Samuel Henkin, Marcus A. Boyd* and Adam Martin

Southeast Asia after the Caliphate: Identifying Spatial Trends in Terrorism and Radicalization in Malaysia

<https://doi.org/10.1515/spp-2020-0001>

Received January 16, 2020; accepted July 16, 2020

Abstract: Recent scholarship on militant Islamist radicalization in Southeast Asia highlights the significance of local context in understanding support and recruitment into militancy. While research on terrorism in Southeast Asia engenders a dynamism of epistemic inquiry in diverse areas of research, an empirical mapping of radicalization is generally absent. Research on militant Islamic radicalization in Southeast Asia needs more robust consideration of geospatial relations and data to fill this lacuna. A geospatial analysis is, above all else, synthesis. It bridges spatial statistical analytics and qualitative socio-spatial investigation. We argue that a geospatial analytical approach to understanding radicalization offers a way in which to begin empirically mapping radicalization in the region. Correspondingly, our work considers militant Islamic radicalization in Malaysia by employing geospatial analysis to build a more nuanced layering and comprehensive understanding of the spatial arrangements of radicalization. Viewed from this perspective, radicalization can be understood through spatial logics and practices aimed at facilitating better understandings of socio-political relations of political violence and terrorism more broadly.

Keywords: geospatial analysis, Malaysia, radicalization, Southeast Asia, terrorism

***Corresponding author: Marcus A. Boyd**, The National Consortium for the Study of Terrorism and Responses to Terrorism (START), University of Maryland, College Park, MD, USA, E-mail: boydma@umd.edu. <https://orcid.org/0000-0002-6872-2216>

Samuel Henkin and Adam Martin, The National Consortium for the Study of Terrorism and Responses to Terrorism (START), University of Maryland, College Park, MD, USA

1 Introduction

The loss of the territorial caliphate in Syria and Iraq will force the Islamic State – or some reconstituted offshoot – to seek new territory. While a formal *wilayat*, a province of its caliphate, does not currently exist in Southeast Asia, the adaptability of Islamic State recruitment to radicalization shows success in Southeast Asia. The establishment of *Katibah Nusantara Lid Daulah Islamiyyah*, a dedicated Southeast Asian military unit within the Islamic State, is illustrative of ISIS recruitment success. Moreover, ISIS mobilization and ironically creative use of social media in recruitment efforts across Southeast Asia continues to metastasize, drawing significant analytical inquiry in attempts to understand whether ISIS will survive/revive itself by exploiting radicalized networks elsewhere, particularly in Southeast Asia.¹

Militant Islamic radicalization is not new in Southeast Asia. The region has some of the world's oldest and most active militant Islamist organizations dating back to post-colonial insurgencies challenging evolving state structures. Since then, radicalization and terrorism landscapes have evolved dynamically in Southeast Asia as the region constitutes an “enabling environment” in which militant Islamist groups like, Jemaah Islamiyyah (JI), Kumpulan Mujaheddin Malaysia (KMM), and Abu Sayyaf Group (ASG), flourish.² Even so, radicalization in Southeast Asia is often understudied in comparison to Europe and Middle Eastern countries in terrorism studies despite having a quarter of the world's Muslim residents, an estimated 240 million.³

The purpose of this article is to forward a geospatial perspective and approach to better understand socio-political relations and spatial arrangements of radicalization and terrorism in Southeast Asia. While a full geographic perspective on terrorism requires significant contributions from other fields of study, in this paper we advance a geospatial analytical approach to radicalization in Southeast Asia to encourage better integration of geographic perspectives in the study of terrorism. This is not to insinuate a geographically deterministic view of a radical regional Islamist movement, which is deeply flawed;⁴ rather a geospatial approach

1 Nathaniel L. Moir, “ISIL Radicalization, recruitment, and Social Media Operations in Indonesia, Malaysia, and the Philippines,” *PRISM*, 7, no. 1 (2017), 91–107.

2 Paul J. Smith, eds., *Terrorism and Violence in Southeast Asia: Transnational Challenges to States and Regional Stability* (London: Routledge, 2005), xii.

3 Julie Chernov Hwang, “Pathways into Terrorism: Understanding entry into and Support for Terrorism in Asia,” *Terrorism and Political Violence*, 30, no. 6 (2018), 883–889.

