment of the requirements for GOV 395L –
Making Big Data**

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Abstract:

This project explores internal displacement in Africa between 2008 and 2023, focusing on two major drivers—conflict and natural disasters. Drawing from data provided by the Internal Displacement Monitoring Centre (IDMC) and the Armed Conflict Location & Event Data Project (ACLED), we map and analyze the spatial and temporal patterns of displacement across the continent. Our goal is not just to track where people are displaced from, but to understand how the nature and intensity of conflict or disaster contribute to long-term and short-term population movements. By merging these sources and creating new regional indicators, displacement maps, and conflict heat layers, we generate a composite data product that supports deeper spatial and temporal analysis. The results show clear regional differences in displacement drivers, with conflict dominating in places like East Africa and the Sahel, and disasters playing a stronger role in Southern Africa. We also find evidence that displacement due to conflict tends to be longer lasting, with growing numbers of people unable to return home. Taken together, our analysis provides a foundation for future work on vulnerability, humanitarian response, and the evolving geography of internal displacement.

¹ [Emeka Joseph GitHub link to BigData Class Project 2025](#)

Introduction

In the past decade, Africa has witnessed a troubling rise in the number of people forcibly displaced within their own countries. Whether driven by violent conflict or environmental disasters, internal displacement remains a persistent humanitarian challenge that strains the capacities of governments and aid organizations alike. In this project, we explore how displacement patterns have evolved across the continent between 2008 and 2023, focusing specifically on the distinctions between conflict-related and disaster-induced internal displacement.

We began with a simple yet important question: How has internal displacement in Africa shifted over time, and what does the data tell us about the scale and nature of these movements? Drawing on displacement figures from the Internal Displacement Monitoring Centre (IDMC) and geocoded conflict event data from the Armed Conflict Location & Event Data Project (ACLED), we examine both temporal trends and regional dynamics. Our goal is not only to visualize these changes but to also offer a clearer understanding of where humanitarian attention may need to be concentrated.

This paper contributes to ongoing discussions in humanitarian data science by pairing descriptive visual analysis with conflict mapping techniques. In doing so, we respond to broader calls in the literature for more integrative approaches that combine temporal, spatial, and thematic dimensions of displacement (de Sherbinin et al. 2019; UNHCR 2023). Ultimately, we hope our findings will serve as a useful reference for researchers and practitioners seeking to understand the evolving landscape of internal displacement in Africa.

Background/Literature

Internal displacement remains one of the most complex and persistent humanitarian challenges in Africa. Unlike cross-border refugee flows, internally displaced persons (IDPs) remain within their country's borders, often receiving fragmented or inadequate assistance. Scholars and humanitarian organizations have emphasized the importance of distinguishing between conflict-induced displacement and disaster-related displacement, both in terms of response needs and long-term planning (Kälin and Chapuisat 2017; UNHCR 2023). Across Africa, these two drivers frequently overlap, particularly in regions vulnerable to both political instability and environmental stress.

Recent studies underscore how advances in data infrastructure are transforming the study of displacement. Tools such as the Internal Displacement Monitoring Centre (IDMC)² and ACLED³ databases have improved the availability of georeferenced, time-series data that allows for more rigorous analysis of when and where displacement occurs. In particular, the IDMC's distinction between *stock* (total number displaced) and *flow* (newly displaced) populations opens up new avenues for understanding the cumulative burden versus sudden-onset crises.

Big data approaches have also been applied to analyze displacement related to environmental shocks. de Sherbinin et al. (2019), for instance, argue that integrating satellite imagery, climate

² Internal Displacement Monitoring Centre (2023)

³ Armed Conflict Location & Event Data Project (ACLED) (2024) Raleigh et al. (2010)

data, and ground-level reporting can help track population movements following floods, droughts, and other extreme events. Though such methods are still evolving, they highlight the growing role of non-traditional data in humanitarian research.

This project contributes to this literature by leveraging publicly available datasets to visualize trends in internal displacement across Africa between 2008 and 2023. Rather than focusing on a single country or crisis, we take a continent-wide approach that distinguishes between conflict- and disaster-related displacements and explores how patterns vary across regions. In doing so, we aim to provide a more holistic view of internal mobility in Africa and demonstrate the value of combining spatial and temporal analysis in the study of humanitarian crises.

