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Title: Are Refugee Camps Refuges? A Spatially Explicit Analysis of Security Threats to African Refugee Camps (1997-2016)

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Despite the growth of the global refugee population, the proliferation of refugee camps, and the personal experiences of many refugees with violent conflict, there is little systematic understanding of the relationships between conflict events, conflict actors, and refugee communities. Indeed, conflict in and around refugee camps has thus far only been explored through local-scale case studies, on a per-camp basis. The purposes of this thesis are 1) to offer an improved understanding of the spatiality and frequency of conflict events near refugee camps and 2) to assess evidence of systematic targeting of refugees by specific actors (e.g. insurgent, state forces, or others). For the first objective, spatial-statistical methods are used to assess conflict event proximity and clustering around refugee camps and to detect changes in spatial patterns of ongoing conflict following refugee camp creation. For the second objective, five specific actors' patterns of conflict are determined to detect frequent proximity to refugee camps, to measure spatial clustering, and to identify refugee populations most frequently targeted. The first investigation finds conflict events within 10 km of 37% of refugee camps, detects statistically significant clustering of conflict events around refugee camps, and shows that conflict events typically move closer to refugee camps by an average of 11 km following camp

creation. These results show that many refugee camps face security threats from frequent, close conflict events. The second investigation finds examples of both insurgents and state forces that have instigated hundreds of conflict events within 10 km of refugee camps, predominantly targeting civilian populations in these near-camp events, and exhibiting statistically significant spatial clustering around refugee camps. These actors' patterns of conflicts suggest deliberate and repeat targeting of refugee camps. Both investigations show that refugee camps face significant security threats and suggest that further research is imperative in order to further characterize and mitigate the persistent threat of conflict near refugee camps.

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Are Refugee Camps Refuges?
A Spatially Explicit Analysis of Security Threats to African Refugee Camps (1997-2016)

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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

Frieda Fein, Author

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CONTRIBUTION OF AUTHORS

Dr. Jamon Van Den Hoek was involved in the design and interpretation of findings. He contributed to the revision process of the manuscript.

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1. Introduction

1.1 The Global Refugee Crisis

By the end of 2016, there were 22.5 million refugees worldwide under the protection of the United Nations High Commissioner for Refugees (UNHCR). This was the largest refugee population ever recorded, and followed 3.4 million new refugee status claims in 2016, which far exceeded the 500,000 refugees who returned to their home countries that year (UNHCR, 2018). Being a refugee is a legal status, granted by the UNHCR, and offers specific protections under the agency's mandate. The 1951 Refugee Convention, ratified by the United Nations at the end of World War II, defines refugee status and enumerates the legal protections guaranteed to refugees. Under this definition, a refugee is any person who:

> … owing to well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country; or who, not having a nationality and being outside the country of his former habitual residence as a result of such events, is unable or, owing to such fear, is unwilling to return to it. (UNHCR, 2011)

Essentially, a refugee must have been forced to leave their home country and cross a national border to seek asylum, and the motivation for this international migration must be driven by persecution or violence.

If an asylum seeker meets the qualification for refugee status, the status guarantees them certain protections. These include "fundamental principles" such as non-penalization for illegal entrance or residency in the host country before refugee status was granted, and non-

refoulement, meaning that refugees cannot be forced to return to the home country from which they were initially forced to flee (UNHCR, 2011). The Convention also guarantees "minimum standards for treatment of refugees," including equal protection under host nation law, access to education, and the right to shelter (UNHCR, 2011), which may take a variety of forms. Refugees may, for example, find their own housing in an urban area (UNHCR, 2009), host nations may provide refugees with housing in existing settlements (e.g. RAP, 2018), or host nations may provide housing in settlements specifically designed and constructed to house refugee populations, i.e. "refugee camps". Current estimates suggest one-third of the global UNHCR refugee population resides in refugee camps (UNHCR, 2016). However, camps have historically been built assuming that refugee residency will be temporary, on the order of a few years, and have housed refugees in tents or other semi-permanent structures (McClelland, 2014).

1.2 Global Geography of Refugee Camps

Since the growth of the global refugee population is far outpacing the rate at which refugees return home, there are ever more refugee camps in operation. As of 2016, there were 1,317 refugee camps in 125 countries (Koren, 2016), with many countries hosting numerous camps, for example: 24 camps in Uganda and 55 in Ghana (UNHCR Lebanon, 2017). The geographic distribution of refugee camps has become increasingly diffuse as well (Figure 1.1). In the 1990s most camps were established in Africa, with a few camps in Europe and Asia – predominantly, the Middle East and South Asia. Beginning in the early 2000s, however, UNHCR camps have been built on all continents except Antarctica. These refugee camps are hardly temporary; the average residency period for refugees living in camps is 17 years

(UNHCR, 2014) though this value is subject to debate (e.g. Devictor and Do, 2016). This

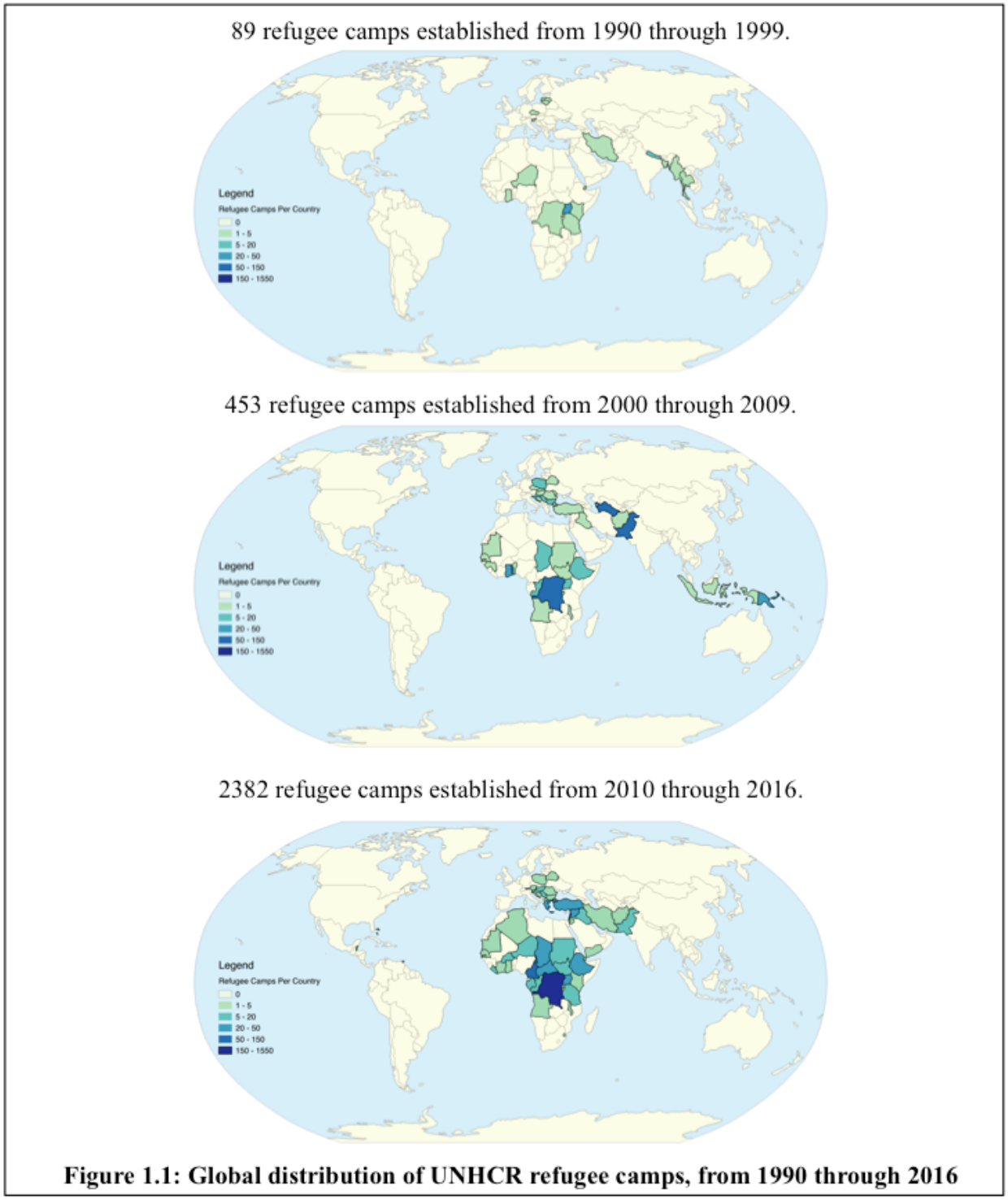

Figure 1.1: Global distribution of UNHCR refugee camps, from 1990 through 2016

protracted residency period presents challenges to the long-term protection of refugees in camps, especially given the large and growing population of refugees (Steiner et al., 2012).

Despite the UNHCR's guarantee to a refugee's right to shelter, the frequency at which UNHCR refugee camps have been constructed, and the duration of refuge camp occupation, there remains no legal framework that defines refugee camp construction practices, details requirements of services offered within refugee camps, or describes the geographic criteria for selecting a camp location. The UNHCR and various humanitarian aid organizations such as Médecins San Frontières (Doctors without Borders) and the Norwegian Refugee Council (NRC) have, however, published handbooks on general principles of site design for establishing a refugee camp (e.g. Birkeland and Vermeulen, 2004; Médecins San Frontières, 1996; UNHCR, 2007). These handbooks cover topics from the immediately practical – such as optimizing space to fit large populations, and maintaining public health via water sanitation and hygiene best practices – to issues affecting the long-term stability of the camp, including establishing democratic governance structures to give refugees a voice, and creating social spaces to any of these principles be adopted during camp design or construction. Instead, the UNHCR, humanitarian aid organizations, or the host nation governments draw from previous experience in identifying potential camp locations. However, camp siting criteria are rarely, if ever, publicly transparent, and the time-sensitive siting and construction of camps is typically carried out with limited resources and tenuous political will within host nations (e.g. McClelland, 2014; UNHCR, 2007).

As a result, the siting of refugee camps often faces significant constraints. Host nations may have limited space suitable for new camps that will be occupied by refugees for a significant length of time; this complicates the host nation's ability to mitigate tensions between host and refugee populations, especially if refugees are viewed as a security threat (Milner, 2005). The process of siting a refugee camp can be further complicated by constraints placed on refugees as

they seek asylum. It is not uncommon for refugees to create informal settlements after they cross the border into host nations, settling where convenient, or where there is a sense of relative safety (e.g. Schmidt, 2000; Martin, 2014; Camarena, 2017). Sometimes, these unplanned settlements are transformed through the support of the UNHCR, host countries, or aid organizations into formally recognized refugee camps (Kok, 1989); despite this assistance, the locations may be fundamentally unsuitable for longer-term habitation (Sengupta and Fountain, 2018).

1.3 Security Environment of Refugee Camps

In host nations, large refugee populations have been shown to correlate with an increase in social conflict (e.g. Lischer, 2005; Salehyan, 2008), domestic terrorism (Choi and Salehyan, 2013), organized criminal activity (Loescher and Milner, 2005b), and intrastate conflict (Salehyan and Gleditsch, 2006). Despite these relationships, there is little evidence that refugees cause or engage in conflict within host nations. Instead, an increase in refugee population accompanies other socio-economic changes that have been shown to have stronger causative links to conflict (e.g. Loescher and Milner, 2005b; Salehyan and Gleditsch, 2006). For example, the arrival of refugee populations generally results in an influx of humanitarian aid into host nations, which offers insurgents, in need of financial or material resources, incentive to cross borders, entering host nations in order to profit via the theft of supplies, or kidnapping of aid workers for ransom (Choi and Salehyan, 2013). Moreover, conflict in neighboring states (i.e. the conflict from which refugees are fleeing) may result in weakened border security, enabling insurgent incursions into host nations (Loescher and Milner, 2005b). Porous borders also enable organized domestic crime within the host nation, lead to, for example, high rates in cross-border weapons trafficking, which often increases with civil conflict in neighboring states (Salehyan and Gleditsch, 2006).

Though refugee populations may not drive an increase in conflict within host nations, neither are refugees without agency, or completely non-violent actors. Loescher and Milner (2005b) argue that, "prolonged and unresolved refugee crises almost universally result in politicization and militancy of refugee communities," but they find that these "refugee warriors" predominantly impact the conflicts in their home countries. Refugees are recruited as militants in refugee camps and then return to their home countries to fight. Many studies have suggested that refugee camps are fertile recruiting grounds for insurgent recruitment, as refugees are commonly impoverished with few prospects for improving their lives (e.g. Humphreys and Weinstein, 2008; Choi and Salehyan, 2013). Moreover, child abductions by forces 'recruiting' child soldiers have been documented at many camps, across several conflicts and continents (e.g. Crisp, 2000; Achvarina and Reich, 2008). Refugee camps offer vulnerable populations, often including large populations of children, who are prime targets for involuntary recruitment.

The vulnerability of a refugee population is partly related to the location of the refugee camps, which are most often in close proximity to national borders (Camarena, 2017). In such border camps, refugees may remain near to the violence that they fled and insurgents remain well positioned to target camps or aid agencies. Regardless of specific actions taken by insurgents, or any direct links to refugee populations, host nations often blame incidents of terrorism and increases in violent crime on refugees. Anti-refugee bias within host nations then motivates the creation of exclusionary refugee policies that relegate and isolate refugees to the ecological and social margins (Chkam, 2016). To keep refugees from integrating into host nation populations, governments may restrict refugees' options for legal residence to refugee camps, severely limit employment and education opportunities, and create legal or bureaucratic barriers to deter even short-term departures from camps (Omata, 2017).

Using a series of case studies of individual camps across Asia and Africa, Loescher and Milner (2005a) found that confinement and isolation only exacerbates refugee camp vulnerability by making it easier for insurgents to find and target refugee populations. Moreover, they suggest that vulnerability and securitization of refugee camps occurs in a self-actualizing and self-perpetuating cycle as the security threats to refugees contribute to host nations perceiving refugees, themselves, as security threats, which leads to additional security threats to refugees, further increasing host nation concerns. While case study findings are crucial for identifying drivers and consequences of security concerns at refugee camps, there is currently little information that systematically characterizes the occurrence and spatiality of conflict surrounding refugee camps.

1.4 Violent Actors Targeting Refugee Camps

There is a large body of research exploring when and why civilians are targeted during intrastate (i.e. civil) conflict yet little attention has been paid to targeting of refugee populations, specifically. Insurgents (i.e., non-state actors) are widely believed to resort to violence against civilian, non-combatant populations when they lack other methods to compel loyalty or cooperation (Balcells and Kalyvas, 2014). Thus, violence against civilians is most likely to occur when insurgent groups are relatively weak, lacking the ability to gather influence or loyalty through good governance or entice cooperation with spoils of war (Wood, 2010). State actors (e.g. military or police forces) may also target civilians in an attempt to erode the base of support of an insurgency or guerilla force that hides within a civilian population (Azam and Hoeffler, 2002; Valentino et al., 2004). Much of our understanding of how and why civilians are targeted is limited to populations who remain at the site of the conflict. Very little research has considered when, or even if, refugee camps are targeted by specific actors involved in intrastate conflict.

Even for research that documents violence within refugee camps (e.g. Loescher and Milner, 2005a; Nagai et al., 2008), the predominant focus lies on the experiences of the victims of violence rather than the perpetrators.

Conceptual models of insurgent and government targeting of civilians could plausibly be applied to understanding conflict near or at refugee camps. Insurgents may be less likely to secure civilian cooperation through positive mechanisms within the organizational and institutional structure of a refugee camp, which could motivate an insurgent group to violence in an attempt to maintain power over refugee populations. Conversely, governments embroiled in intrastate conflicts often see refugee camps across their borders as sanctuaries for enemy insurgent forces, which could lead government forces to target camps in the hopes of depriving insurgent groups of this advantage. With such little research precedence, these relationships remain purely speculative.

1.5 Study Goals and Motivating Questions

The goals of this study are to better understand the frequency and spatiality of conflict near refugee camps, and to assess evidence of systematic targeting of refugee camps by specific actors. By considering the relationships between all UNHCR refugee camps in Africa, in operation after 1996, and all conflict events in the Armed Conflict Location and Event Database Project's (ACLED) Africa dataset, from 1997-2016, this study answers the following questions:

1. Do conflict events occur in close proximity to refugee camps? Does the local pattern of conflict events change after the establishment of a refugee camp?
2. Do specific conflict actors (e.g. insurgents, government forces, or others) target refugee camps?

For the first question (Chapter 2), three spatial relationships between refugee camps and conflict events were considered: the proximity of conflict events to refugee camps, the spatial clustering of conflict events around refugee camps, and the change in distance between conflict events and refugee camp locations before and after camp creation. For the second question (Chapter 3), the various spatial patterns of actors engaged in conflict in close proximity to refugee camps were assessed. The frequency with which each actor participated in conflict events near refugee camps, in comparison to other, non-refugee targets, was considered, and the most frequent victims of these conflict events were determined.

The results of this study offer a novel, systematic, and spatially explicit perspective on the diverse and persistent character of security threats faced by refugee camp communities across Africa. This study confirms that refugee communities in camps consistently face proximal conflict and that government and insurgent groups alike consistently instigate conflict events within close proximity of refugee camps. Thus, already vulnerable populations of refugees remain vulnerable to security threats years after settling in refugee camps. This security environment presents a great concern not only for the refugee communities, themselves, but also the UNHCR, host countries, and aid organizations who seek to ensure the various protections guaranteed to refugees under the 1951 Refugee Convention.

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2. Spatializing Security Threats to Refugee Camps

2.1 Introduction

Numerous case studies of refugee camps around the world suggest that refugee camps commonly face significant security threats (e.g. Lischer, 2005; Rawlence, 2016). Refugee camps are widely seen as targets of spillover violence as insurgents from refugees' home countries cross borders and continue to victimize refugee populations settled in camps (Camarena, 2017). In response, host nations often conceptualize refugee camps, and refugees, themselves, as threats (Loescher and Milner, 2005b), potentially leading to increased state security presences in refugee camps, heightened tensions, and creating further opportunity for conflict (Salehyan, 2008).