4 John Sidel, *The Islamist Threat in Southeast Asia: A Reassessment*, (Washington, DC: East-West Center, 2007): 3.

connects spatial manifestations of the interplay of Islam, radicalization, violence, and terrorism/counter-terrorism across Southeast Asia.⁵ From our perspective, geospatial approaches to radicalization transgress distinct geographic regions and places allowing for an analysis of emerging trends and patterns of spatial processes and practices. This can be better accomplished by blending spatial statistics and qualitative interpretation of spatial data, enabling the terrorism studies community to expand broader literature and draw connections between the unique experiences and recent trends of militant Islamists in Southeast Asia to other vulnerable spaces across the world.

To illustrate our conceptualization of a geospatial approach to radicalization, we provide specific analyses of spatial arrangements of radicalization and political violence in Southeast Asia to illustrate the overall value of geospatial approaches. We proceed as follows. First, we provide a brief overview of research on radicalization and terrorism in Southeast Asia. Subsequently, we consider the geographic and historical contexts of militant Islamist radicalization and terrorism in Malaysia. Malaysia's geography and history with militant Islamist radicalization converge as significant vectors of analysis. Next, we outline our approach and methodology. This is followed by a specific local-scaled geospatial analysis of militant Islamist activity along the Malaysia–Thailand border which begins the process of empirically mapping radicalization in Malaysia.

It is our aim to point out that examining radicalization through a geospatial lens demonstrates how the possibilities for radicalization effect, and reflect, the spatialities of historical and socio-political conditions of Malaysia. We conclude with a synopsis of our findings emphasizing the strengths of our geospatial approach to analyzing militant Islamist radicalization in Malaysia. Moreover, we call on scholars in terrorism studies and related fields to fully engage the spatial arrangements of radicalization.

1.1 Radicalization and Terrorism Research in Southeast Asia

Since 9/11 three broad but interrelated questions have driven research on radicalization and counter-terrorism research: (1) How and (2) why do individuals join militant Islamist groups and (3) what motivates individuals to support militant Islamist groups? Accordingly, there is a robust literature that interrogates support of, and pathways to, militancy to identify potential radicalization factors.⁶

⁵ Medina, Richard M., and George F. Hepner. "Advancing the understanding of sociospatial dependencies in terrorist networks." *Transactions in GIS* 15, no. 5 (2011): 577–597.

⁶ Ibid., 883; John Horgan, "From Profiles to Pathways and Roots to Routes: Perspectives from Psychology on Radicalization into Terrorism." *The ANNALS of the American Academy of Political*

Inevitably, there is variance in determining which factors, roles, phenomena, and experiences engender radicalization. Nevertheless, there is general agreement that radicalization and joining terrorist organizations is a continual process of “becoming”.⁷ We too consider radicalization—as becoming as it is—through heterogeneous inquiry of processes and relations. Specifically, we emphasize spatial processes and relations. The question of “where?” continues to permeate research on radicalization and terrorism but tends to sustain a dichotomy between static spatial explanations (e.g. specific place names and attack locations) and intangible geographies of transnationalisms where “no such geographic clarity” exists.⁸ This dichotomy ignores the complexity of historical and socio-political convergence that coexists with layered spatial relations in radicalization processes.

While the dynamics of militant Islamist radicalization and terrorism are multifarious across Southeast Asia and historically contingent, certain recent trends post-2000 are determinable, particularly from a geographic perspective. In the early 2000s, radicalized militant Islamist groups in Southeast Asia demonstrated a significant capacity to recruit and carry out successful terrorist attacks across the region. For example, the 12 October 2002 Bali Bombing in Indonesia marked the significant rise of the Jemaah Islamiyyah (JI) network and their capacity to manage several militia units, despite geographical barriers and diverse ethno-nationalities among its members, across Malaysia, southern Philippines, Indonesia, Singapore, and Australia. The successes of JI's early years catalyzed a range of interest in radicalization and terrorism in Southeast Asia.⁹ The early 2000s also marked a revival of the Free Aceh Movement in Indonesia¹⁰, the discovery of Kumpulan Mujaheddin Malaysia (KMM) in Malaysia¹¹, increased separatist terror activities in the southern provinces of Pattani, Yala, and Narathiwat in Southern

and Social Science, 618, no. 1 (2008), 80–94; Paul Gill, “Toward a Scientific Approach to Identifying and Understanding Indicators of Radicalization and Terrorism Intent: Eight Key Problems.” *Journal of Threat Assessment and Management*, 2, no. 3–4 (2015), 187–191.

⁷ See Andrew Silke, “Becoming a Terrorist,” in *Terrorists, Victims and Society: Psychological Perspectives on Terrorism and its Consequences*, ed. Andrew Silke, (London: Wiley, 2003).