Data and Method

This project relies on two publicly available datasets: the Internal Displacement Monitoring Centre (IDMC) displacement database and the Armed Conflict Location & Event Data Project (ACLED) conflict event records. Together, these sources provide a basis for understanding how internal displacement trends across Africa have evolved over time and how they relate to underlying conflict intensity.

For displacement data, we used the IDMC's compiled figures on disaster- and conflict-induced displacement from 2008 to 2023. The dataset distinguishes between stock and flow estimates, which allowed us to visualize cumulative versus new displacement patterns across the continent. We cleaned the Excel file in R and filtered for African countries based on UN-recognized regions. Each row was tagged with a displacement type—conflict or disaster—and categorized accordingly. We aggregated the values annually and summarized them at the regional level (e.g., East, West, Central, Southern, and North Africa). These transformations were conducted using standard tidyverse packages (*dplyr*, *tidyr*, and *readxl*), with visualizations built in *ggplot2*.

For the conflict intensity layer, we used geocoded data from ACLED covering 2008–2023. The goal here was to produce a heat map that highlights spatial clustering of conflict events, overlaid onto a map of Africa. After filtering the dataset to include only African countries, we used *sf*, *rnatrualearth*, and *ggspatial* packages to map conflict hotspots and assign intensity based on event density. The resulting figure helps to visually link the prevalence of violence to the flow of displaced populations across different regions.

All data manipulation and plotting scripts were written in R and are included as supplementary files. The main *.qmd* file details the time-series plots of internal displacement, while a second script contains the spatial visualization of ACLED conflict patterns. These files are available upon request and will also be included in a GitHub repository for reproducibility.

Choosing to combine displacement and conflict datasets over a 15-year window gave us a clearer picture of how crises evolve across regions and time. The visual strategy—juxtaposing temporal trends with spatial intensity—allowed us to detect not just *how much* displacement occurred, but also *where* and potentially *why*. Working with raw, messy datasets challenged us to make practical decisions on filtering, aggregation, and scale, which is at the heart of big data work.

Results and Discussion

Figure 1 gives us a broad view of internal displacement trends across Africa from 2008 to 2023, comparing those driven by conflict versus natural disasters. A clear pattern stands out: conflict consistently displaces far more people than disasters. Notable spikes in conflict-related displacement show up in 2013, 2014, 2017, and again in 2021. While disaster-induced displacement fluctuates, it generally stays at lower levels. This consistent pattern of conflict-induced movement suggests ongoing instability in certain regions and highlights just how enduring political violence can be compared to environmental shocks.

Figure 1: Internal Displacement in Africa: Conflict vs. Disaster (2008–2023)