The goal of this study is to systematically evaluate the security threat to refugee camps across Africa. For this study, security was considered solely through the lens of conflict, and conflict events' proximity to refugee camps was used as a proxy measurement to understand the security threat faced by refugee camps. No direct indicators of conflict events explicitly targeting refugee camps currently exist, but proximity to conflict has a significant effect on lived experiences (Namakula and Witter, 2014). Thus, considering conflict events proximal to refugee camps is an effective means of examining events that explicitly target refugee populations. Specifically, this study used spatial-statistical methods in order to describe the proximity and spatial clustering of conflict events surrounding refugee camps. Change in proximity of conflict events to refugee camps in the years following a camp's creation was also measured. This work offers an initial, broad view of patterns of conflict surrounding refugee camps.

2.2 Methods

2.2.1 Study Area

This study incorporates human settlement and social conflict datasets in a spatial statistical examination of conflict near refugee camps in Africa between 1997 and 2016. Africa was chosen as the spatial focus of this study because 30% of displaced people lived in Africa in 2017, more than on any other continent (UNHCR, 2018), and almost two-thirds of all of the UNHCR's refugee camps are located in Africa (UNHCR Lebanon, 2017). This population size makes patterns of violence near refugee settlements highly relevant and, as a practical matter, also offers a large sample size with which to work.

2.2.2 Settlement Datasets

UNHCR Refugee Camp Data: UNHCR Lebanon's Beirut County Office has made available a dataset on "UNHCR populations of concern" through ArcGIS Online (UNHCR Lebanon, 2017). The dataset includes information on refugee settlements, worldwide, as well as other populations of displaced people (e.g., internally displaced people) over which the UNHCR has jurisdiction. The dataset includes the name and geographic coordinates for each settlement (WGS84 coordinate reference system); location classifiers, describing the type of settlement; creation dates for each settlement, updated through 2016, as well as closure dates when applicable. Population and broader demographic information for each settlement are not included. In total, there are 1317 settlements associated with non-urban refugee populations in the dataset with creation dates ranging from 1966 to 2016. For this study, the UNHCR dataset was subset to only include refugee camps in Africa, yielding 827 settlement locations (Figure 2.1).

Georeferenced conflict event data (i.e., ACLED, described in 2.2.3) were not available prior to 1997 and UNCHR refugee camp locations were not available after 2016, yet the period

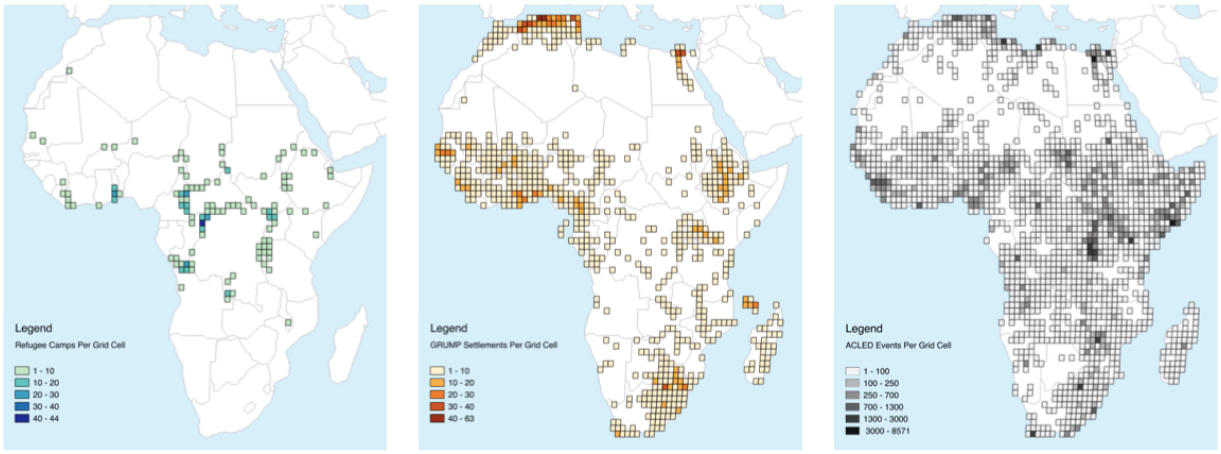

Figure 2.1: Distribution of UNHCR Refugee Camps (left), GRUMP Settlements (middle), and ACLED Events (right) across Africa

of 1997-2016 included the creation of more than 90% of UNHCR camps in Africa (UNHCR Lebanon, 2017). Escalating frequency and duration of civil conflict across the continent during this time period was the primary factor contributing to the forced displacement of populations and subsequent asylum claims (Gettleman, 2010; Roser, 2018). Thus, though the study period of 1997-2017 was constrained by data availability, this period is suitable given the high rates of displacement and active camp creation that took place. There are refugee camps that the UNHCR does not oversee but since there is currently no dataset on the locations or attributes of these camps, they are not included in the study. Nonetheless, since the UNHCR manages or is affiliated with the vast majority of African, and indeed global, refugee camps, the UNHCR dataset on refugee camps represents the majority of African refugee camps.

GRUMP Settlement Data: As a complement to established UNHCR refugee camps, the Global Rural-Urban Mapping Project (GRUMP) Settlement Points dataset was used to represent the geographic distribution of human settlements that do not have large UNHCR refugee populations. GRUMP Settlement Points data are derived from a 30-arcsecond-resolution raster dataset of global population primarily based on nation-level census data (Balk, et al., 2006). The

dataset includes 70,629 geocoded settlements with location names, geographic coordinates of settlement centroids, and population estimates for 1990, 1995, and (CIESIN et al., 2017).

After subsetting GRUMP data to only include African settlements, 4716 GRUMP locations were used for subsequent analyses (Figure 2.1). GRUMP data allow for comparison of spatial relationships between conflict events and each of the two settlement layers – refugee camps, and settlements unassociated with refugee populations. In order to ensure that refugee camps were not included in the GRUMP dataset, GRUMP settlements located within 10 km of a UNHCR settlement were excluded from the analysis; this exclusion amounted to only 2% (136 locations) of GRUMP settlements. While this subset likely removed some non-refugee settlements, their exclusion supports a more confident comparison between UNHCR refugee camps and non-refugee GRUMP settlements.

2.2.3 Georeferenced Conflict Events

The Armed Conflict Location and Event Data Project (ACLED) produces datasets that aggregate conflict events across broad geographical regions: Africa, South Asia, Southeast Asia, and the Middle East. ACLED is a human-reported conflict event dataset, meaning that events are based on reports from people, generally journalists or human rights defenders, on the ground, within a given conflict situation (Eck, 2012). ACLED was selected for this study because of its rigorous and well-defined protocol for conflict event documentation, its broad temporal duration (1997-present), and its geographic referencing (i.e. latitude-longitude coordinates) and geocoding (i.e. a city name) of individual conflict events. ACLED's broad definition of a conflict event was also appropriate for the study since it includes direct violence, such as armed clashes between militaries and extremist groups, as well as cultural violence, such as politically motivated vandalism, destruction of crops, theft of livestock, etc., and political protest, such as

demonstrations and riots (ACLED, 2017). Unlike many conflict event datasets, events in ACLED do not need to result in casualties to be included. This inclusive conceptualization of a conflict event supports examination of a broad range of security threats faced by refugee camps beyond only those that result in physical harm.

Between 1997 and 2016, ACLED recorded 140,737 conflict events across Africa (Figure 2.1). Each event is geocoded to a specific location mentioned in the event report. If only a general geographic region of a given event is known, the event is geocoded to the provincial capital. In a comparative study, Eck (2012) found that this geographic generalization leads to some spatial inaccuracy, especially for events occurring in rural or otherwise remote locations where geographic coordinates were less likely to be reported. In these instances, rural events would be geocoded to nearby urban locations such as provincial capitals, due to lack of information. In addition to geocoded and georeferenced location information for each conflict event, ACLED also records the event date, the name of the group or groups instigating a given conflict event, the name of the group or groups targeted during a given conflict event, an event type category (e.g., 'Violence Against Civilians' or 'Riots/Protests'), the number of fatalities resulting from the event, and a notes field including a brief description of the event, e.g., "Anuak attack Sudanese Dinka refugees" and "Eritrean refugees demonstrate against Eritrean regime" (Raleigh et al., 2010). Only 681 ACLED event notes include the word 'refugee' in the event descriptions. Events explicitly mentioning refugee communities are only a fraction of the total ACLED dataset, but do not necessarily represent all conflict events that occurred in proximity to refugee camps, those that directly involve refugees, nor those that may be perceived as security threats by refugees or a given host country.

2.2.4 Measuring Spatial Relationships Between Conflict Events and Settlements

To quantify and spatialize the relationships between conflict events and refugee camps and non-refugee settlements, three different analyses were used: minimum distance, proximity, and spatial clustering.

Minimum Distance of Conflict Events to Settlements: The minimum distance between a conflict event and settlement locations was measured as an initial assessment of a given conflict event's spatial relationship to refugee and non-refugee settlements. For each refugee camp and GRUMP settlement, the minimum distance from the respective camp or settlement to an ACLED event was calculated using ArcGIS's Generate Near Table tool. Summary statistics (e.g. quartile breaks, mean, and variance) were calculated for refugee camps and non-refugee settlements to compare the difference in minimum distance from conflict events. Since the ACLED dataset was not subset by year, the closest conflict event to a camp could have occurred prior to a camp's creation; a temporally explicit spatial relationship between conflict events and refugee camps is considered in 2.2.5.

Proximity of Conflict Events to Settlements: The minimum distance of an ACLED event to a refugee camps only considers the relationship of one event to each camp. In considering the geographic distribution of multiple conflict events around refugee camps and the resulting localized conflict event density, the count of all ACLED events within 10 km of each UNHCR camp was calculated by creating 10 km radial buffer regions around each UNHCR settlement using ArcGIS. The selection of a 10 km radial buffer distance represents an estimate of a given refugee camp's range of influence on their surrounding environment following Sprohnle et al. (2015). In addition, there is a natural break in the histogram of the minimum distance of African

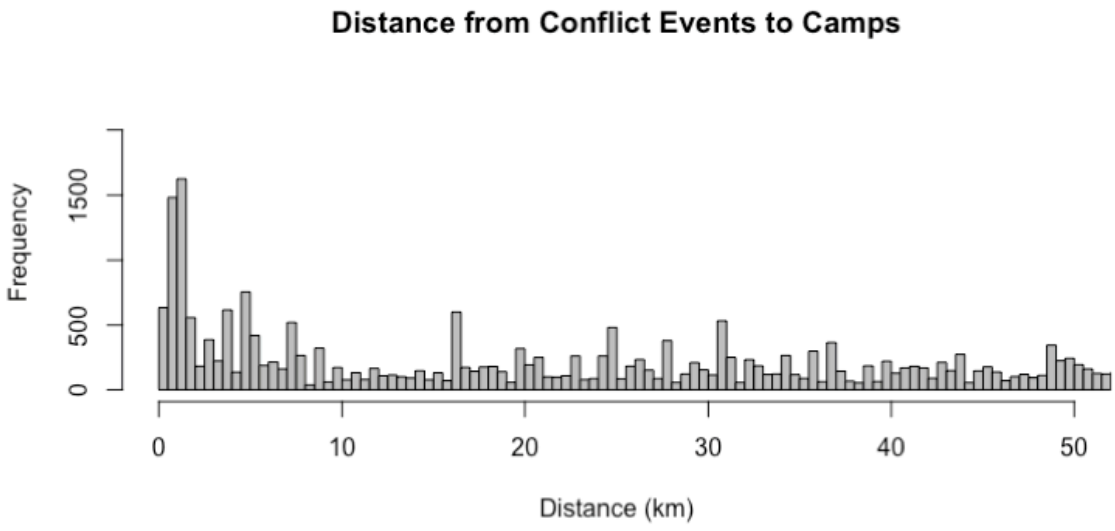

Figure 2.2: Minimum Distance from ACLED Conflict Events to Refugee Camps
Distribution of minimum distance to refugee camps from all ACLED points in Africa. (Subset to only display ACLED events within 50 km of refugee camps.) The frequency of ACLED event distances from refugee camps decreases until approximately 10 km from refugee camps and then approximately stabilizes at a relatively low level of frequency.

ACLED conflict events from UNHCR refugee camps very near to 10 km (Figure 2.2). After using ArcGIS's Spatial Join tool to find the number of ACLED events within 10km of each camp, summary statistics of all camps' event counts and the proportion of camps with one or more conflict event within 10 km were calculated. As above, this process was repeated for GRUMP non-refugee settlements as a means of measuring differences in the proximity of conflict events between the two types of settlements.

Spatial Clustering of Conflict Events around Settlements: Distance and proximity calculations only consider a one-dimensional relationship between individual conflict events and nearby settlements. In order to understand the potential for multiple conflict events to cluster around settlements, a version of the Ripley's Bivariate K statistic spatial clustering was measured between ACLED events and settlements. Ripley's Bivariate K is a second-order point pattern

analysis of cumulative distribution (Ripley, 1977). Ripley's Bivariate K describes spatial patterns between two types of points, i.e. settlements (either UNHCR or GRUMP) and conflict events, and classifies the relationship between the two point types as spatially clustered, spatially dispersed, or randomly distributed (Figure 2.3). Complete spatial randomness (CSR) is modeled by a homogenous Poisson process where points of either type are equally likely at any location within the study area, regardless of other points' locations. (Grantham, 2012). If type-one points are spatially distributed such that they are located closer to type-two points than predicted under a CSR scenario, Ripley's Bivariate K would classify the pattern as between-type clustering. If type-one and type-two points types are consistently further apart than predicted under CSR, the point pattern is spatially dispersed.

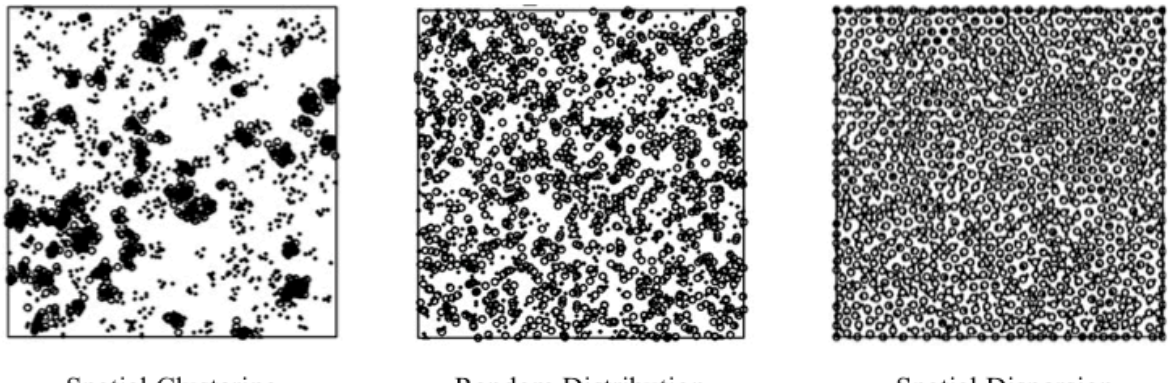

Figure 2.3: Bivariate Spatial Point Patterns
Figure from Edmonds, et al. (2014).

To classify spatial points patterns, Ripley's Bivariate K function essentially performs the same calculation as the proximity count, albeit repeatedly with increasing radial distances from a settlement location. For all type-one points, in this case settlement points, either UNHCR or GRUMP, the number of type-two points, in this case ACLED events, within a given radial distance 'r' from each type-one point are counted. This count is repeated for increasingly large

radii ‘r’ so that the end result is a count of how many type-two points can be found within each distance ‘r’ from the central type-one point. These counts are then compared to a Poisson distribution, representing the count of points expected from a completely random spatial distribution around a given settlement. If there are more points than the random pattern’s count, a point pattern is classified as clustered, and if there are fewer points than the random count, the point pattern is classified as dispersed.

Because variance of K-statistic estimates increases as distance ‘r’ increases, a variance-standardized form of the K-function, the bivariate L-function for inhomogeneous data or L-cross-inhomogeneous function, was used, to normalize the variance of the clustering estimate over distance ‘r’ (Braddeley et al., 2000). The standard L-function assumes a homogeneous intensity, i.e., approximately equal numbers of points per unit area (Grantham, 2012), but since the point pattern of conflict events and settlements intensity is varied, the inhomogeneous correction to the L-function is needed.

Using the spatstat package in R, the function Lcross.inhom was used to measure the clustering of ACLED conflict events around UNHCR refugee camps. In order to detect statistical significance of these spatial relationships, simulation envelopes were calculated using the envelope function, also from R’s spatstat package. This function generates maxima and minima from 100 simulations of the random distribution to create a maximum and minimum bound for the random Poisson distribution against which the L-cross-inhomogeneous function is compared (Rice et al., 2012). However, as explained by Rice et al. (2012), “an envelope of e.g., 100 simulated distributions, is not equivalent to a significance level of 0.01 because the minima and maxima that define the envelope may derive from <100 simulations”. Thus, the geographic distance ‘r’ at which the L-function overlaps the simulation envelopes represents the distance

until which statistically significant clustering (or dispersion) occurs (Figure 2.4), though an exact statistical significance is not assigned to this relationship.

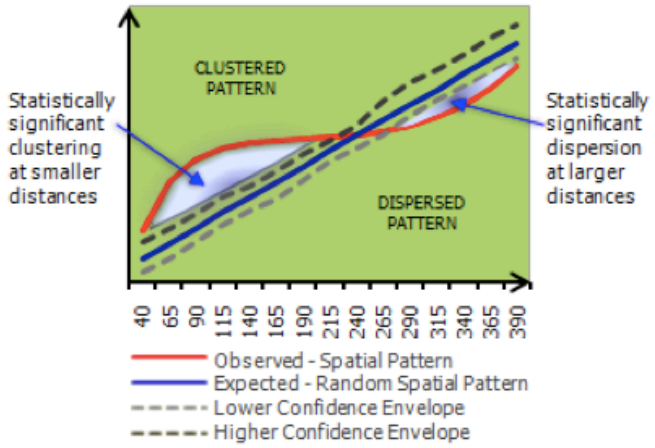

Figure 2.4: Measurement of Spatial Clustering and Dispersion

Interpretation of L-cross-inhomogeneous function results. Figure from ArcGIS Pro (2018).