⁸ Harm De Bij, *Why Geography Matters – Three Challenges Facing America: Climate Change, the Rise of America, and Global Terrorism*, (Oxford: Oxford University Press, 2005).

⁹ See Zachary Abuza, *Militant Islam in Southeast Asia: Crucible of Terror*, (Boulder, CO: Lynne Rienner, 2003); Stuart Koschade, “A Social Network Analysis of Jemaah Islamiyah: The Applications to Counterterrorism and Intelligence,” *Studies in Conflict & Terrorism*, 29, no. 6 (2006), 559–575.

¹⁰ Michael L. Ross, “Rebellion and resources in Aceh, Indonesia,” in *Understanding civil war: evidence and analysis*, eds. Paul Collier., and Nicholas Sambanis, 2nd ed., (2005), 2–43.

¹¹ Kamarulnizam Abdullah, “Kumpulan Mujahidin Malaysia (KMM) and Jemaah Islamiyah (JI), The Links,” *Journal of Policing, Intelligence and Counter Terrorism*, 4, no. 1 (2009), 29–46.

Thailand¹², and the prominent growth of the Moro Islamic Liberation Front (MILF) and the Abu Sayyaf Group (ASG) in southern Philippines.¹³ While clear links among these militant Islamist groups as well as connections to greater transnational terrorist networks, like al-Qaeda, have been uncovered, their geographic scope and operational parameters remained predominantly within Southeast Asia.¹⁴

With the rapid rise of ISIS in 2014, the global terrorism landscape perceptibly shifted. ISIS transgressed numerous long-held beliefs about terrorist groups. Their adaptability and agility in spreading propaganda and recruiting globally through social media and communication applications in addition to their territorial gains in Iraq and Syria provoked significant security anxieties.¹⁵ In Southeast Asia, these security anxieties and relative success of ISIS radicalization strategies materialized with the emergence of Katibah Nusantara in Shaddadi, Syria. Initially, a smaller unit containing 100 Malay and Indonesian fighters, Katibah Nusantara quickly grew to form three distinct geographical subunits in both Iraq and Syria with radicalized fighters from across Southeast Asia.¹⁶ Within a year, around 450 Malaysian and Indonesian fighters and their families had traveled to Syria and Iraq to join ISIS/Katibah Nusantara.¹⁷ Additionally, at the height of Southeast Asian recruitment in 2016–2017, militant Islamist organizations across Southeast Asia vied for recognition from and affiliation with ISIS. ISIS-subsidiaries pronounced southern Philippines as a *wilayat* for ISIS (*Daulah Islamiyah Wilayatul Mashriq* [Islamic State-Eastern Region]).¹⁸ ISIS called upon Southeast Asian militants to travel to southern Philippines. The geographic scope of militant Islamists in Southeast Asia altered significantly as a transnational orientation towards ISIS grew.

ISIS outreach through Al-Hayat (ISIS's media division) strategically targeted Southeast Asia, particularly vulnerable Malay and Indonesian Muslim

12 Aurel Croissant, "Unrest in Thailand: contours, causes and consequences since 2001," *Contemporary Southeast Asia: a journal of international and strategic affairs*, 27, no. 2 (2005), 21–43.

13 Mel C. Labrador, "The Philippines in 2000: In search of a Silver Lining," *Asian Survey*, 41, no. 1 (2001), 221–229.

14 Abuza, *Militant Islam in Southeast Asia: Crucible of Terror*: 23.

15 Christina Schori Liang, "Cyber Jihad: understanding and countering Islamic State propaganda," *GSCP Policy Paper*, 2, no. 4 (2015), 1–12.

16 Kumar Ramakrishna, "The Growth of ISIS Extremism in Southeast Asia: Its Ideological and Cognitive Features—and Possible Policy Responses," *New England Journal of Public Policy*, 29, no. 1 (2017), 5.

17 Ibid., 5.

18 Richard Javad Heydarian, "The Philippines' counter-terror conundrum: Marawi and Duterte's battle against the Islamic State", in Shanthie Mariet D'Souza (ed.) *Countering Insurgencies and Violent Extremism in South and South East Asia*, (London: Routledge, 2019), 46.

communities. As a “virtual caliphate” it encouraged localized sympathy and radicalization efforts to combat the Southeast Asian anti-ISIS coalition—notably the governments of Singapore, Malaysia, and Indonesia.¹⁹ For example, the August 2015 issue of *Dabiq*, ISIS’s Indonesian-language periodical, called on sympathizers to attack embassies of the countries listed above.²⁰ Also, in an October 2015 recruitment video, ISIS filmed a weapons training session with Malay children in ISIS-held territory; “These children will be the next generation of fighters. You can capture us, kill us, we will regenerate, no matter how hard you try.”²¹