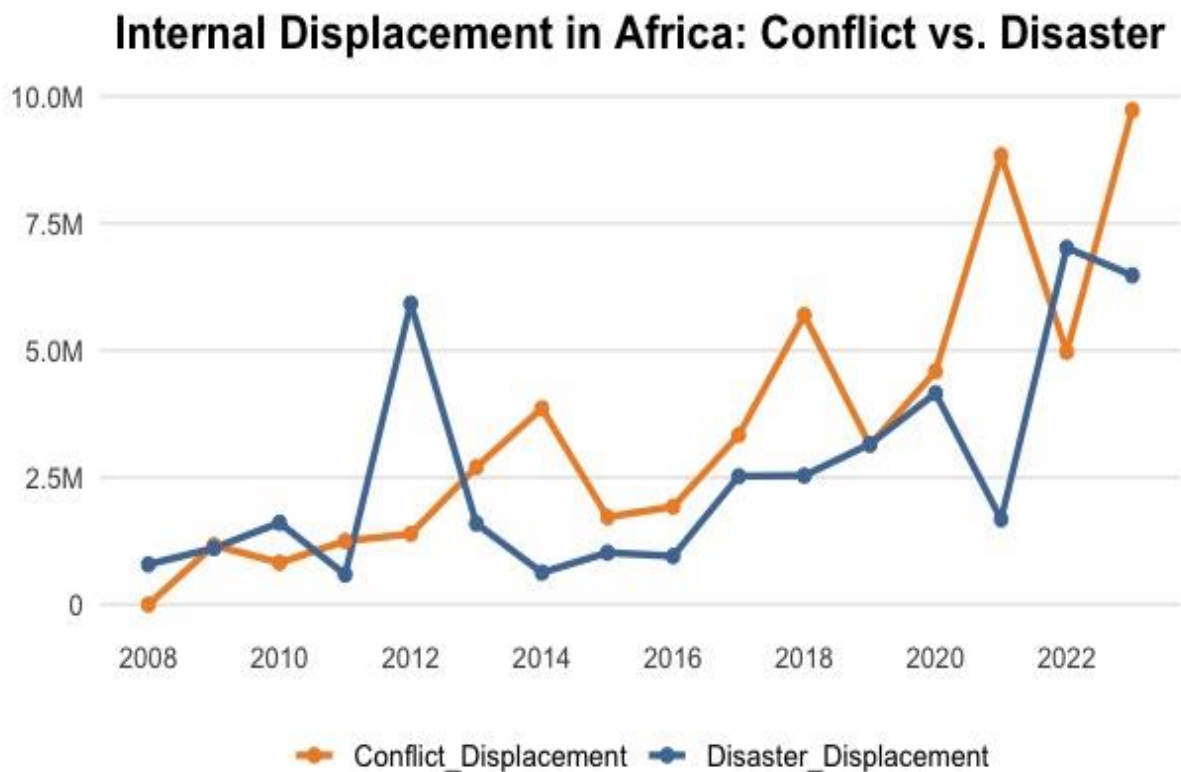


Figure 2 dives deeper into conflict displacement by breaking it into two parts: the total number of people displaced over time (stock) and the newly displaced each year (flow). The stock keeps growing steadily, while the flow shows sharp spikes in certain years—especially around 2013 and 2021—echoing what we saw in Figure 1. What’s striking is how the gap between stock and flow widens after 2014, suggesting many displaced individuals are stuck in long-term displacement situations, unable to return home. It’s not just repeated crises; it’s an accumulation of unresolved ones.