Annual subsets of both datasets were created so that ACLED events occurring within a given calendar year could be readily compared to all UNHCR camps in operation during that year. Thus, L-cross-inhomogeneous statistics and simulation envelopes were created for each year of ACLED data with respect to UNHCR refugee camps, as well as GRUMP non-refugee settlements. Unlike UNHCR refugee camps, however, the geographic distribution of GRUMP points does not vary annually, so the GRUMP settlement dataset from 2000 was individually compared to each year of ACLED data. To further assess whether conflict-settlement clustering varied significantly with settlement population size, L-cross-inhomogeneous measurements were made for GRUMP settlements stratified by population. Settlements were thus subset into five population categories: less than 10,000 people; from 10,001 to 50,000 people; from 50,001 to 100,000 people; from 100,001 to 1,000,000 people; and greater than 1,000,000 people.

2.2.5 Changes in Conflict-Camp Proximity following Camp Establishment

To account for whether the distance of conflict events from refugee camps changes after a camp is established, the minimum distance of ACLED conflict events from a given refugee camp was calculated every year for all camps created at least four years after ACLED data collection began in 1997 (i.e. camps created no later than 2000) or four years before the most recently available 2017 ACLED data (i.e. camps created no later than 2013). A four-year preceding or concluding period was chosen to capture the average duration of a civil war; Brandt et al. found that average civil war duration, for conflicts since 1945, is slightly longer than 4 years (Brandt, 2008). Thus, a four-year temporal window around camp establishment should detect of changes in on-going conflicts in relation to refugee camps. This resulted in a dataset in which each refugee camp had an annual minimum distance of conflict events relative to the camp's create date, e.g. Year -4 and Year +4, representing four years before or after a given camp's creation year, respectively, regardless of the specific year when an individual camp was created. By using relative dates in this way, changes in conflict event patterns could be compared across the entire dataset.

To consider the relationship between proximal conflict events and changes in conflict event frequency over the study period, refugee camps were subset into high, intermediate, and low-conflict strata (Figure 2.5) based on natural breaks in the distribution of the total number of conflict events within 10 km of each camp. The resulting stratification yielded 353 low-conflict camps with zero conflict events, 133 intermediate-conflict camps with 1-12 conflict events, and 60 high-conflict camps with 13 or more conflict events within 10 km of camp location. For each of these three groups, the minimum camp-conflict distance was measured each year from 2000-2013 and trends in minimum distance were measured.

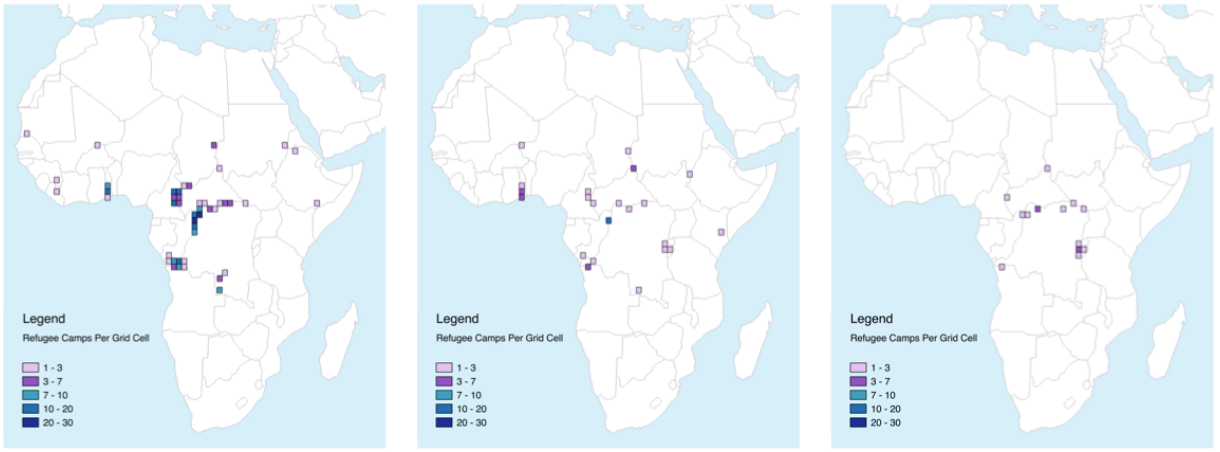

Figure 2.5: Distribution of Low Conflict (left), Intermediate Conflict (middle), and High Conflict (right) Refugee Camps
For all camps established in Africa, between 2000 and 2013.

To measure the change in the annual average minimum distance *before* and *after* camp creation, Year -3 and Year -2 distances (i.e. minimum distance of events three and two years *before* a camp's creation year, respectively) were averaged to create a *pre-camp* mean. Similarly, Year +2 and Year +3 distances (i.e. minimum distance of events 2 and 3 years *after* a camp's creation year) were averaged to create a *post-camp* mean. Including Year -4 and Year +4 was found to dilute the trends detected in the three years before and after camp creation, due to larger intra-year variances, and so Year -4 and Year +4 were excluded from the trend analysis. Conflict event-camp distances were also calculated in Year -1, Year 0 (i.e. the year of camp creation), and Year +1 to represent conflict event proximity at the time of camp creation. Rather than only using Year 0, the three-year range was used to mitigate the differences in the month of camp creation during a given year and minimize the influence of temporal edge effects.

2.3 Results

2.3.1 Measuring Spatial Relationships Between Conflict Events and Settlements

Minimum Distance of Conflict Events to Settlements: The median minimum distance of conflict events from UNHCR refugee camps and GRUMP non-refugee settlements was 14.3 km and 3.7 km, respectively. Though further than the median minimum distance of conflict events from non-refugee settlements, such proximity of refugee camps to conflict events reflects a significant and widespread threat to already highly vulnerable refugee populations. The minimum distance of conflict events from refugee settlements ranged from 0 km, i.e. a conflict event located at the same coordinates as the refugee camp, to 158 km. In contrast, the minimum distance of conflict events from non-refugee settlements ranged from 0 km to 1920 km. The distributions of minimum distance from each settlement to a conflict event are displayed in Figure 2.6. Both refugee and non-refugee settlement distributions exhibit strong positive skew (i.e. a large number of settlements for which conflict events are nearby) and long right tails, which represent settlements for which the minimum distance from conflict events is much larger.

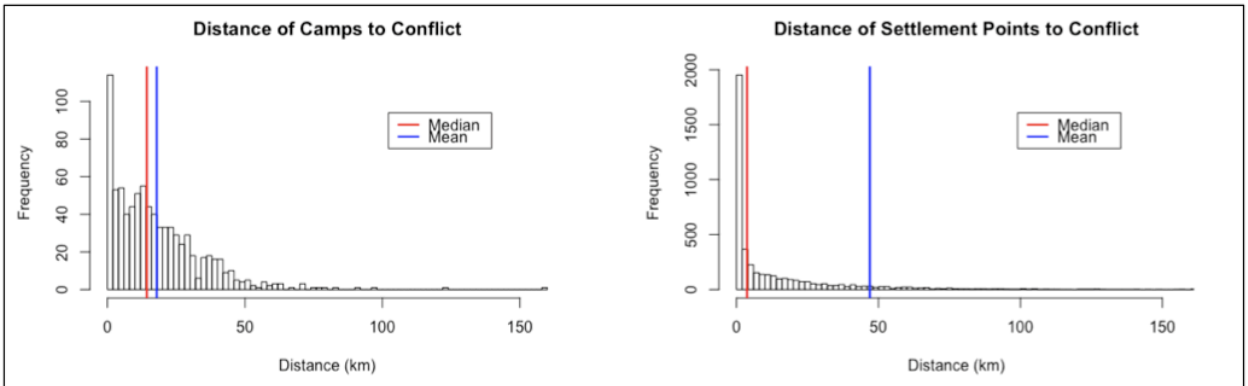

Figure 2.6: Minimum Distance from Refugee Camps and Non-Refugee Settlements to Conflict Events

Distribution of minimum distance from refugee camps to ACLED events (left) and from non-refugee settlements to ACLED events (right). The x-axis of the distribution of minimum distance from settlement points to conflict events has been constrained to 155 km to better display the majority of the distribution, but the distribution's tail extends to 1920 km.

The distribution of minimum distance of conflict events from non-refugee settlements is more strongly right-skewed than the distribution of distance from refugee settlements. Non-refugee settlements experience a low minimum distance from conflict events with greater frequency than refugee settlements. The right tail of the non-refugee settlement distribution is also much longer; non-refugee settlements far from conflict tend to be much further from conflict events than even the refugee camps with minimal proximal conflict events.

Proximity of Conflict Events to Settlements: Proximity of conflict events to settlements was considered by measuring the frequency of conflict events within 10 km of each settlement. On average, there were 12.6 conflict events within 10 km of a given refugee camp, but the distribution is heavily right skewed as the majority of refugee camps did not experience conflict within 10 km of their location. However, 37% of camps (305) experienced at least one conflict event within 10 km, which reflects a significant refugee population that remained vulnerable to nearby conflict.

In general, there were fewer conflict events proximal to refugee camps than non-refugee settlements. The number of conflict events within 10 km of refugee camps ranged from 0 to 2355 events and the number of conflict events within 10 km of non-refugee settlements ranged from 0 to 6767 events. Like refugee camps, the distribution of conflict events within 10 km of non-refugee settlements has a positive skew, though the majority of non-refugee settlements (62%) saw at least one conflict event within 10 km of their location (Figure 2.7).

Though there are several factors that contribute to the difference in number of proximal conflict events between refugee and non-refugee settlements, at least two factors are readily identifiable. First, because there are more than four times as many GRUMP settlements than refugee camps across the continent, all things equal, this inevitably results in higher event counts

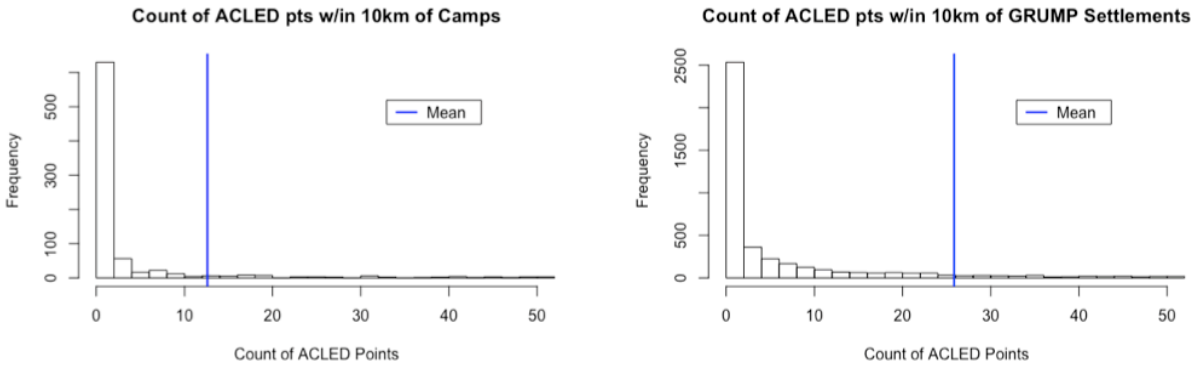

Figure 2.7: Count of Conflict Events within 10 km of Refugee Camps and Non-Refugee Settlements

Number of ACLED events within 10km of each refugee camp (left) and non-refugee settlement (right). The x-axis of the distribution of minimum distance from settlement points to conflict has been constrained to 50 events to better display the majority of the distribution, but the distributions' tails extends to 2355 events (for refugee camps) and 6767 events (for non-refugee settlements).

around non-refugee settlements. Second, this assessment did not account for the creation year of settlements. Non-refugee settlements remained population centers for the entire 20-year study period, yet only 67 of the 827 refugee camps considered (about 8%) were created prior to the start of the study period. Thus, most refugee camps were in existence for fewer years than the non-refugee settlements to which they were compared. The spatio-temporal relationship of conflict events to refugee camps is considered explicitly in 2.3.2.

Clustering of Conflict Events around Settlements: The L-cross-inhomogeneous function was used to detect spatial clustering of conflict events around settlements. Previous studies have concluded that the L-cross function has "limited capacity to accurately detect the scale and statistical significance of pattern, but can be used to seek bivariate relationships" (Rice et al., 2012). Indeed, spatial clustering at relatively short distances can lead to the appearance of clustering at further distances, because of the cumulative measure of clustering used to calculate the L-cross function (Goreaud and Pélissier, 2003). Since detection of a bivariate relationship is of greater relevance than the exact distance to which this relationship can be detected, such limitations affect how the L-cross function is interpreted, but are not of significant concern.

The L-cross-inhomogeneous function measures the degree of spatial clustering between settlement and conflict event locations for every year of the 20-year study period (all plots in Appendix I.A). For each year considered, statistically significant clustering of conflict events around settlements was detected for both refugee camps and non-refugee settlements (Figure 2.8). On average, per year, spatial clustering of conflict events around refugee camps was evident until approximately 179 km from the camp while non-refugee settlements expressed spatial clustering of conflict events until 536 km. These results indicate that conflict events are clustered around both refugee camps and non-refugee settlements, but are more tightly clustered around refugee camps at a clustering distance three times smaller than that of non-refugee settlements.

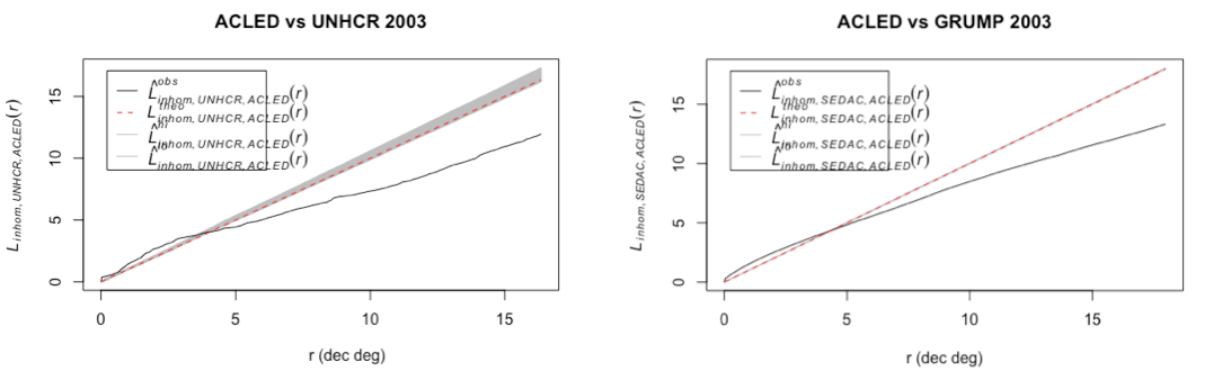

Figure 2.8: Examples of Spatial Clustering of Conflict Events around Refugee Camps and Non-Refugee Settlements Per Year
L-cross-inhomogeneous outputs, measuring the extent of spatial clustering of ACLED events around refugee camps in 2003 (left) and the extent of spatial clustering of ACLED events around non-refugee settlements in 2003 (right).

The spatial clustering of settlement and conflict event locations was also measured across the full 20-year study period (Figure 2.9). When considering all conflict events during this period, refugee camps exhibited statistically significant clustering until approximately 67 km and non-refugee camps exhibited clustering for the entire distance of the function, through 334 km. As with annual measures of clustering, conflict events cluster around refugee camps on a smaller scale than non-refugee settlements. Moreover, when stratified by settlement population, every non-refugee settlement stratum exhibited statistically significant clustering until at least 272.73

km (2.45 degrees) (all plots in Appendix I.B). The distance of significant clustering is consistently larger for non-refugee settlements, than for refugee camps, across all population strata.

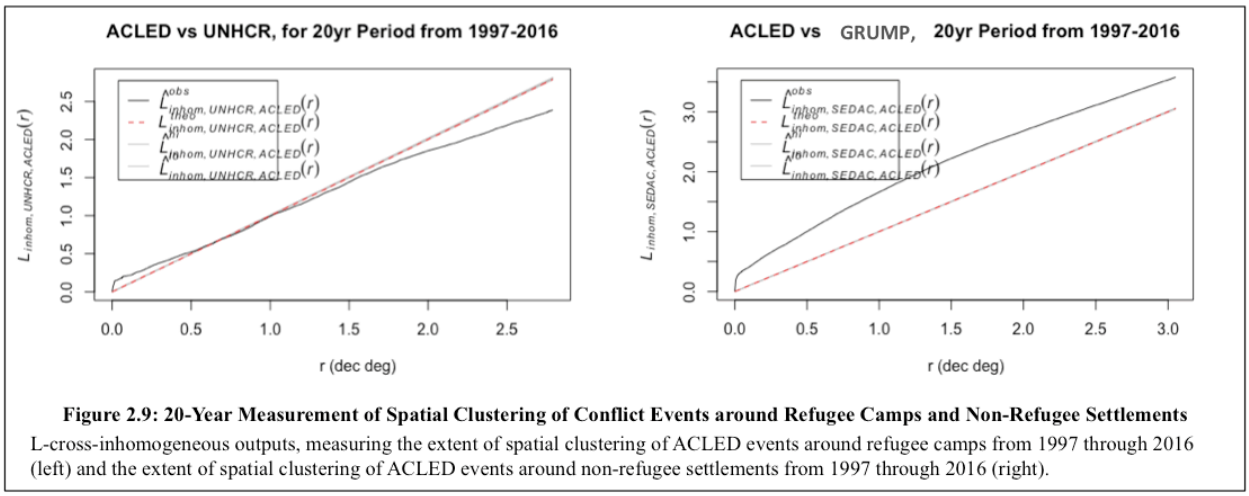

Figure 2.9: 20-Year Measurement of Spatial Clustering of Conflict Events around Refugee Camps and Non-Refugee Settlements
L-cross-inhomogeneous outputs, measuring the extent of spatial clustering of ACLED events around refugee camps from 1997 through 2016 (left) and the extent of spatial clustering of ACLED events around non-refugee settlements from 1997 through 2016 (right).