Militant Islamist regional networks, their transnational links, and relationships among Southeast Asian militant Islamist organizations has drawn significant debate. Schulze and Chernov Hwang provide a succinct synopsis of the two broad schools of scholarship—the globalists versus regionalists.²² While the globalists tend to focus on broader organizational structures (e.g. networks and links), regionalists privilege complex local contexts (e.g. history, geography, local socio-political relations) in their evaluations of militant Islamist organizations. The bulk of in-depth analysis on the local context for understanding terrorism, radicalization, and support for militant Islamist organizations primarily focuses on historical contextualization and socio-political relations.²³ Less attention has been paid to geographic approaches in evaluating militant Islamist organizations in Southeast Asia.

Significantly, we see the fundamental trapping within debates between globalists and regionalists as the fixed and static conceptualization of scale. A geographic approach to evaluating militant Islamist organizations applies a geographer’s sense of scale that involves investigating how varied phenomena

¹⁹ Andrin J. N. Raj, “Challenges in counter terrorism and counter violent extremism in Malaysia,” in Shanthie Mariet D’Souza (ed.) *Countering Insurgencies and Violent Extremism in South and South East Asia*, (New York: Routledge, 2019), 207.

²⁰ Lim Yan Liang, “19-Year-Old Detained for Planning to Join ISIS Had Planned to Kill President and PM Lee,” *Straits Times*, May 29, 2015, <https://www.straitstimes.com/singapore/19-year-old-detained-for-planning-to-join-isis-had-planned-to-kill-president-and-pm-lee>.

²¹ Vidia Arianti and Jasminder Singh, “ISIS’ Southeast Asia Unit: Raising the Security Threat,” *RSIS Commentaries*, no. 220, *RSIS Commentaries*, (Singapore: Nanyang Technological University, 2015), <https://www.rsis.edu.sg/rsis-publication/icpvtr/co15220-isis-southeast-asia-unit-raising-the-security-threat/#.Vlkcv2DFH-Y>.

²² Kristen E. Schulze and Julie Chernov Hwang, “Militant Islam in Southeast Asia: New Insights into Jihad in Indonesia, Malaysia and the Philippines,” *Contemporary Southeast Asia: A Journal of International and Strategic Affairs*, 41, no. 1 (2019), 4.

²³ Joseph Chinyong Liow and Aida Arosoaie, “The Sound of Silence: Nuancing Religiopolitical Legitimacy and Conceptualizing the Appeal of ISIS in Malaysia,” *Contemporary Southeast Asia: A Journal of International and Strategic Affairs*, 41, no. 1 (2019), 86–113.

interact across space.²⁴ Scale is not simply a container of human phenomena. Rather, scale is a product of human phenomena and is continually changing. Scale can be understood in all its complexities (observational, measurement, operational, and cartographic²⁵) as mutually constructed relationships among specific processes, people, and places.²⁶ From this perspective, the spatial scales at which scholarship on radicalization and terrorism in Southeast Asia are generally discussed and understood can be re-conceptualized. Capturing spatial scale in this way, we examine the particular relationships among actors and places to understand the complexity of radicalization issues while at the same time highlighting the ways in which geospatial dimensions' shape, and are shaped by, ongoing radicalization processes in Southeast Asia.

We believe it is essential to extend research on the study of militant Islamic radicalization in Southeast Asia to consider geospatial relations and data.²⁷ Terrorism is often conceived as a "socio-political" problem, but the complexities of terrorism are inherently spatial.²⁸ Radicalization and terrorist activities do not occur in spatial voids but rather operate over time and space, in varied geographical contexts²⁹, and across geopolitical realms. Moreover, the complex relationship between geography and terrorism significantly affects the local geospatial dynamics of radicalization.³⁰ Geospatial analysis integrates quantitative computational analysis of spatial data and qualitative analysis of spatial relations. It advances a more comprehensive approach to understanding the complexities of radicalization. Specifically, this paper offers a geospatial analysis of militant Islamic radicalization in Malaysia to support our assertions.

24 Shannon O'Lear, *Environmental Politics: Scale and power*, (Cambridge University Press, 2010), 7.

25 Nina Siu-Ngan Lam and Dale A. Quattrochi, "On the Issues of Scale, Resolution, and Fractal Analysis in Mapping Sciences." *The Professional Geographer*, 44, no. 1 (1992).

26 Shannon O'Lear and Paul F. Diehl, "Not Drawn to Scale: Research on Resource and Environmental Conflict," *Geopolitics*, 12, no. 1, (2007).