Figure 2: Stock vs. Flow Trends in Conflict Displacement

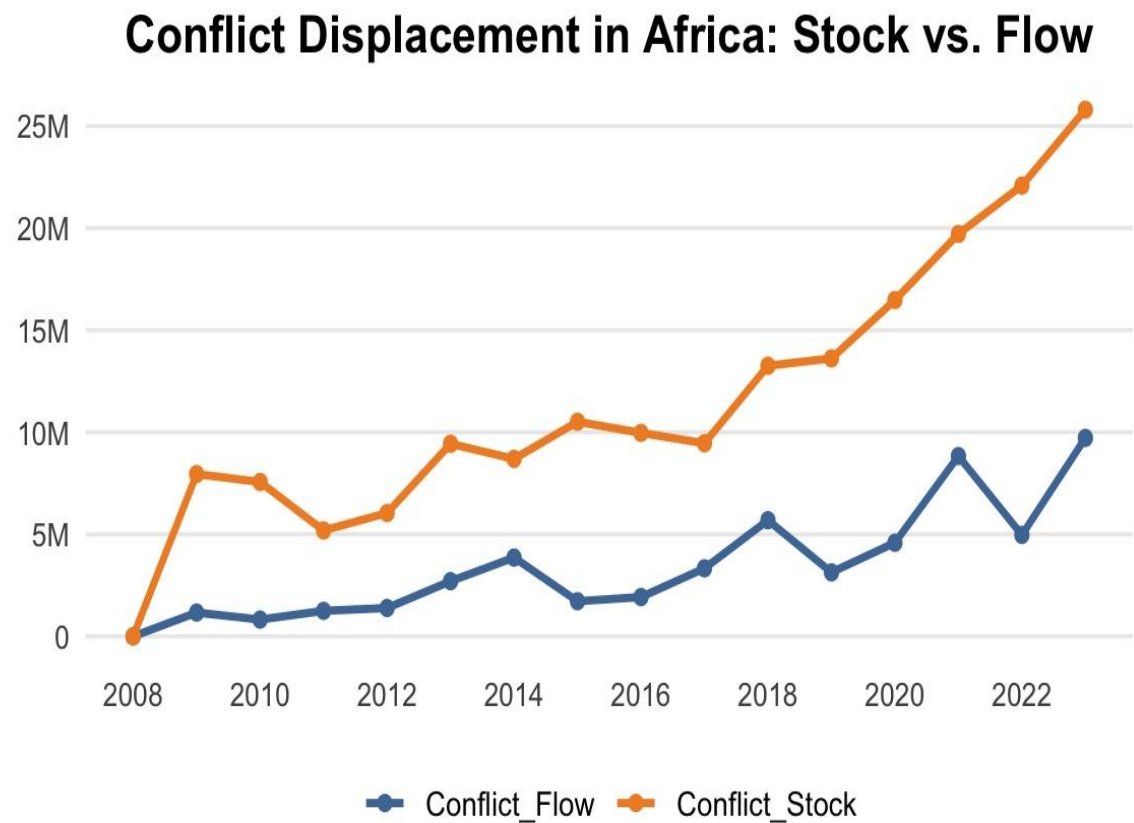


Figure 3 breaks things down by region. West and East Africa stand out with the highest displacement numbers. East Africa sees more conflict-related movement, especially in countries like South Sudan, Ethiopia, and Somalia. In Southern Africa, disasters play a bigger role—hinting at climate-related vulnerability in that zone. Central Africa is also hit hard by conflict, particularly in the DRC. These patterns remind us that while the continent faces shared challenges, the roots and scale of displacement vary widely across regions.