2.3.2 Changes in Conflict-Camp Proximity Following Camp Establishment

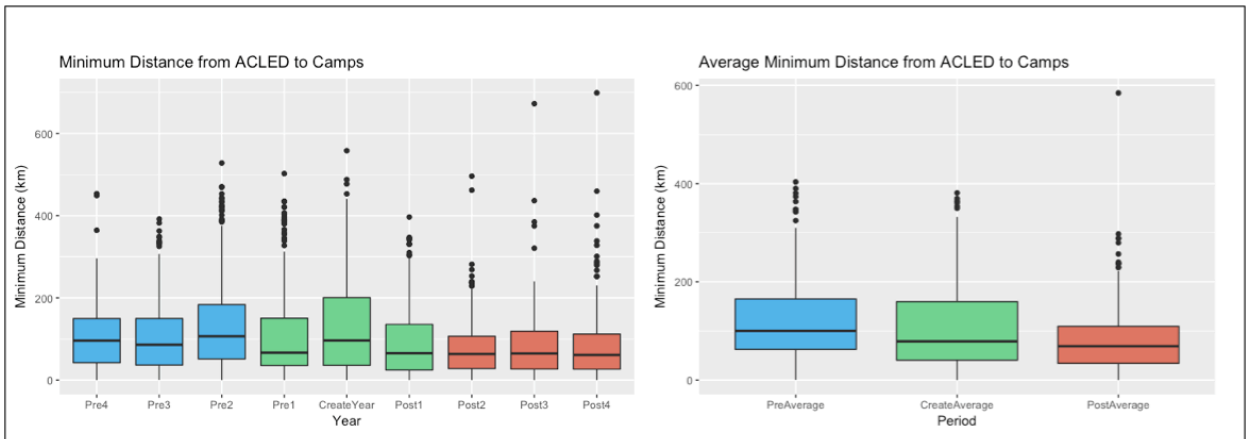

Figure 2.10: Minimum Distance from Refugee Camps to Conflict Events (Before, During, and After Camp Establishment)

To better understand whether the spatial relationship between conflict events and refugee camps varies over time, the minimum distance from a refugee camp to a conflict event was calculated for each camp for each of the four years before and following a given camp's creation year as well as for the creation year (Figure 2.10). Despite the average annual standard deviation

of 83 km, however, a general trend is visible: the average minimum distance of conflict events from each camp decreases after camp creation. The average decrease in minimum distance of a conflict event from a refugee camp before and after its creation is 11 km, a significant shift in the location of conflict events *towards* a given camp's location.

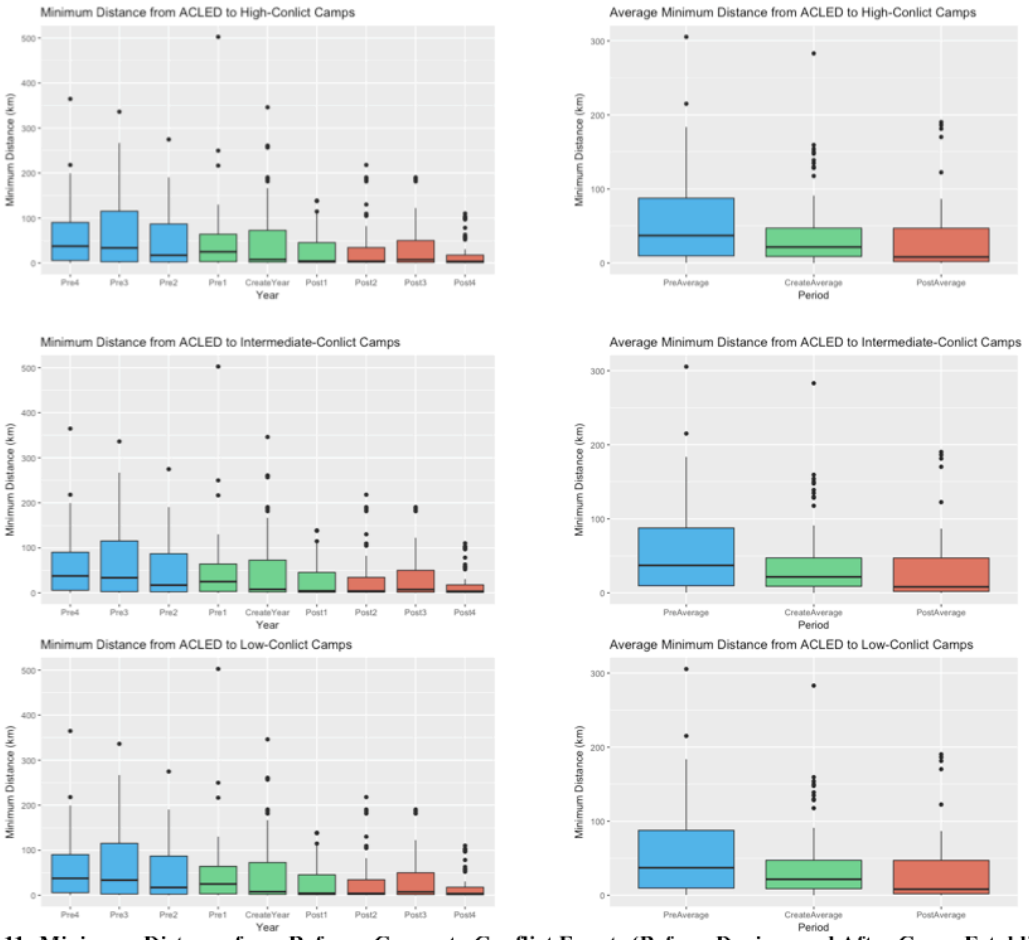

Figure 2.11: Minimum Distance from Refugee Camps to Conflict Events (Before, During, and After Camp Establishment)
Camps are subset by frequency of conflict events near camps. Trends are displayed for high-conflict camps (top row), intermediate-conflict camps (middle row), and low-conflict camps (bottom row).

When separately considering high, intermediate, and low-conflict camps, conflict events effectively shift their distribution towards refugee camps following camp creation in all three conflict strata (Figure 2.11). Though the distribution of annual minimum distances remains highly variable, low, intermediate, and high-conflict camps experienced average decreases of 33

km, 16 km and 7 km, respectively, in minimum distance from conflict events, which account for median decreases of 29.1%, 19.6%, and 30.9% in minimum distance from a conflict event. (Figure 2.12). The apparent movement of conflicts towards refugee camps is most distinct for low-conflict camps.

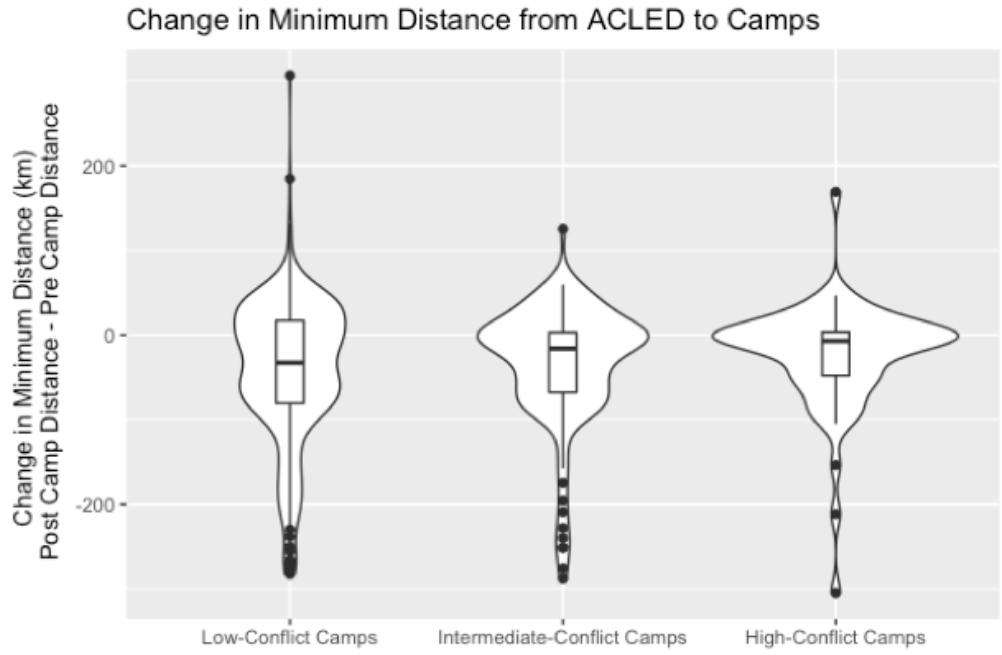

Figure 2.12: Average Change in Minimum Distance of Conflict Events to Refugee Camps Violin plots showing the probability density distributions of average change in minimum distance of conflict events from refugee camps following camp creation. (Change calculated as post-pre; negative values indicate conflict moving closer to camps.)

2.4 Discussion

This study presents the first continent-wide spatially explicit assessment of security threats to refugee camps due to conflict events. Conflict events were shown to frequently cluster around refugee camps and move closer to refugee camps in the years following a camp's creation. However, the strength of these trends varied across the population of refugee camps considered, suggesting that refugee camps have varying experiences with regard to local security

threats. The diversity of refugee camps' security experiences highlights the need for further research on these issues.

Analysis of conflict events' proximity to refugee camps shows that a large number of refugee camps were subject to proximal conflict events. 50% of the 827 refugee camp locations were less than 15 km from a conflict event and 37% of refugee camps experienced one or more conflict events less than 10 km away. Moreover, refugee camps were spatially attractive to conflict events, as conflict events exhibited statistically significant clustering around refugee camps. Similarly, measuring the change in minimum distance of conflict events from a given refugee camp following the camp's creation indicates that conflict events move toward refugee camps following camp creation; this shift in the geographic distribution of conflict toward refugee camps was detectable even in relatively low-conflict camps. These Africa-wide results corroborate camp-level case studies findings that refugee camps remain vulnerable to conflict events (e.g. Loescher and Milner, 2005a; Lischer, 2005, Rawlence, 2016).

The level of violence associated with these conflict events varies widely. Within 10 km of refugee camps, ACLED includes high casualty events, such as: "FNL [National Forces of Liberation, an ethnic Hutu rebel group in Burundi] raided a United Nations refugee camp and killed 189 Banyamulenge. FNL claimed the camp was a hideout for Burundi army soldiers and Congolese tribal militiamen. Most of the victims appeared to be women and children" (Raleigh et al., 2010). But the dataset also records non-violent acts of protest, e.g. "Army sent to restore peace in Forchana refugee camp after riots and failed negotiations. 13 Sudanese, 2 Chadians and 1 Saudi arrested," and non-violent but coercive actions undertaken by militant groups, e.g. "FDLR [Democratic Forces for the Liberation of Rwanda – an ethnic Hutu rebel group] recruiting fleeing Hutu refugees, working within DRC" (Raleigh et al., 2010). Thus, even

conflict events that do not result in fatalities can pose a security threat to refugees, despite the ostensible protection of refugee camps.

Finally, 63% of refugee camps did not experience any conflict events within 10 km of their location, and refugee camps were as far away as 158 km from the nearest conflict event. This suggests that conflict is not endogenous to refugee camps but rather contextualized by regional factors such as border porosity, specific drivers of conflict events, and underpinning grievances of combatants involved in the conflict at large. Even the refugee camps furthest from conflict, however, were an order of magnitude closer to conflict than non-refugee settlements furthest from conflict, which were up to 1920 km away. Though this difference is sizable, it remains difficult to gauge how a conflict event 158 km rather than 1920 km away changes the practical or perceived experience of the event. Further research explicitly examining the various socio-spatial factors contributing to conflict event likelihood near refugee camps and perceptions of such events would be enlightening.

Unsurprisingly, non-refugee settlements tended to experience more conflict events than refugee settlements. Half of non-refugee settlements were less than 5 km away from the closest conflict event while 61% of non-refugee settlements experienced at least one conflict event within 10 km. Though a smaller proportion of refugee camps may experience conflict than non-refugee settlements, the proportion of refugee camps that do experience violence represents a large enough population to warrant humanitarian concern and further research to better understand the security experiences of these camps.

2.5 Conclusion

Building on findings from camp-level studies (e.g. Loescher and Milner, 2005a; Lischer, 2005, Rawlence, 2016) that suggest refugee camps to be targets of conflict, this study analyzed spatial relationships between conflict events and refugee camps across Africa, finding that many refugee camps face security threats from frequent, close conflict events. This is not the case at all refugee camps, and this study shows that experiences of conflict at refugee camps are highly variable. Nonetheless, the security threat this study depicts at many camps remains significant since refugee camps are home to highly vulnerable communities that are ill equipped to effectively respond to conflict events. Thus, these security threats present the very real possibility of exacerbating the vulnerability of an already vulnerable population. As the population of refugees in Africa, and worldwide grows in the face of the global refugee crisis, refugee camps proliferate, necessitating a better understanding of security threats surrounding refugee camps in support of the well-being of the populations served by these camps.

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3. Identifying Conflict Actors Who Consistently Target Refugee Camps

3.1 Introduction

Both insurgents and state forces fighting in civil conflicts target civilians as part of some wartime strategies (e.g. Balcells and Kalyvas, 2014; Valentino et al., 2004). The conflict conditions under which it becomes advantageous for different actors to employ violence against civilian populations vary between state and insurgent actors, but generally this violence is pursued from a position of strategic weakness. Insurgents are likely to attack civilians if they have no other options to compel loyalty from populations (Wood, 2010) and state forces tend to resort to violence when they are otherwise unable to detect or flush out insurgents hidden within the civilian populations (Azam and Hoeffler, 2002). Despite these broad theories of civilian violence in civil wars and the literal and symbolic proximity of refugees to such violence, very little research has considered how, or even if, insurgents, state forces, or other conflict actors target refugee populations. This study presents a novel analytical approach to determine if any conflict actors consistently instigate conflict events near to refugee populations.

The actors that most frequently participate in conflict events near refugee camps were determined and the spatial distribution of each actor's conflict events' around refugee camps was calculated. Proximity of a given actor's conflict events to refugee populations is not evidence of intentional targeting of refugee camps, but nonetheless serves as a potential indicator of such targeting, especially when the actor's conflict events are systematically focused around refugee camps. Unfortunately, the best available conflict event dataset documents groups targeted by each conflict event but targets are, for example, broadly identified as civilians rather than being specified as refugees. While

useful, information on victims of conflict events cannot fully corroborate whether refugee populations were specifically targeted. However, by considering the proximity to refugee camps of conflict events carried out by specific actors, in tandem with the victims of these events, this study achieves a novel understanding of the individual actors' behavior in instigating conflict near refugee camps.

3.2 Methods

3.2.1 Study Area

This study uses refugee camp and social conflict datasets to measure the spatial statistical relationships of specific conflict actors (e.g. insurgents, government forces, etc.) to refugee camps in Africa between 1997 and 2016. As in Chapter 2, Africa was chosen as the spatial focus of this study, because of its large population of refugees and refugee camps (UNHCR, 2018; UNHCR Lebanon, 2017), making questions of refugee security in the region particularly relevant and offering a large sample size with which to conduct statistical analyses.

3.2.2 UNHCR Refugee Camp Data

The "UNHCR populations of concern" dataset from Chapter 2 was also used in this study (UNHCR Lebanon, 2017). The global dataset was subset to only include non-urban refugee settlements in Africa, following the same procedures outlined in Chapter 2.

3.2.3 Georeferenced Conflict Events

The Armed Conflict Location and Event Data Project's (ACLED) Africa dataset was used as the source of conflict events in this study. Though ACLED includes conflict events

from 1997 through the present, to match the timespan of the UNHCR data, only conflict events carried out through the end of 2016 were used, resulting in a dataset of 140,737 events between 1997 and 2016. As justified in Chapter 2, ACLED's rigorous and well-defined protocol for conflict event documentation and georeferencing, long temporal span, and broad definition of 'conflict events' remain relevant to this study. Though not considered in Chapter 2, ACLED records relatively detailed information on the groups involved in each conflict event. Each event records 'Actor1,' the primary perpetrator of the conflict event, and 'Actor2' the intended target or victim (ACLED, 2017). The dataset also records 'Ally_Actor1,' if the event was coordinated or executed in conjunction with a second actor, and 'Ally_Actor2,' if a group other than the intended target was affected by the conflict event; neither 'Ally_Actor1' nor 'Ally_Actor2' were considered in this study, but offer intriguing avenues for further research. ACLED actors or allies may represent "governments, rebels, militias, ethnic groups, active political organizations, external forces, and civilians" (ACLED, 2017), and all actors are indexed with official, standardized, unique names. Most actors are politically violent, but the dataset also includes protestors, rioters, and civilians. When necessary as a distinguisher, the location of each actor is included in its official title, e.g. "Civilians (Rwanda)," "Protestors (Kenya)," or "Police Forces of Algeria" (Raleigh et al., 2010).

3.2.4 Detection of Conflict Actors Targeting Refugee Camps

To determine whether specific actors have consistently targeted refugee camps, three metrics were considered: the frequency with which actors caused conflict events near refugee camps, the spatial clustering of the most frequent actors' conflict events around refugee camps, and the most frequent victims of these actors' conflict events.

Frequency of Near-Camp Conflict Events by Specific Actors: To find actors who frequently incite conflict near refugee camps, the minimum distance of each ACLED event to a refugee camp was calculated. All actors described as 'Actor1' in the ACLED dataset for at least one conflict event within 10 km of a refugee camp were identified as well as their frequency of conflict events within 10 km of refugee camps: as in Chapter 2, the radial distance of 10 km was used following Spronhle et al. (2015). After determining their respective conflict frequencies, the five actors with the largest number of near-camp conflict events were identified as potentially targeting refugee camps and considered for further analysis. All other actors listed as 'Actor1' for at least one ACLED event within 10 km of a refugee camp were stratified into quartiles based on the frequency of their near-camp conflicts; five actors were then randomly selected from each quartile for comparison with the five most frequent actors. For the 25 actors explicitly considered in this study, minimum conflict event-camp distance histograms were created to determine how frequently an actor carried out conflict events near refugee camps, compared to other non-refugee settlements.