27 Gary LaFree, "The Global Terrorism Database (GTD): Accomplishments and Challenges," *Perspectives on Terrorism* 4, no. 4 (2010), 44.

28 Karim Bahgat and Richard M. Medina, "An Overview of Geographical Perspectives and Approaches in Terrorism Research," *Perspectives on Terrorism*, 7, no. 1 (2013), 39.

29 Halvard Buhaug and Scott Gates, "The Geography of Civil War," *Journal of Peace Research*, 39, no. 4 (2002), 417–433; Harlvard Buhaug and Päivi Lujala, "Accounting for scale: Measuring geography in quantitative studies of civil war," *Political Geography*, 24 (2005), 399–418.

30 Harvey Starr, "Territory, Proximity, and Spatiality: The Geography of International Conflict," *International Studies Review*, 7 (2005), 387–406; Halvard Buhaug, "Dude, Where's My Conflict? LSG, Relative Strength, and the Location of Civil War," *Conflict Management and Peace Science*, 27, no. 2 (2010), 107–128.

While many scholars suggest that radicalization is empirically difficult to map in Malaysia, employing a geospatial analysis we begin this process.³¹ Exploring geospatial relations of militant Islamic radicalization in Malaysia will assist in bolstering the usefulness of geographical perspectives and approaches in the study of terrorism, strategies of counter-terrorism, and de-radicalization. In other words, geospatial perspectives and tools (e.g. geographic information sciences/systems [GIS]) can better inform what we term the *spatial arrangements of radicalization*.

It is necessary to examine spatial arrangements of radicalization—the spatial manifestations of phenomena, imaginaries, factors, and experiences leading to and embedded in radicalization—which, co-constitute a constellation of spaces and socio-political and historical contexts that can be mapped.³² Geospatial approaches are above all else synthesis. Understanding spatial arrangements of radicalization links seemingly disparate information demonstrating the spatial and strategic interconnections and interactions of militant Islamist radicalization efforts. Overall, geospatial analysis assesses how and why certain places are more or less vulnerable to radicalization and can project various spatial trajectories and a new geography of violent extremism and terrorism.

1.2 Geographic Contexts: Radicalization and Counter-Terrorism in Malaysia

On 10 March 2019, Mohamad Fuzi Harun, Inspector General of Police in Malaysia, warned that police had exposed a plan by foreign militants to use Malaysia as a “safe haven” and transit and logistic center, following the territorial collapse of ISIS.³³ The following month Malaysian authorities arrested 26 people suspected of involvement in terrorist or Islamic State (IS) related activities including five Malaysians, 13 Filipinos, six Egyptians, one Pakistani, and one Tunisian.³⁴ Two years earlier, on 29 June 2016, a bomb exploded at a nightclub in Puchong,

31 Moir, “ISIL Radicalization, recruitment, and Social Media Operations in Indonesia, Malaysia, and the Philippines,” 97.

32 Daanish Mustafa, “The Terrible Geographicalness of Terrorism: Reflections of a Hazards Geographer,” *Antipode*, 37, no. 1 (2013), 72–92.

33 Nadirah H. Rodzi, “Kuala Lumpur says foreign militants eyeing Malaysia as safe haven,” *The Strait Times*, 11 March 2019, <https://www.straitstimes.com/asia/se-asia/kl-says-foreign-militants-eyeing-malaysia-as-safe-haven>.

34 <https://www.nst.com.my/news/nation/2019/04/482928/eyes-tawau-and-sandakan-transit-points-says-igp>.

Selangor in an ISIS attack carried out by two local supporters, a first in Malaysia. In fact since 2013, the Malaysian government revealed that over 100 Malaysians had joined the ranks of ISIS in Syria and arrested 389 individuals for their links to ISIS in the process foiling over 30 attack plots.³⁵ Locating these events within broader historical and socio-political convergence of radicalization in Malaysia and their counterterrorism efforts illustrates the importance of Malaysia's role and geography in Southeast Asian experiences of radicalization and terrorism.

The spatial arrangements of radicalization in Malaysia are not only bound to physical space but inherently entrenched in virtual space as well. According to recent reporting 75 percent of all ISIS supporters in Malaysia were radicalized online.³⁶ The success of ISIS's virtual radicalization in Malaysia, and beyond, is unmistakable as 30,000 foreign terrorist fighters (FTFs) from more than 100 different countries arrived to fight for ISIS in Syria alone by 2015.³⁷ Malaysia has a long history with FTFs. Malaysians served as FTFs elsewhere, particularly Afghanistan, Bosnia, Pakistan, Iraq, and Syria before returning and establishing militant Islamist groups at home. Malaysia also houses FTFs, as the range of foreign national arrests in 2019 above attests to. The threat of returning Malaysian militants from Syria and Iraq as well as external FTFs who use Malaysia as a conduit, recruitment, and fundraising state is palpable. Undoubtedly, Malaysia has become an access point from which militant Islamist organizations circulate and operate.