Figure 3: Regional Breakdown of Conflict vs. Disaster Displacement

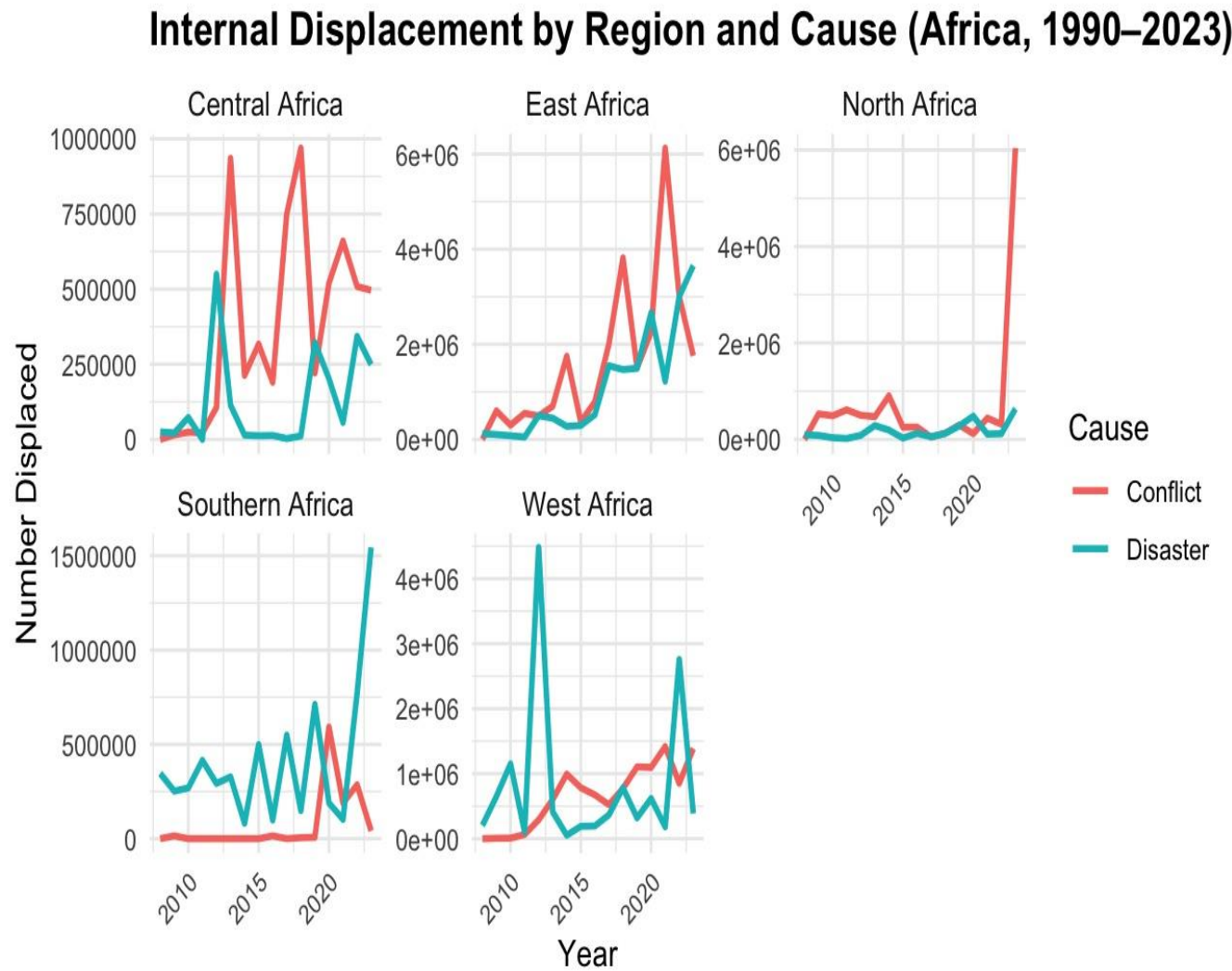


Figure 4 uses ACLED data to give us a heat map of conflict intensity. The hotspots light up across the Sahel (like Mali and Burkina Faso), the Horn of Africa (especially South Sudan and Somalia), and parts of Central Africa (mainly eastern DRC). These align closely with regions flagged in the IDMC displacement data, confirming that these are not just violent areas—they're areas where violence leads to widespread forced migration.

Figure 4: ACLED Conflict Heat Map

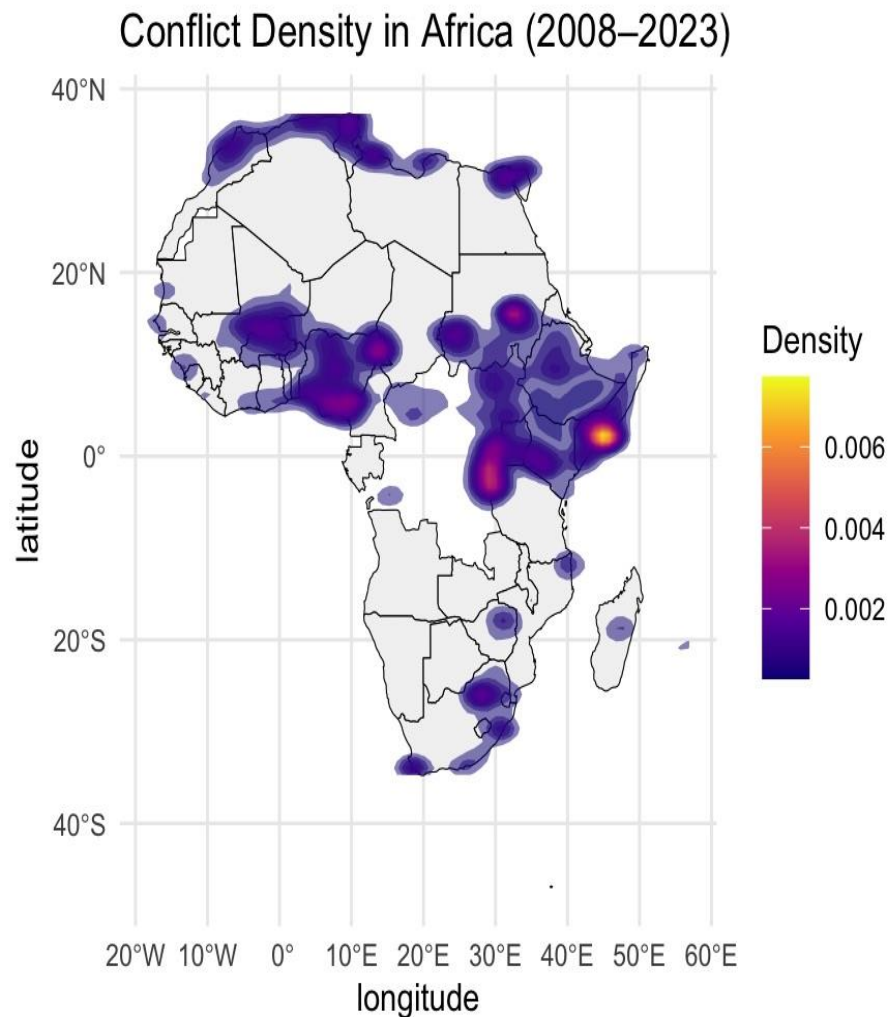
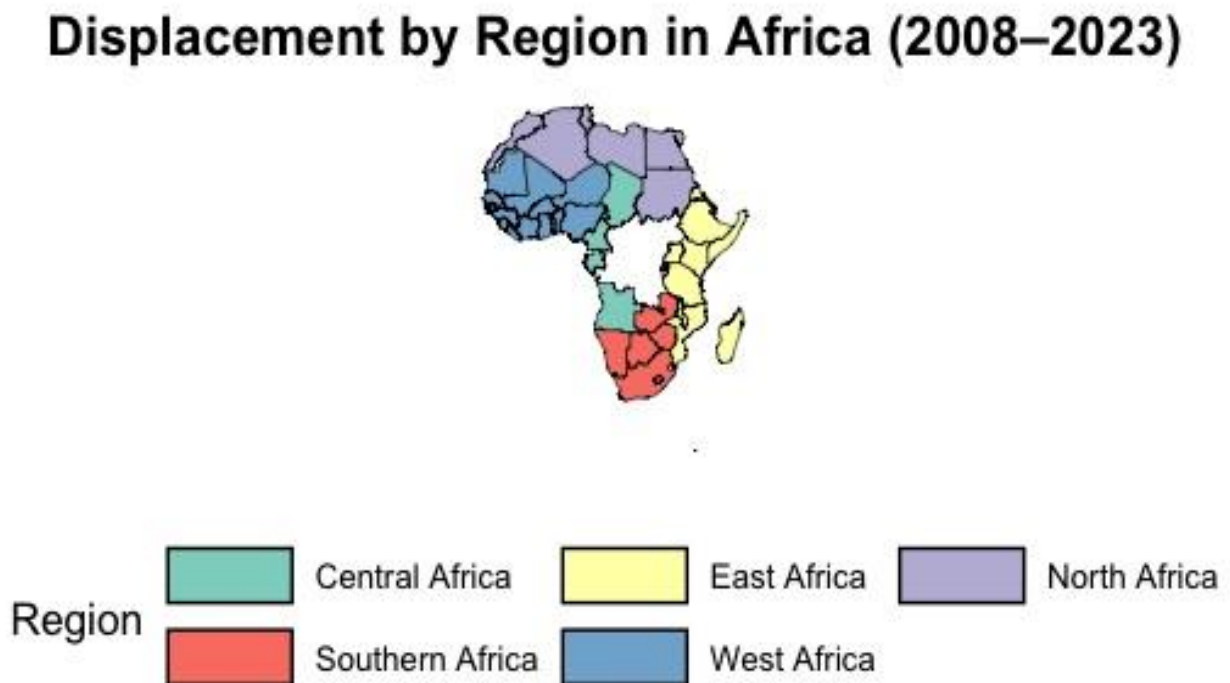