Spatial Clustering of Near-Camp Conflicts by Specific Actors: To select refugee camps most commonly targeted by frequent near-camp actors, all camps within each country in which frequent near-camp actors operated were considered, as well as all camps in a 50 km buffer region around the border of each country. Including a transboundary border region in this way reflects the commonality of refugees establishing informal settlements close to national borders (Camarena, 2017) and the high percent of UNHCR refugee camps in Africa (77% or 637 camps) within 50 km of a national border (UNHCR Lebanon, 2017). ArcGIS's Intersect Tool was used to select refugee camps within each border region (Figure 3.1),

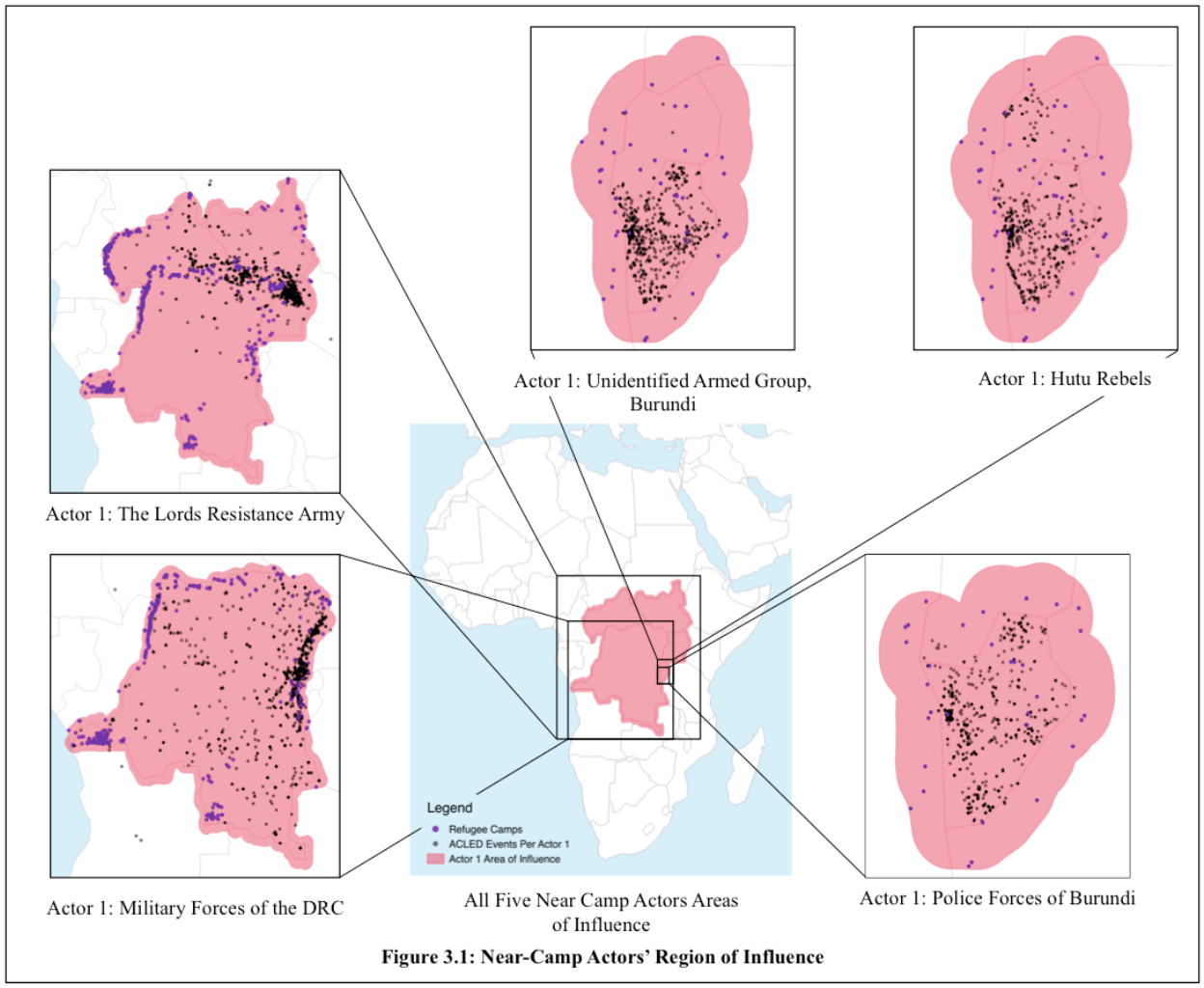

Figure 3.1: Near-Camp Actors' Region of Influence

and, for each of the five most frequent near-camp actors, the L-cross-inhomogeneous function (as described in Chapter 2) was used to assess the spatial clustering of specific actors' conflict events around refugee camp locations. In order to maintain sample sizes of refugee camps large enough to generate statistically meaningful results, neither conflict events nor refugee camps were temporally subset; instead all conflict events by a given actor and all refugee camps in a given actor's region of influence were considered.

Frequent Conflict Targets near Refugee Camps: Since near-camp actors may be active near refugee camps but primarily target groups elsewhere, the five most frequent conflict targets (referred to as 'Actor2' in ACLED) were identified for the five most active near-

camp actors. Then, the distances between conflict events involving these frequent targets and the nearest refugee camp were measured. For each near-camp actor, histograms of the minimum distance from each conflict event to a refugee camp were used to examine whether targets of near-camp actors were indeed commonly targeted near refugee camps. Finally, the 10 most frequent targets of conflict events (i.e. groups listed as Actor2), regardless of which conflict actor instigated the conflict event, were determined. The distances between these targets' conflict events and the nearest refugee camp were calculated to consider the frequency with which these Actor2 groups were involved in conflict events close to refugee camps.

3.3 Results

3.3.1 Detection of Conflict Actors Targeting Refugee Camps

Frequency of Near-Camp Conflicts by Specific Actors: The five most frequent near-camp actors were identified as an Unidentified Armed Group (Burundi), Police Forces of Burundi, Military Forces of the Democratic Republic of Congo, the Lord's Resistance Army, and Hutu Rebels. Of these near-camp actors, two groups were state forces and three are insurgent groups. The distributions of minimum distance from a refugee camp of each conflict event associated with each actor show large spikes in event frequency very close to refugee camps, generally even closer than 10 km from the camp (Figure 3.2). The histograms all exhibit positive-skew indicating conflict events enacted quite far from refugee camps, indicating that none of these actors are exclusively acting near refugee camps. Nevertheless, a significant percentage of each of the five actors' conflict events fell within 10 km of a refugee camp: 49% (735 / 1494) of Unidentified Armed Group (Burundi)'s

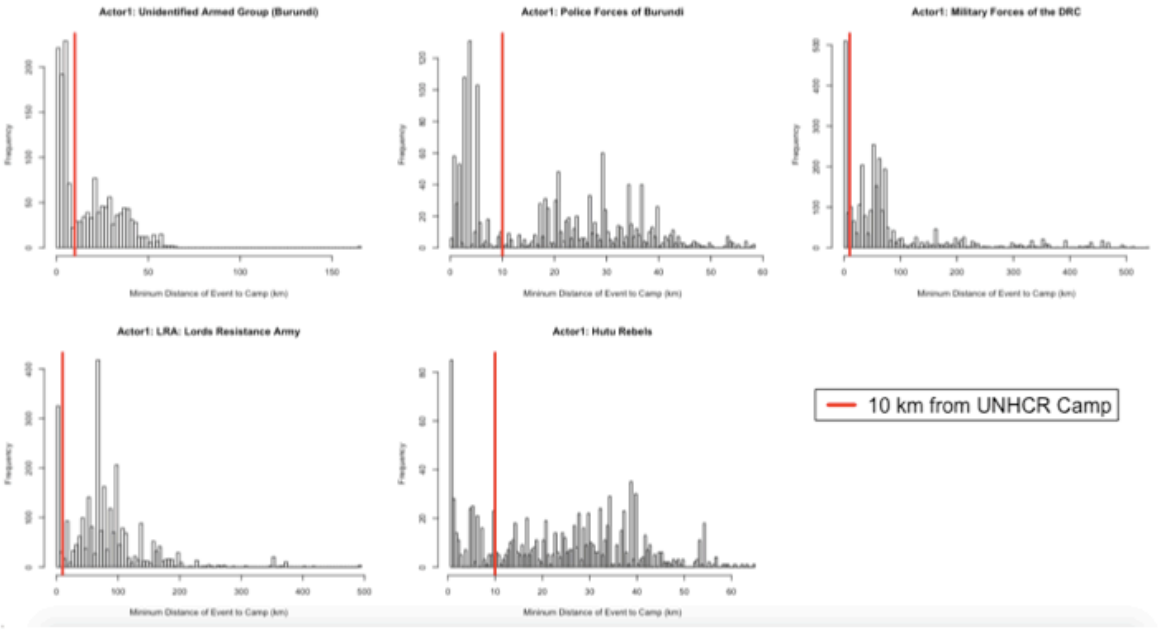

Figure 3.2: Minimum Distance to Refugee Camps from Near-Camp Actors' Conflict Events
Note that the scales of both x- and y-axes change between each plot.

events, 40% (562 / 1389) of Police Forces of Burundi's events, 20% (596/ 2905) of Military Forces of the Democratic Republic of Congo's events, 13% (355 / 2747) of the Lord's Resistance Army's events, and 28% (275 / 995) of Hutu Rebels' events. Four of the five actors targeted refugee camps significantly more frequently than any other single non-refugee settlement while 18% (491 events of a total 2747) of the Lord's Resistance Army conflict events were 60 to 70 km away from the nearest refuge camps; the majority of these events (271) were within 10 km of Gulu, Uganda.

All remaining actors inciting at least one conflict even within 10 km of a refugee camp were subset into quartiles based on frequency of conflict events within 10 km of refugee camps. 187 actors were in first quartile (i.e. one conflict event within 10 km of refugee camps); 81 actors were in the second quartile (i.e. two near-camp conflict events); 123 actors were in the third quartile (i.e. three to seven near-camp conflict events); and

115 actors were in the fourth quartile (i.e. eight or more near-camp conflict events). A random sample of five actors was selected from each quartile, and the distributions of the minimum distance of each actor's conflict events from refugee camps were plotted. The histograms for each of the 20 randomly selected actors are widely varied (Figure 3.3).

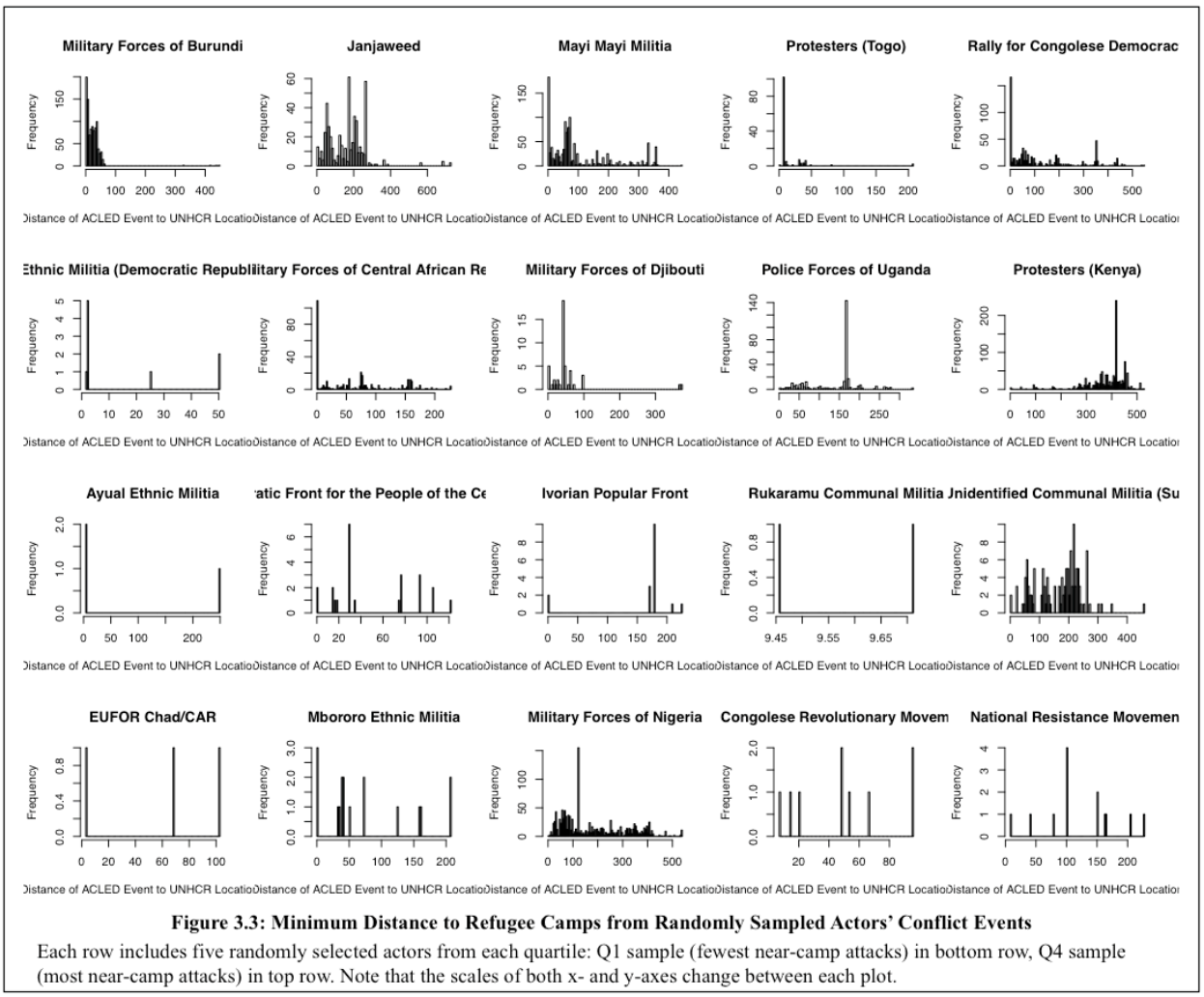

Figure 3.3: Minimum Distance to Refugee Camps from Randomly Sampled Actors' Conflict Events

Each row includes five randomly selected actors from each quartile: Q1 sample (fewest near-camp attacks) in bottom row, Q4 sample (most near-camp attacks) in top row. Note that the scales of both x- and y-axes change between each plot.

Four of the five fourth quartile samples exhibit similar trends to the five most frequent near-camp actors: very frequent near-camp activity as well as tails of various lengths and densities associated with conflict events relatively far from refugee camps. However, one of the fourth quartile samples, Janjaweed, does not appear to significantly target refugee camps in comparison with other locations, and only one actor sampled from quartiles one

through three, Military Forces of the Central African Republic, exhibited a high frequency of near-camp events, relative to other locations. These samples suggest that the five most frequent near-camp actors are not alone in their patterns of violence but also that these patterns vary significantly between groups.

Spatial Clustering of Near-Camp Conflicts by Specific Actors: The L-cross-inhomogeneous function statistics calculated for two of the five most frequent near-camp actors, Unidentified Armed Group (Burundi) and Police Forces of Burundi, resulted in wide confidence envelopes and no statistically significant clustering of conflict events around refugee camps (Figure 3.4). The other three of the five most frequent near-camp actors' conflict events exhibited statistically significant spatial clustering around refugee camps (Figure 3.4). Military Forces of the Democratic Republic of Congo's conflict events were clustered around refugee camps until 46.4 km; the Lord's Resistance Army exhibited clustering of conflict events around refugee camps until 18.8 km and Hutu Rebels' conflict events exhibited clustering until 5.5 km.

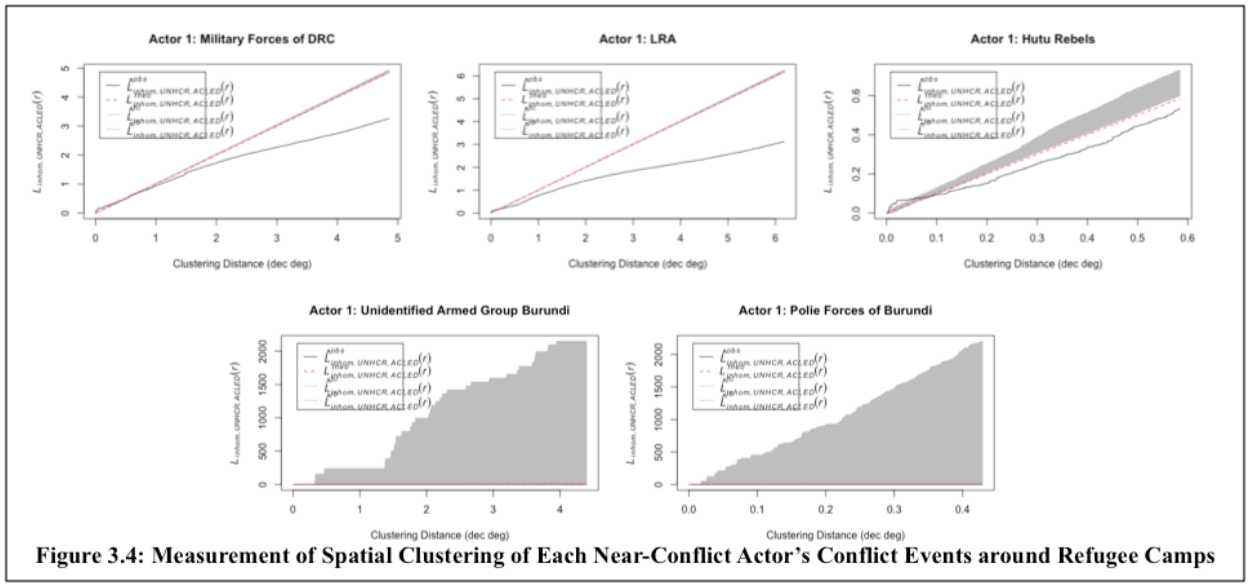

Figure 3.4: Measurement of Spatial Clustering of Each Near-Conflict Actor's Conflict Events around Refugee Camps

Frequent Conflict Targets near Refugee Camps: The most frequent targets (i.e. groups coded as ACLED 'Actor2') of all five near-camp actors' conflict events were civilian populations (Figure 3.5). All of the near-camp actors targeted civilian populations in at least two different nations; for example, 'Civilians (Burundi)' and 'Civilians (Rwanda)' were two of the Hutu Rebels' five most frequent targets. For three of the five groups, however, only one civilian group was within their five most frequent targets. Other than civilians, the dominant trend was insurgent groups' targeting state forces and state forces targeting insurgent groups. Finally, four of the five near-camp actors were involved in sizeable counts of conflict events for which no Actor2 was recorded.