Thus, Malaysia's geographic position in Southeast Asia is a significant vector of analysis. Its spatial proximity to prominent "hot spots" of militant Islamist movements along its borders with southern Thailand, Indonesia, and southern Philippines are of significant concern.³⁸ The ideology, actors, and motivations to extremism in these hot spots are notably diverse and at times competing. Regardless, within these hot spots militant Islamic radicalization constitutes radicalization to violence. Furthermore, the interplay between the distinctive phenomena and patterns where historical and socio-political relations converge and spatial proximity manifest through spatial arrangements of radicalization that can be empirically analyzed. Since Malaysia lies within three active centers of Islamist extremism and terrorism threats it is highly likely that it will encounter further threats of terrorist activities within Malaysia.

35 Mohamed Nawab Mohamed Osman and Aida Arosoaie, "Jihad in the Bastion of "Moderation": Understanding the Threat of ISIS in Malaysia," *Asian Security*, (2019), 1–14.

36 "Islamic State: Defeating the Virtual Caliphate." *The Express Tribune*, October 6, 2017.

37 Alex P. Schmid and Judith Tinnes, "Foreign (Terrorist) Fighters with IS: A European Perspective," (International Centre for Counter-Terrorism Report, 8, no 6, The Hague, 2015), 3.

38 Alex Braithwaite and Quan Li, "Transnational Terrorism Hot Spots: Identification and Impact Evaluation," *Conflict Management and Peace Science*, 24, (2007), 281–296.

As a geospatial approach illustrates, radicalization and terrorism activities are not often contained by any one border and have significant relational effects. Malaysia's shared borders with Thailand, Indonesia, and the Philippines are not contiguous and are notoriously porous, remote places.³⁹ To a large extent border control remains peripheral in governing interests and physical border control does not play a pivotal role in mitigating the movement of people and goods.⁴⁰ Additionally, the inaccessibility along many parts of Malaysia's borders is conducive to remaining outside the grasp of state governance, and thus, counterterrorism efforts.⁴¹ Sympathy for a range of militant Islamist groups operating along and oftentimes within Malaysian border areas remains relatively high.⁴² An empirical mapping of radicalization in Malaysia must take into account Malaysia's spatial proximity to hot spots of militant Islamist activities along its borders.

1.3 A Geospatial Approach to Understanding Radicalization

A geospatial approach to understanding radicalization does not seek to displace the dynamic milieu of theoretical explanations of radicalization in terrorism studies but rather seeks to add another nuanced layer of analysis. From this perspective, it offers the potential to empirically test the wealth of theories propagated and add new insights to the theoretical knowledge base. The world is constituted through a "mosaic of spatial units", whether real or perceived, and overlapping and often conflicting spatial units can be, and are linked, with the realities of conflict and terrorism.⁴³ Considering the strategic needs of space and place embedded within terrorist ideology and forms of radicalization reflects distinctive modes of socio-political and spatial organization. For example, the 29 June 2014 ISIS proclamation of a caliphate (the Islamic State) and end to the Sykes-Picot Agreement, thus invalidating the border between Syria and Iraq, is an

³⁹ Diana Wong, "The National Context of Migration Research in Malaysia. Which Nation, What State, Whose Migration?" in *National Paradigms of Migration Research*, Dietrich Thränhardt and Michael Bommes eds. (Osnabrück Germany: V& R Press, 2002).

⁴⁰ Blanca Garcés-Mascareñas, "Revisiting Bordering Practices: Irregular Migration, Borders, and Citizenship in Malaysia," *International Political Sociology*, 9, no. 2 (2015), 129.

⁴¹ Andreas Forø Tollefsen and Halvard Buhaug, "Insurgency and Inaccessibility", *International Studies Review*, 17 (2015), 6–25.

⁴² Alex P. Schmid, "Public Opinion Survey Data to Measure Sympathy and Support for Islamist Terrorism: A Look at Muslim Opinions on Al Qaeda and IS," (The International Centre for Counter-Terrorism, 8, no. 2, The Hague, 2017).