Figure 5 offers a geographic overview of displacement types. The map highlights clear regional distinctions: West Africa faces dual pressures from conflict and disaster, while North Africa has seen relatively fewer displacement cases in recent years. This kind of spatial lens gives us a clearer sense of where interventions might be needed most and how different causes of displacement shape regional experiences.

Figure 5: Displacement by Region Map



Altogether, these figures lead to three big takeaways: First, conflict is still the main driver of internal displacement in Africa. Second, displacement is not evenly spread—it shifts across time and space. And third, bringing together time-series trends and spatial data helps us tell a fuller story than either could on its own. By blending insights from IDMC and ACLED, we get a richer understanding of both the patterns and the places behind displacement. This matters not just for research, but for the organizations on the ground trying to address it in real time.

Conclusion and Next Steps

In sum, our project shows how conflict remains the dominant driver of internal displacement across Africa, with certain regions experiencing prolonged and repeated upheaval. The trends are not static; they reveal surges, shifts, and accumulations of displacement that must inform how we think about humanitarian interventions. Overlaying ACLED conflict data on IDMC displacement trends allows us to see not only where conflict is happening, but where it leads to significant population movement. This kind of integration strengthens both our descriptive power and our ability to identify high-risk zones.

Going forward, there are several directions this project could take. First, we could disaggregate the analysis to the country level, zooming into specific cases like Nigeria, South Sudan, or the DRC to better understand how conflict and disaster interact in localized settings. Second, incorporating demographic data—such as age, gender, or urban vs. rural origin—would allow us to ask deeper questions about vulnerability and resilience among displaced populations. Third, we can explore the role of international aid responses by bringing in datasets on humanitarian spending and interventions.

Finally, given how visual our findings are, a natural next step is to make this data accessible beyond the classroom. We've done that by uploading our project—including the full write-up, R scripts, and visualizations—to GitHub: [Big Data Class Project](#). We hope it serves as a resource for others—students, researchers, and practitioners—interested in understanding displacement dynamics across Africa.

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