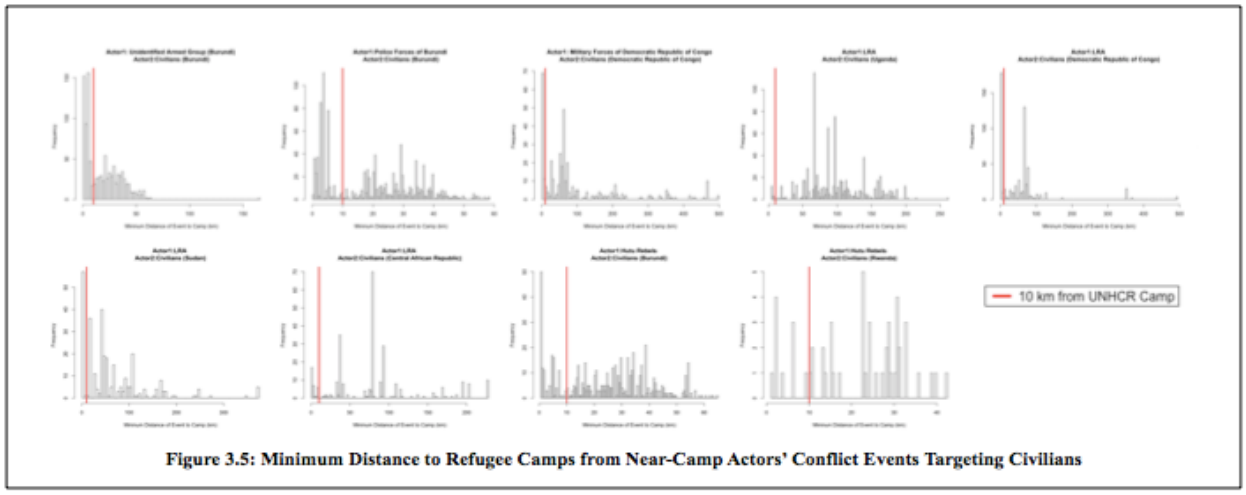

Figure 3.5: Minimum Distance to Refugee Camps from Near-Camp Actors' Conflict Events Targeting Civilians

Considering each near-camp actor's five most frequent target groups, histograms of the distance of each Actor2's conflict events from refugee camps (all plots in Appendix II) generally show high frequencies of events within 10 km of a refugee camp: 17 of the 25 target groups were more frequently involved in a conflict event within 10 km of a refugee camp than any other single non-refugee settlement. Even for target groups who were more frequently involved in conflicts near non-refugee settlements, these targets still experienced many conflict events within 10 km of refugee camps.

Of all named targets (i.e. all Actor2 groups), regardless of which conflict actor instigated the conflict event (i.e. associated with any Actor1), civilians were the most frequently targeted, representing 31% (2802) of the total 8959 conflict events within 10 km of refugee camps. Four of the other 10 most frequent targets were state forces, targeted in 8% (746) of near-camp conflict events. One insurgent group, Hutu Rebels, was within the top 10 most frequent targets of conflict events within 10 km of refugee camps, but in general insurgent groups were targeted near refugee camps much less frequently than civilians or state forces. Of remaining near-camp conflict events, 21% (1881) of events were not associated with a named target (i.e. Actor2), with no additional information. Histograms of the minimum distance of conflict events from refugee camps for conflict events involving each of the 10 most frequently targeted near-camp groups show high frequencies of events near refugee camps but also indicate that all of these groups are also frequently targeted at other non-refugee settlements (Figure 3.6).

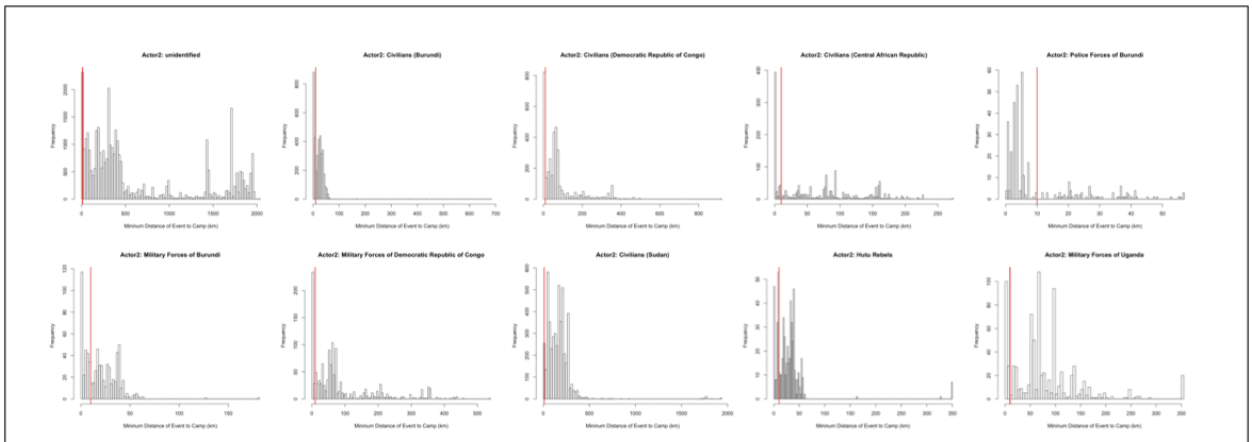

Figure 3.6: Minimum Distance to Refugee Camps from Conflict Events of Most Frequent Near-Camp Targets

3.4 Discussion

This study offers new insights that extend theories of civilians as targets of conflict by specifically considering conflicts between specific actors and civilian populations near or within refugee camps. Previous studies have established links between characteristics of intrastate conflict and increased likelihood that insurgents, state forces, or other conflict actors will enact violence on civilian populations (e.g. Wood, 2010; Balcells and Kalyvas, 2014). Past research has focused, however, on civilians that remain within conflict zones rather than refugee populations that have ostensibly migrated across the border, away from the conflict. Because many refugee camps appear to experience relatively frequent conflict (Chapter 2), this study considers whether specific conflict actors systematically target refugee camp populations.

The results of this study indicate that some conflict actors do appear to consistently target refugee camps. Both insurgent groups (e.g. Hutu Rebel and the Lord's Resistance Army) and state forces (e.g. Police Forces of Burundi and Militiary Forces of the Democratic Republic of Congo) were found to incite conflict within close proximity to refugee camps with high frequencies. Moreover, spatial clustering of some actors' conflict events around refugee camps was detected, and civilian populations were shown to be regular targets by these actors. Violence against civilians in such close proximity to refugee camps suggests that refugee populations, specifically, were likely to be impacted by these conflict events, both directly, as targets, and indirectly, as proximal conflict events affect perceptions of security.

Not all conflict actors appear to follow these patterns, however. Many actors simply did not engage in conflict events close to refugee camps while others simply did not act

near refugee camps frequently. However, the five most frequent near-camp actors identified and considered in this study exhibited clear and consistent patterns of violence around refugee camps, as did several other actors who were considered through a stratified random sample. The variation in the spatial pattern of conflict events across actors suggests that, just as not all conflict actors target civilians, not all conflict actors target refugee camps. These results indicate a need to for further research to explain why some conflict actors choose to target refugee populations.

Of the five most active near-camp actors – three insurgent groups and two state forces – considered in detail in this study, all five showed evidence of targeting refugee camps, frequently enacting conflict events against civilians close to refugee camps. On average, 30% of these actors' conflict events fell within 10 km of refugee camps, and three of the actors' conflict events exhibited statistically significant spatial clustering around refugee camps. All five near-camp actors tended to frequently target civilians, often in multiple nations, and these conflict events enacted against civilians predominantly occurred within 10 km of refugee camps. The five actors most frequently carrying out conflict events near refugee camps were often acting in the same regions. Three of the groups, Unidentified Armed Group (Burundi), Police Forces of Burundi, and Hutu Rebels, operated in overlapping regions of Rwanda and Burundi. The other two groups, Military Forces of the Democratic Republic of Congo and the Lord's Resistance Army also operated in a shared geography: Military Forces of the Democratic Republic of Congo engaged in conflict events primarily in the Democratic Republic of Congo and though the Lord's Resistance Army operated across a larger region, the group also frequently acted in the Democratic Republic of Congo. This geographic overlap suggests that one near-camp actor

may draw other actors into the proximity of refugee camps as well. Previous research has indicated that insurgent groups may recruit within refugee camps, or even seek sanctuary and hide within refugee camps (Choi and Salehyan, 2013). If insurgent groups imbed themselves within refugee camps, that could lead to state forces engaging near refugee camps, in response to the insurgent presence. Though this study offers no specific corroboration of these relationships, the findings that some insurgent groups and state forces both frequently engage in conflict near refugee camps in the same regions suggest the merit of a more detailed consideration of the various mechanisms leading both groups to target refugee camps.

3.5 Conclusion

By measuring the pattern of actors targeting refugee camps, this research identifies conflict actors, both insurgents and state forces, who appear to target refugee camps. These patterns of conflict are not ubiquitous across all actors, but this study identified five actors whose pattern of conflict over several years clearly depicts a consistent targeting refugee camps. A stratified random sampling of other actors suggests that these patterns are not exclusive to the actors most active near refugee camps nor to a specific actor type, as both insurgent groups and state forces incite near-camp conflicts. Future research is needed to explore why refugee camps are targeted, what overarching conflict conditions may result in near-camp conflict, and how insurgents, state forces and refugee populations interact in ways that may lead to conflict targeting refugee camps.

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4. Conclusions

4.1 General Conclusions

This research demonstrates that African refugee camps face significant and frequent security threats by various conflict actors. Using spatial-statistical methods to consider the relationships between all UNHCR refugee camps in Africa, in operation after 1996, and all conflict events in the Armed Conflict Location and Event Database Project's (ACLED) Africa dataset, from 1997-2016, this thesis found that refugee camps face security threats from frequent, close conflict events; that conflicts move toward refugee camps following camp establishment; and that specific actors' patterns of conflict suggest deliberate and repeat targeting of refugee camps.

In Chapter 2, the proximity of conflict events to refugee camps, the spatial clustering of conflict events around refugee camps, and the change in distance between conflict events and refugee camp locations before and after camp creation were analyzed. All three metrics indicated that conflict events are proximal to many refugee camps; 37% of refugee camps experienced at least one conflict event within 10 km of their locations, spatially significant clustering of conflict events around refugee camps was detected in every year of the study, and the minimum distance of refugee camps from conflict events decreased by an average of 11 km in the years following camp establishment. In Chapter 3, examples of both insurgent and state forces were found to have instigated hundreds of conflict events within 10 km of refugee camps, civilians were frequently targeted by these actors, again, within close proximity of refugee camps, and many actors' conflict events exhibited statistically significant spatial clustering around refugee camps.

Though none of the metrics calculated offer direct confirmation that refugee camps were specifically targeted, when collectively assessed, a pattern of frequent conflict near refugee

camps emerges. Aside from the direct threat to life and wellbeing from conflict events, even if refugee populations are not the intended targets, living within close proximity of frequent and persistent conflicts poses its own, if less direct threat. Not only does experiencing proximal conflict exact a significant psychological toll (Namakula and Witter, 2014) but the association between refugees and conflict can lead governments hosting refugees to enact exclusionary policies (Loescher and Milner, 2005), limiting the economic and educational opportunities of refugees and broadly impacting the well-being of already vulnerable communities (Chkam, 2016).

The results of this thesis highlight the need for many avenues of further study. First, explorations of how proximal conflict affects refugee populations are crucial to understanding the severity of the threat detected in this research and to directing policy solution or humanitarian interventions to assist refugee camps affected by these threats. Second, experiences of conflict at refugee camps are highly variable and deeper understanding of why specific refugee communities or camps experience more or less conflict is imperative. Such research could identify ways to create safer refugee camps and thus protect refugee communities from further conflict. Third, research examining the factors that drive certain insurgent groups and state forces targeting refugee camps would be most welcome. Understanding the overarching conflict conditions that may result in near-camp conflict could both identify specific refugee camps that are at the greatest risk of victimization and in need of immediate and direct humanitarian intervention, and guide the design of locally sensitive policy to prevent continued victimization of vulnerable refugee populations.

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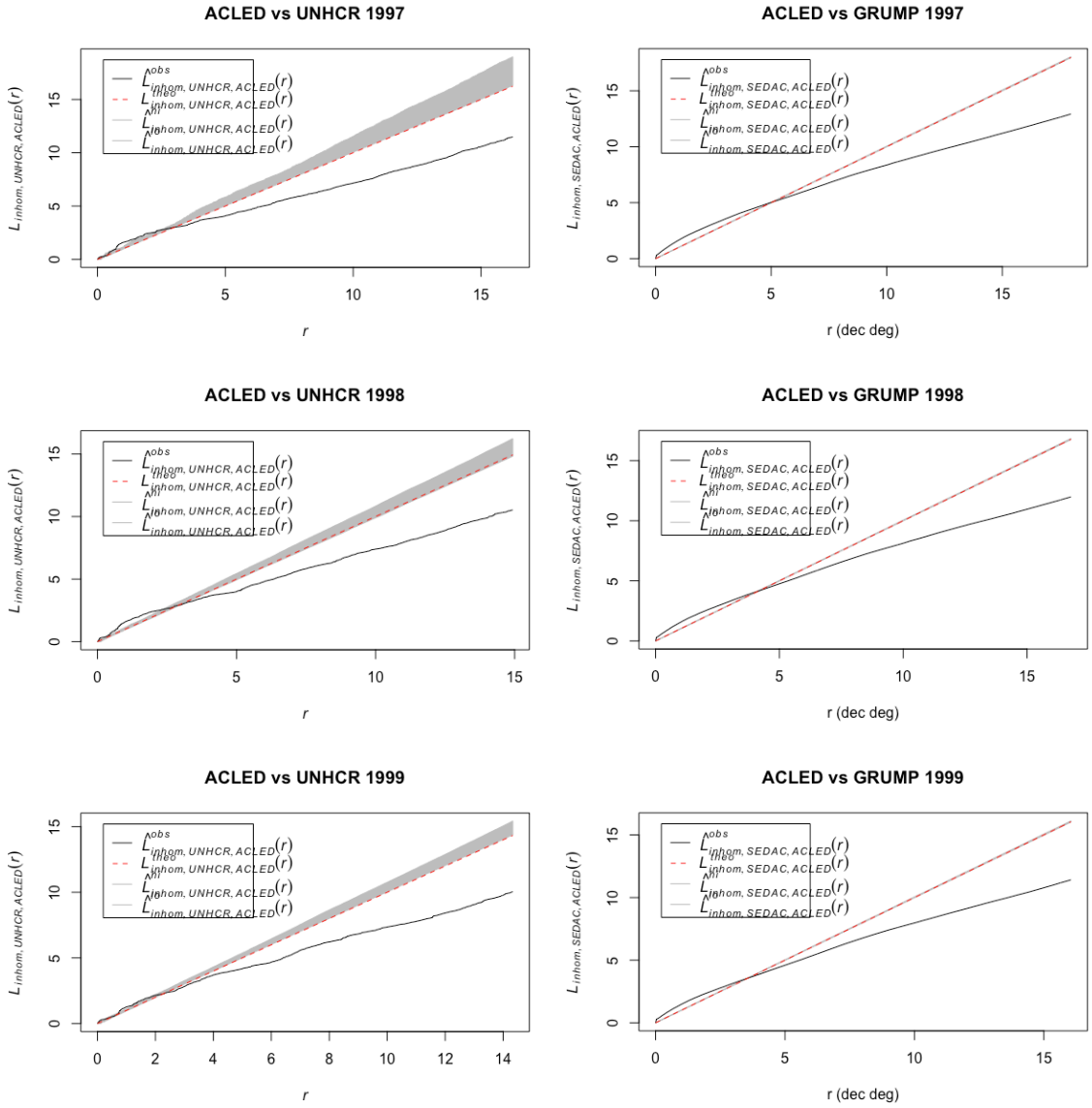
APPENDICES

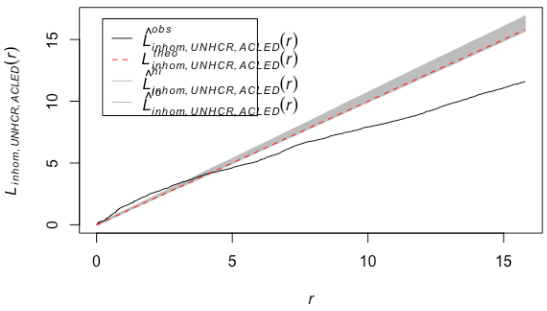
Appendix I: Chapter 2 – Spatial Clustering Measurements

I.A. Measurement by Year

Plots depict L-cross-inhomogeneous measurements of spatial clustering of ACLED conflict events around settlements, either UNHCR refugee camps (plots on the left), or non-refugee settlements (plots on the right). Note that both x- and y-axes change scale between plots.