⁴³ Alexander B. Murphy, "The Space of Terror," in *The Geographical Dimensions of Terrorism*, Susan L. Cutter, Douglas B. Richardson and Thomas J. Wilbanks (eds.), (London: Routledge, 2014), 47–52.

inherent calculative spatial logic. ISIS's significant expansion of its caliphate through territorial gains (more than 34,000 square miles at its height) and rejection of Western boundary making assisted in radicalization and recruitment efforts as it constituted legitimacy through Islamic spatial administration.

In Southeast Asia, JI's structural dynamism fundamentally relied on the spatial administration of their *mantiqis*, which functioned as more than just mere spatial units. Mantiqi 1 (peninsular Malaysia and Singapore), Mantiqi II (Java, Sumatra, and most of the other islands of Indonesia excluding Sulawesi), Mantiqi III (the Philippines, Sabah in eastern Malaysia, Sulawesi, and eastern Kalimantan) and Mantiqi IV (Australia) provided JI a flexible and adaptable organizational structure.⁴⁴ Originally, Mantiqi 1 was responsible for fundraising activities, Mantiqi II was the primary focus of jihad, and Mantiqi III served as their training grounds.⁴⁵ Even after the collapse of Mantiqi I, as a result of Malaysian and Singaporean counter-terrorism efforts in the early 2000s, JI structure adapted and responded to its needs and carried out significant attacks in Mantiqi III well into the mid-2000s. The examples above illustrate the ways radicalization and terrorism, in all their complexities, have spatial expression. The processes, structures, behaviors, and countless other phenomena inherent to militant Islamist organizations expose the spatial arrangements of radicalization and terrorism. Overall, spatial relations and arrangements provide an important frame for understanding radicalization and terrorism.

A geospatial approach can better inform the spatial arrangements of radicalization. It reveals spatial relations that would otherwise go unnoticed or uninterrogated in conventional studies of terrorism and counter-terrorism. A geospatial approach to radicalization explores the spatial manifestations of factors, phenomena, and experiences leading to radicalization that intertwine in interesting patterns, distributions, diffusions, and collocations. Considering the spatial arrangements of radicalization has the potential to advance knowledge in terrorism studies and counter-terrorism practice in the ways terrorist networks and systems operate. Examining and mapping the intricacies of the spatial diffusion and distribution of terrorist recruitment and propaganda, spatial association among various terrorist networks, and the spatial variation of terrorist activities can produce vigorous analysis within terrorism studies and related fields.⁴⁶

44 Sydney Jones, "The changing nature of Jemaah Islamiyah," *Australian Journal of International Affairs*, 59, no. 2 (2005), 170.

45 Ibid.

46 Idean Salehyan, *Rebels Without Borders: Transnational Insurgencies in World Politics*. Ithica, NY: Cornell University Press.

Importantly, a geospatial approach is not limited to producing illustrations or maps – it is a means of doing research.⁴⁷

Geospatial analyses deliver empirically nuanced analysis drawing on spatial processes, patterns, and places which inform greater socio-political trends. Research on terrorism and radicalization has faced critique over its enduring methodological issues.⁴⁸ The rapid pace of geospatial technologies catalyze incredible growth in the development of new models and methods of geographic data analysis, representation, and visualization.⁴⁹ Synthesizing spatial data with conventional primary and secondary source data moves beyond one-dimensional network analysis to provide a more robust engagement with root causes, driving forces, and enabling structures of radicalization and terrorism.

2 Methods and Data

The initial challenge to a quantitative – and specifically geospatial – analysis of terrorism in Southeast Asia is the overall uneven distribution of terrorism in the region (Figure 1). The types, actors, and underlying reasons for terrorism across Thailand, Malaysia, Indonesia, and the Philippines vary widely. Of the four countries, Malaysia has experienced, by far, the least amount of terrorism both in the scale of violence (measured by deaths) and by the overall total of individual attacks. This again makes the region of interest – what is it that Malaysia has done well versus its neighbors?

We have chosen second-order administrative boundaries as our unit of analysis. We use the term second-order administrative boundaries due to Malaysia's somewhat confusing naming conventions for administrative divisions. Malaysia is comprised of thirteen states and three federal territories. On Peninsular Malaysia, the administrative boundaries below the state (first-order) are called "districts" (second-order). However, the subdivision below states (first-order) on Borneo are called "divisions" (second-order) and these divisions are divided into "districts"

⁴⁷ Medina, Richard M., Laura K. Siebeneck, and George F. Hepner. "A geographic information systems (GIS) analysis of spatiotemporal patterns of terrorist incidents in Iraq 2004–2009." *Studies in Conflict & Terrorism* 34, no. 11 (2011): 862–882.; Medina, Richard M., and George F. Hepner. *The geography of international terrorism: an introduction to spaces and places of violent non-state groups*. CRC Press, 2013.; Medina, Richard, and George Hepner. "Geospatial analysis of dynamic terrorist networks." In *Values and Violence*, pp. 151–167. Springer, Dordrecht, 2008.