ACLED vs UNHCR 2000



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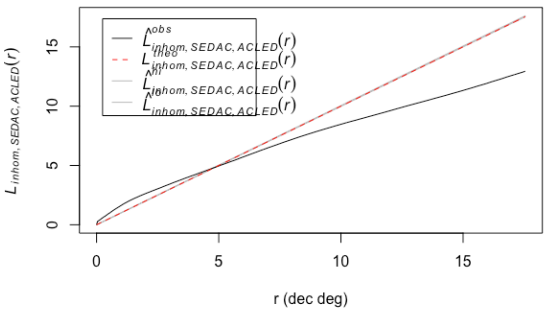
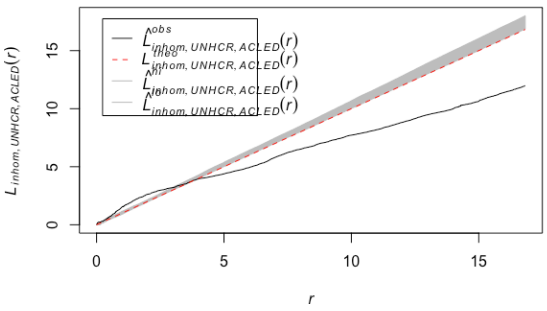


ACLED vs UNHCR 2001



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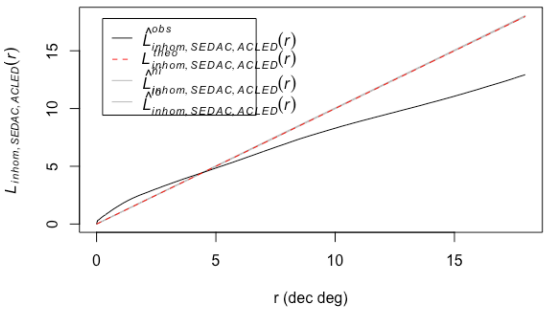
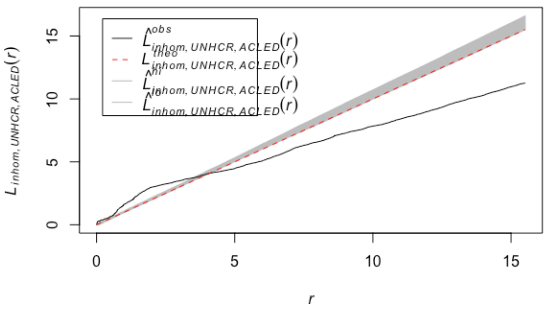


ACLED vs UNHCR 2002



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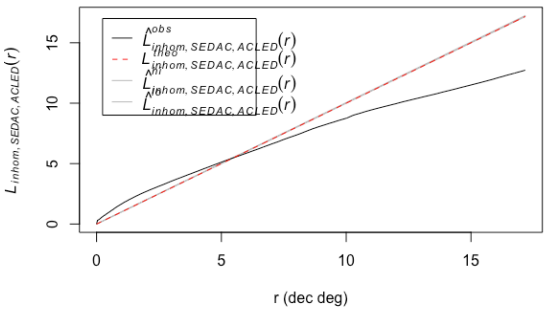
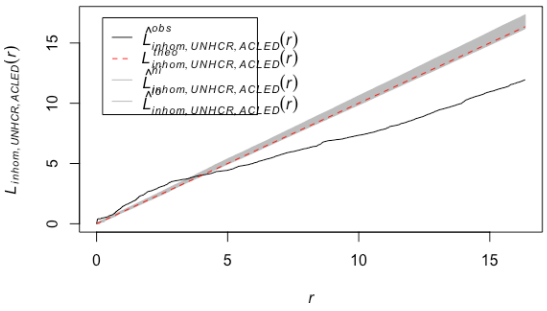


ACLED vs UNHCR 2003



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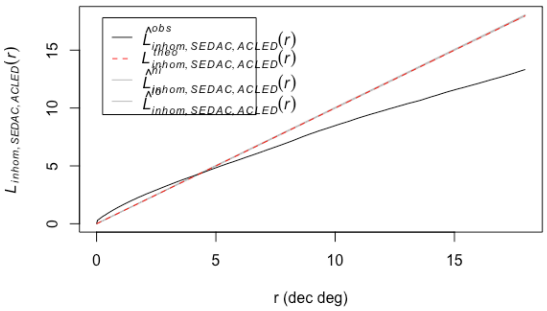

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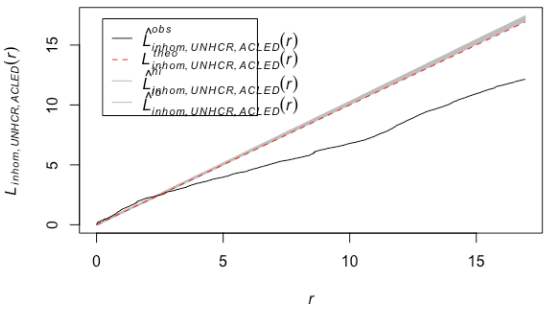

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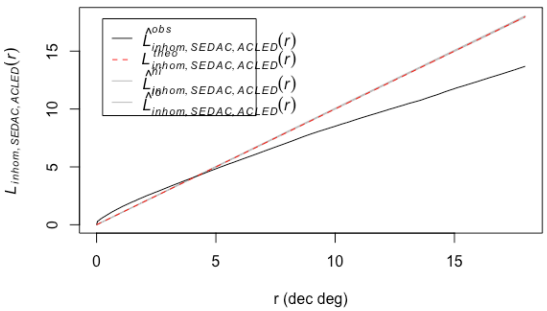

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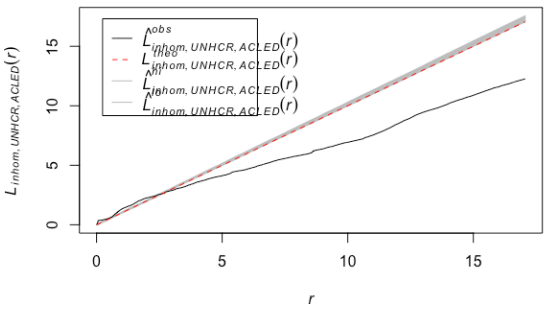
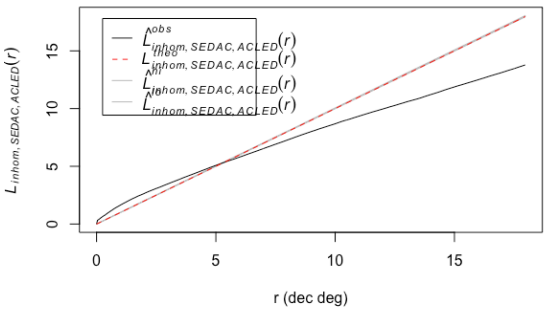
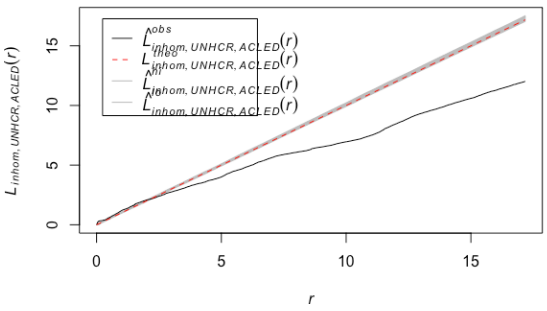


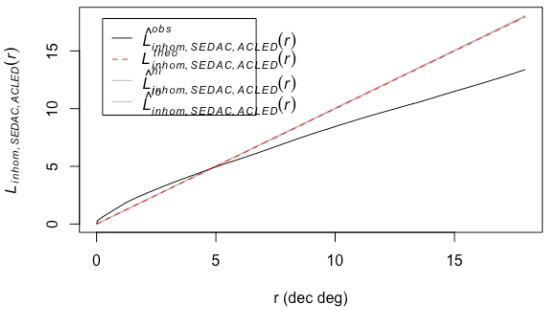
ACLED vs GRUMP 2005



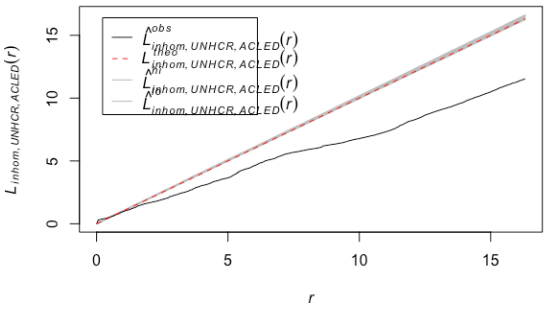
ACLED vs UNHCR 2006



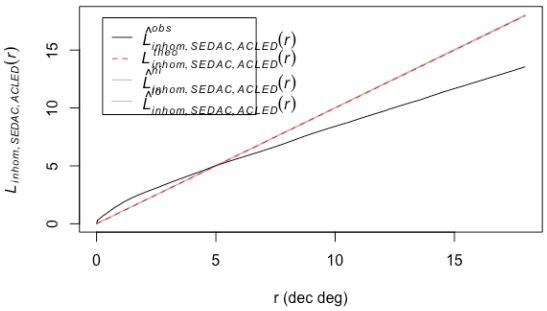
ACLED vs GRUMP 2006



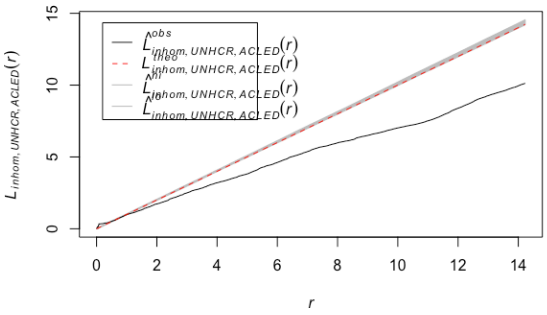
ACLED vs UNHCR 2007



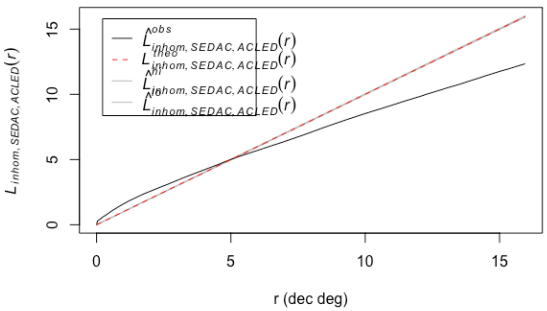
ACLED vs GRUMP 2007



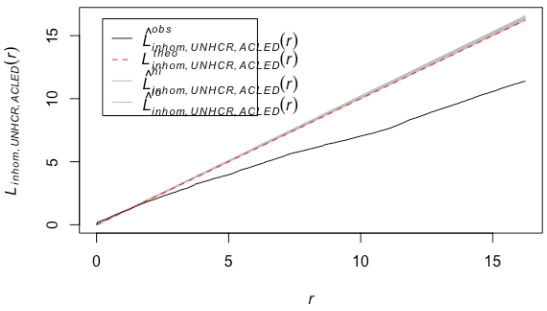
ACLED vs UNHCR 2008



ACLED vs GRUMP 2008



ACLED vs UNHCR 2009



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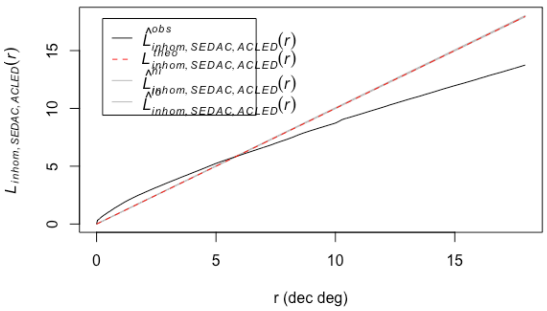

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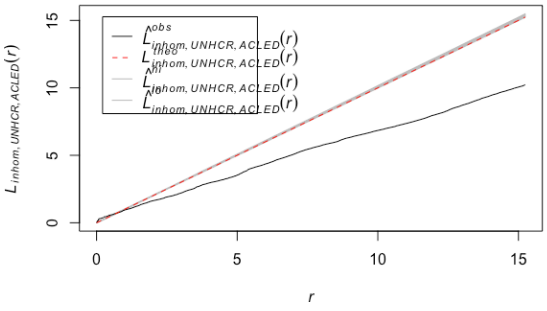

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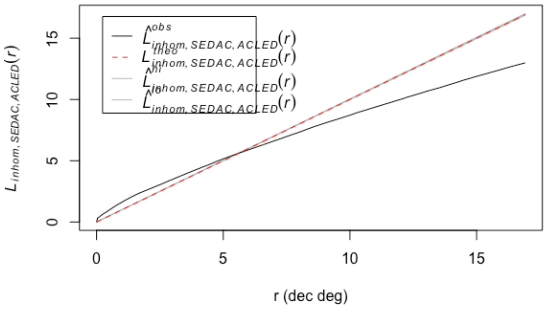
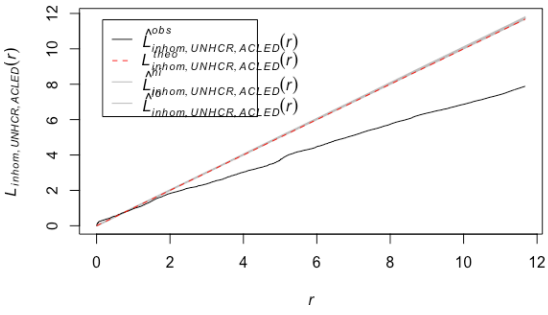
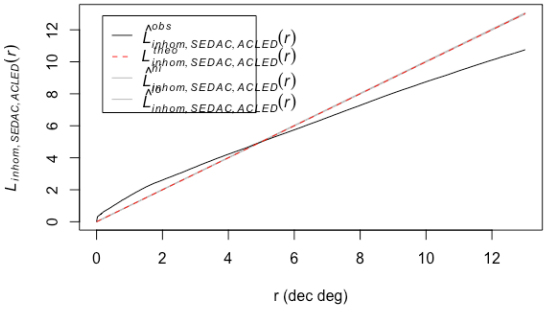


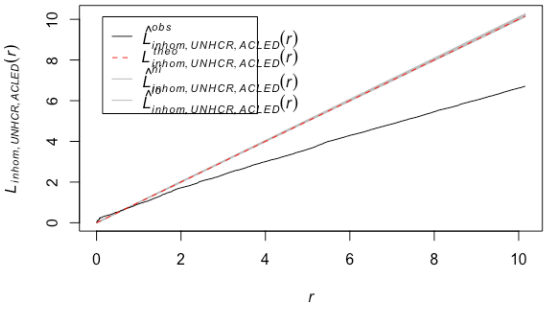
ACLED vs UNHCR 2011



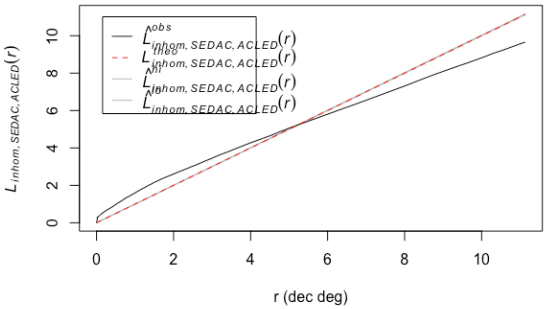
ACLED vs GRUMP 2011



ACLED vs UNHCR 2012



ACLED vs GRUMP 2012



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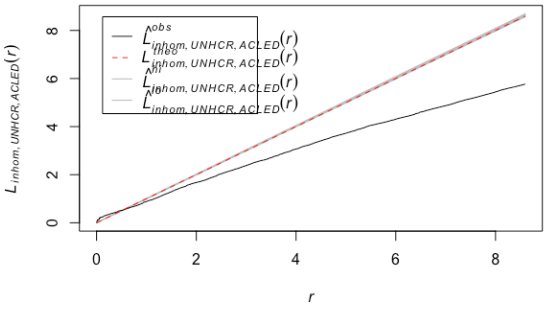
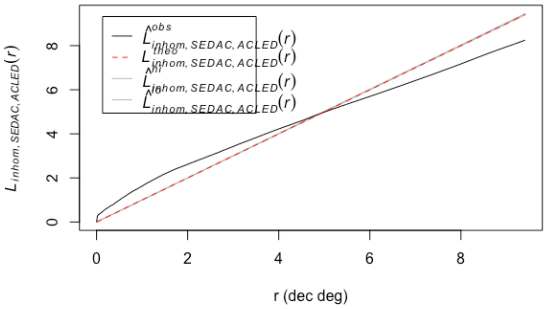


ACLED vs GRUMP 2013



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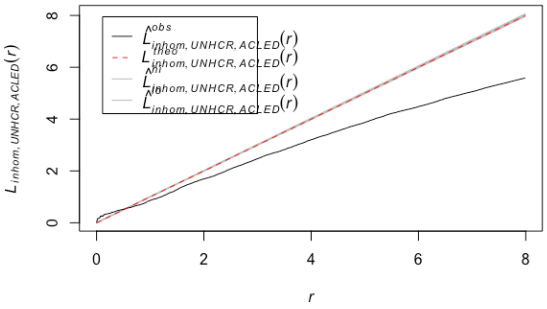

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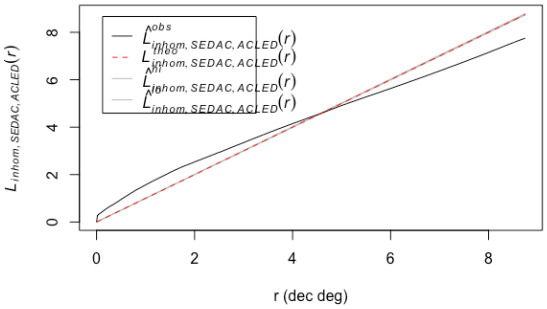
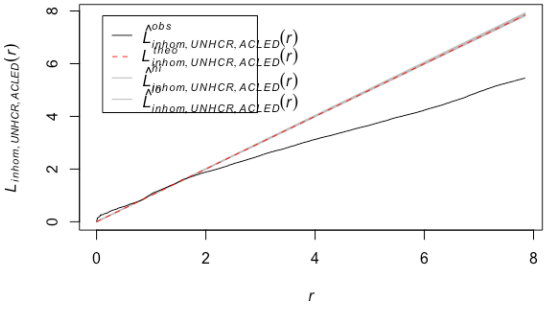
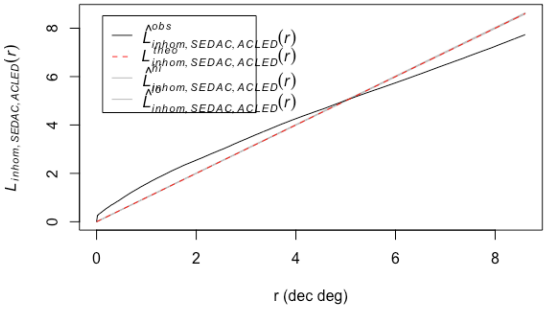
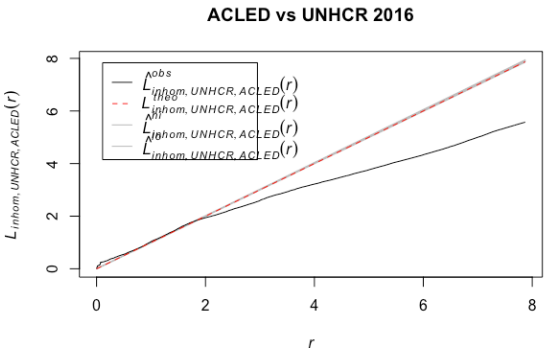


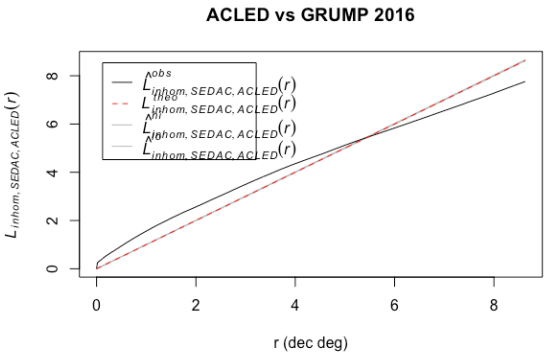
ACLED vs UNHCR 2015



ACLED vs GRUMP 2015

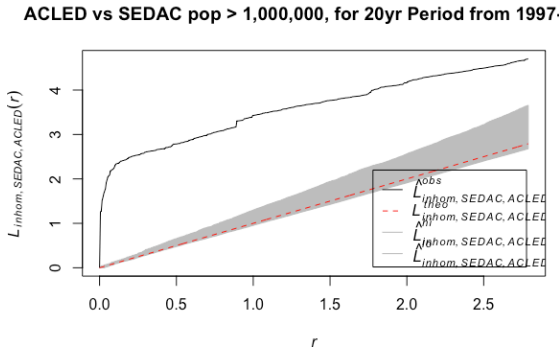


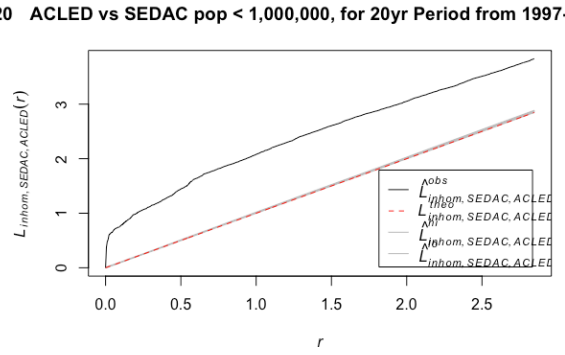


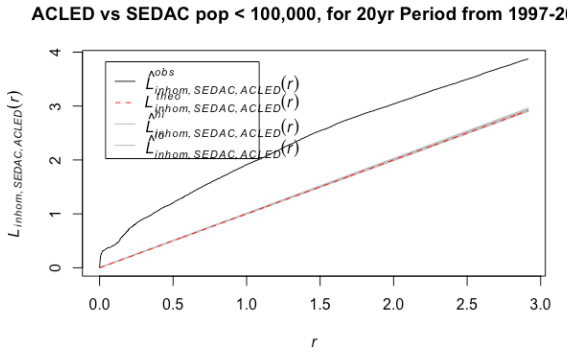


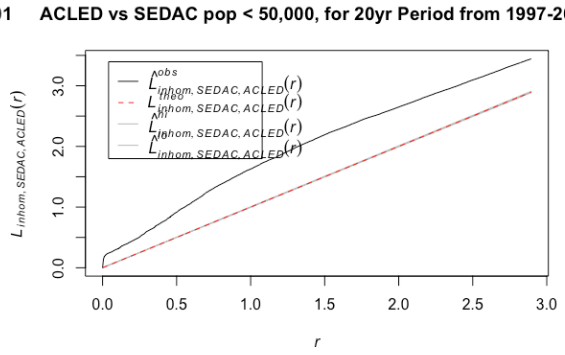
I.B. Measurement by Population

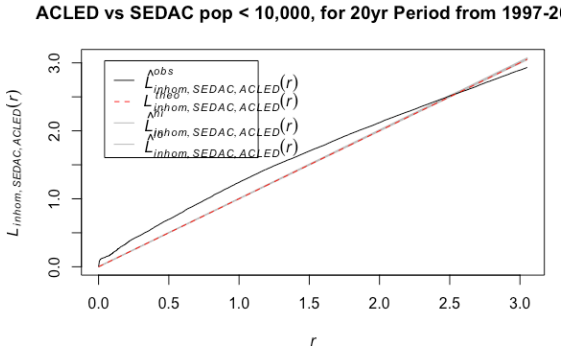
Plots depict L-cross-inhomogeneous measurements of spatial clustering of ACLED conflict events around non-refugee settlements, subset by population size. Note that both x- and y-axes change scale between plots.







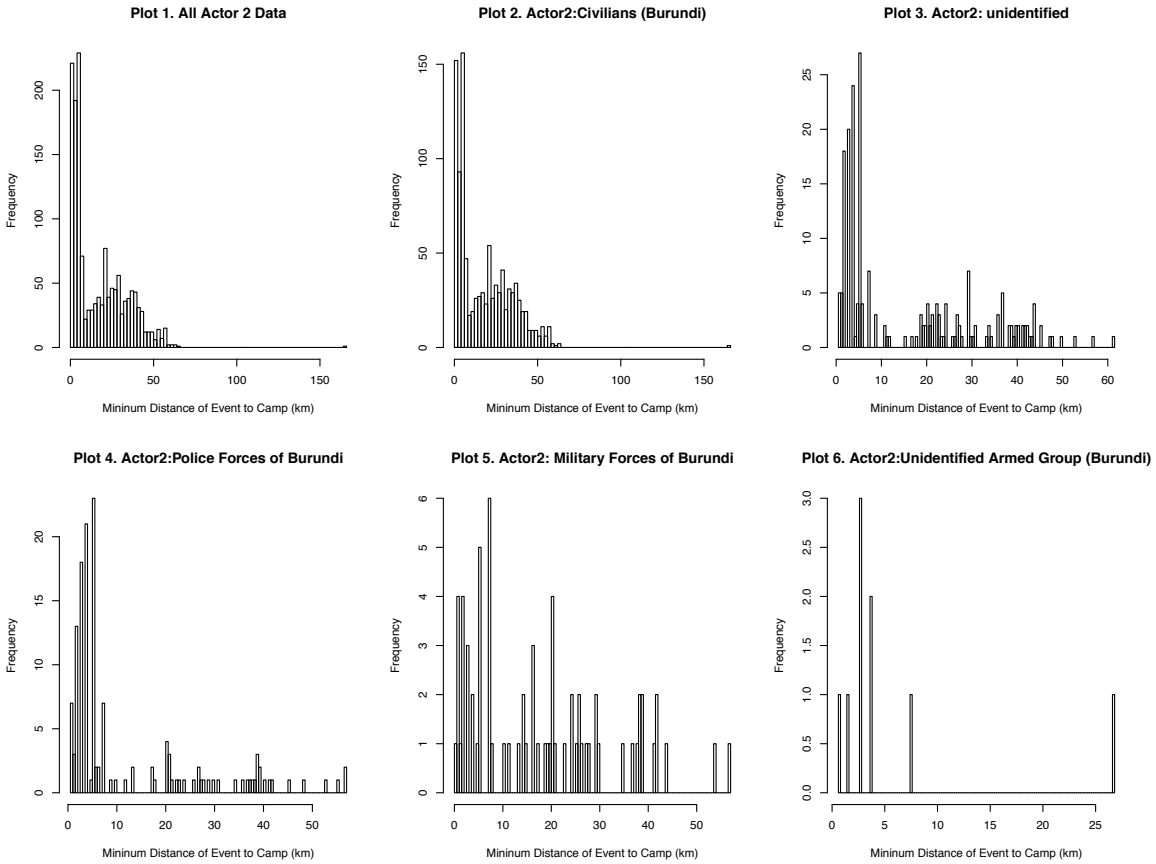




Appendix II: Chapter 3 – Near Camp Actors' Most Frequent Targets

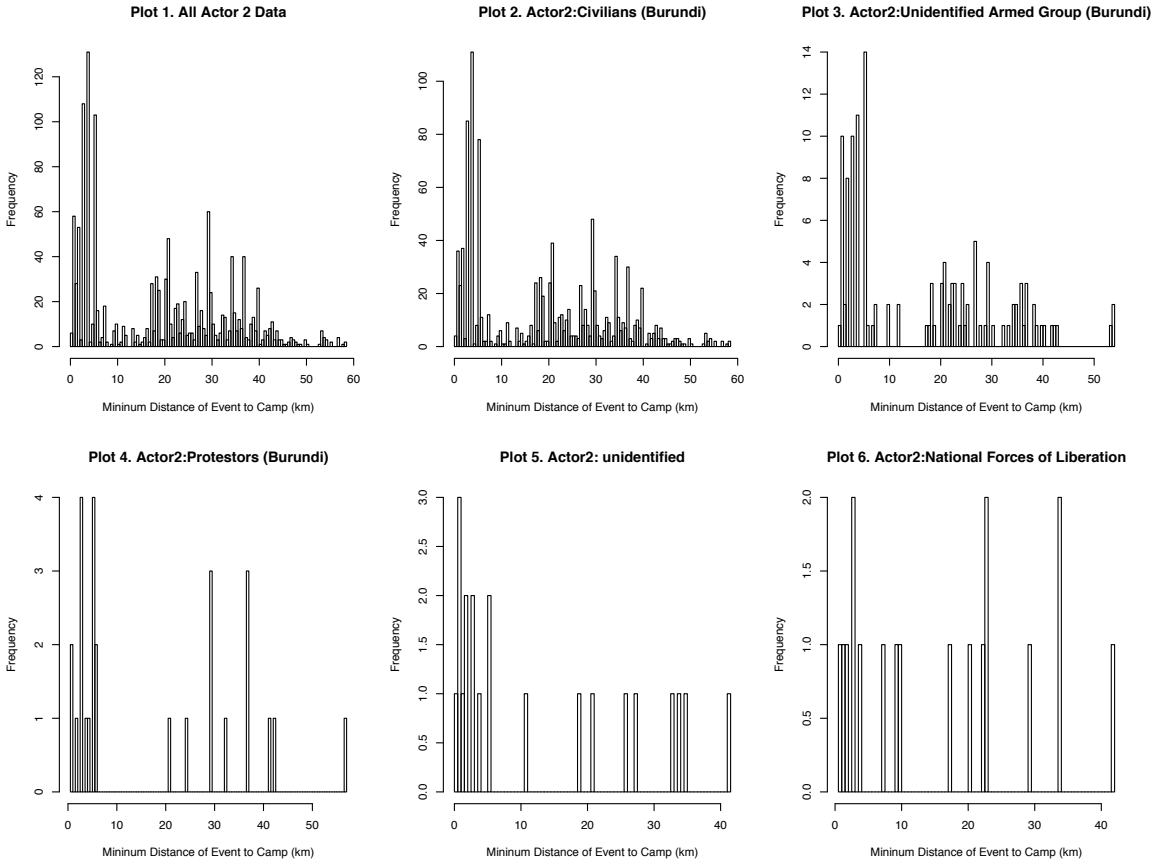
II.A. Unidentified Armed Groups (Burundi)

Plot 1 shows all Unidentified Armed Group (Burundi) conflict events, regardless of Actor2. Plot 2 through Plot 6 show the five most frequent Actor2s listed in Unidentified Armed Group (Burundi) conflict events, with Plot 2 showing the most frequent Actor2 and Plot 6 showing the fifth most frequent. Note that both x- and y-axes change scale between plots.



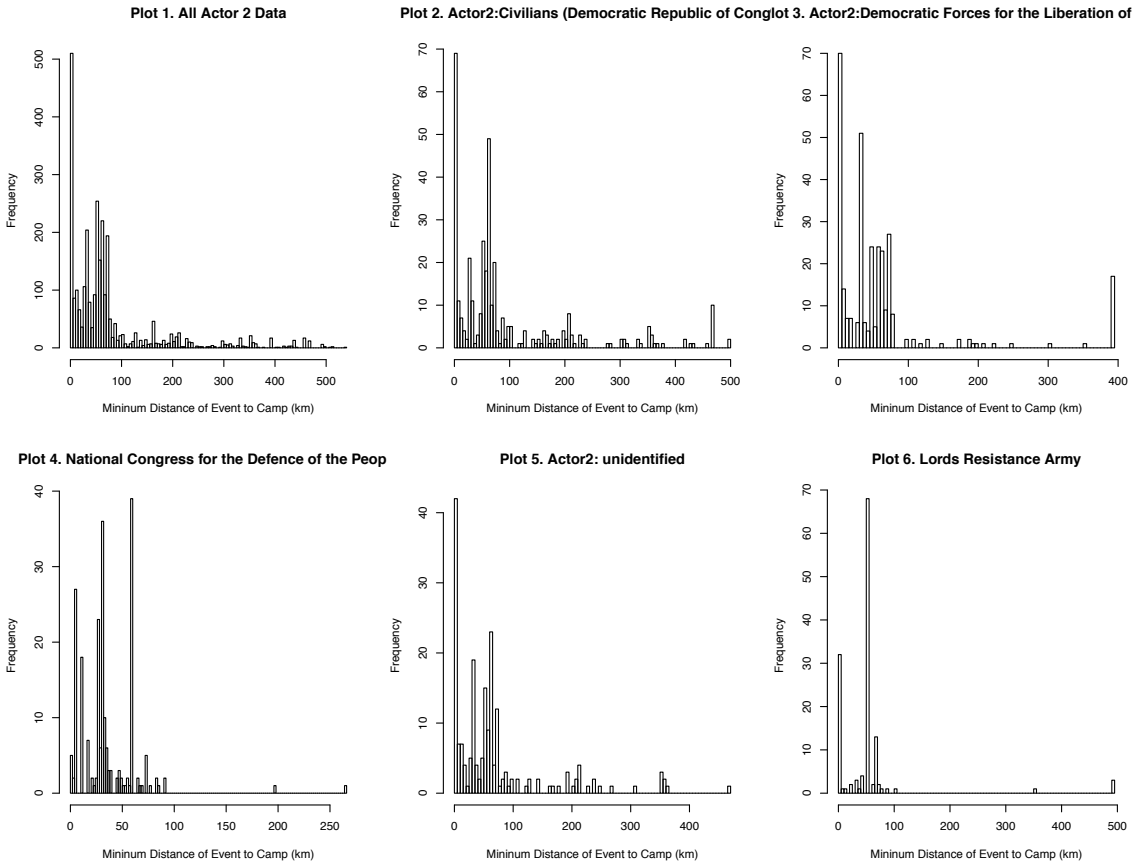
II.B. Police Forces of Burundi

Plot 1 shows all Police Forces of Burundi conflict events, regardless of Actor2. Plot 2 through Plot 6 show the five most frequent Actor2s listed in Police Forces of Burundi conflict events, with Plot 2 showing the most frequent Actor2 and Plot 6 showing the fifth most frequent. Note that both x- and y-axes change scale between plots.



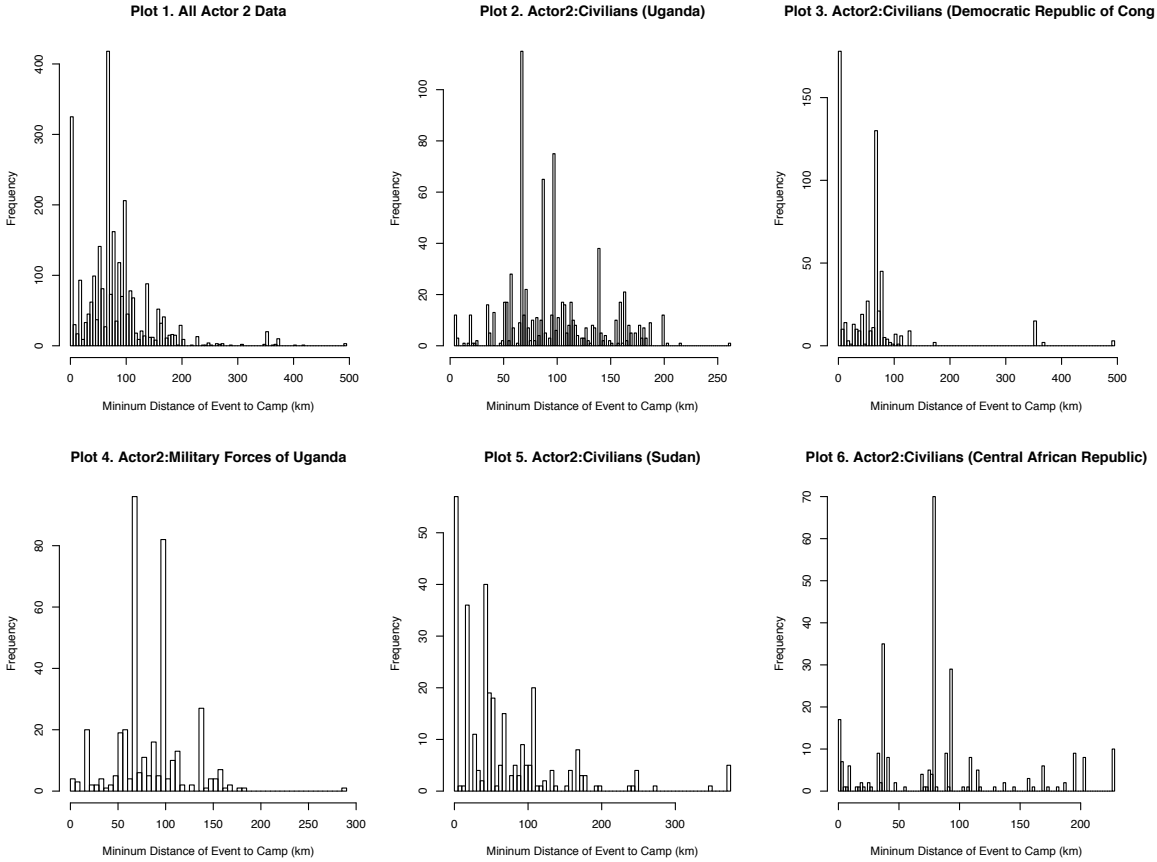
II.C. Military Forces of the Democratic Republic of Congo

Plot 1 shows all Military Force of the Democratic Republic of Congo conflict events, regardless of Actor2. Plot 2 through Plot 6 show the five most frequent Actor2s listed in Military Force of the Democratic Republic of Congo conflict events, with Plot 2 showing the most frequent Actor2 and Plot 6 showing the fifth most frequent. Note that both x- and y-axes change scale between plots.



II.D. The Lord's Resistance Army

Plot 1 shows all Lord's Resistance Army conflict events, regardless of Actor2. Plot 2 through Plot 6 show the five most frequent Actor2s listed in Lord's Resistance Army conflict events, with Plot 2 showing the most frequent Actor2 and Plot 6 showing the fifth most frequent. Note that both x- and y-axes change scale between plots.



II.E. Hutu Rebels

Plot 1 shows all Hutu Rebel conflict events, regardless of Actor2. Plot 2 through Plot 6 show the five most frequent Actor2s listed in Hutu Rebel conflict events, with Plot 2 showing the most frequent Actor2 and Plot 6 showing the fifth most frequent. Note that both x- and y-axes change scale between plots.