⁴⁸ Bart Schuurman, "Research on Terrorism. 2007–2016: A Review of Data, Methods, and Authorship," *Terrorism and Political Violence*, 1 (2018), 1.

⁴⁹ Mike Tait, "The Need for a National Spatial Data Infrastructure," in *The Geographical Dimensions of Terrorism*, Susan Cutter, Douglas B. Richardson, and Thomas J. Wilbanks (eds.), (London; Routledge, 2003), 77.

Figure 1: Distribution of terrorist attacks in Southeast Asia.

(third-order). While there has been a tendency within terrorism research to meld point data to grids⁵⁰ or country-level analysis,⁵¹ we have selected the most granular administrative unit of analysis at our disposal. Our reasoning for using second-order administrative boundaries is to discover localized trends that can then foster and support future field research.

The data are derived from the Global Terrorism Database (GTD)⁵² and the Armed Conflict Location and Event Data (ACLED) project.⁵³ The GTD, housed at the National Consortium for the Study of Terrorism and Responses to Terrorism at the University of Maryland, is an open source dataset of global terrorist attacks from

⁵⁰ Boutton, Andrew, and Henry Pascoe. “Do Foreign Aid Projects Attract Transnational Terrorism?,” *Peace Economics, Peace Science and Public Policy* 24, no. 4 (2018); Python, Andre, Jürgen Brandsch, and Aliya Tskhay. “Provoking local ethnic violence—A global study on ethnic polarization and terrorist targeting.” *Political Geography*, 58 (2017), 77–89.

⁵¹ LaFree, Gary, Min Xie, and Aila M. Matanock, “The Contagious Diffusion of Worldwide Terrorism: Is It Less Common Than We Might Think?,” *Studies in Conflict & Terrorism*, 41, no. 4 (2018), 261–280; Marcus A. Boyd, Timothy F. Leslie, Katarina Jarmin, and Melissa Cidade, “Illicit Finance, Terrorism, and the Semi-periphery,” *The Geographical Journal*, (under review).

⁵² National Consortium for the Study of Terrorism and Responses to Terrorism (START). (2018). Global Terrorism Database [Data file]. Retrieved from <https://www.start.umd.edu/gtd>.

⁵³ Raleigh Clionadh, Andrew Linke, Håvard Hegre, and Joakim Karlsen, “Introducing ACLED: an armed conflict location and event dataset: special data feature,” *Journal of peace research*, 47, no. 5 (2010), 651–660.

1970 through 2017. ACLED collects data on a wider range of conflicts related to political violence and instability. For this paper, we rely on ACLED's data pertaining to riots and protests. To conduct our spatial analysis, we used GeoDA and ArcMap. GeoDA, created by Luc Anselin and presently housed at NORC, is open source software dedicated to advanced spatial statistical analysis. ESRI's ArcMap is proprietary and we used it for the purposes of data construction and visualization.

A main focus of geospatial methods is sense-making of spatial patterns: First, are there patterns? Second, if there are patterns, how do we properly interpret them? Unlike traditional statistics, the vast majority of spatial statistics have only come into existence within the 20th century.⁵⁴ While there were precursors, Cliff and Ord⁵⁵ brought spatial autocorrelation to the “mainstream” of regional science.⁵⁶ They noted the statistical importance of the same variable clustering across adjoining areal units. Traditional correlation statistics show relationships between two (or more) different variables, the various spatial autocorrelation statistics are designed to show the relationship between the same variable across space.⁵⁷ The global spatial autocorrelation statistics developed by Moran,⁵⁸ Geary,⁵⁹ and Getis and Ord⁶⁰ result in a singular numeric result detailing the level of autocorrelation. But as Anselin⁶¹ notes, these global statistics are incapable of identifying “potential instability” at the local level. To mitigate this issue, Getis and Ord⁶² and Anselin⁶³ developed what Anselin⁶⁴ terms local indicators of spatial association (LISA) statistics. We use LISA maps which are based on Anselin's local Moran's I

54 Arthur Getis, “Reflections on spatial autocorrelation,” *Regional Science and Urban Economics*, 37, no. 4 (2007), 491–496.

55 Andrew Cliff and Keith Ord, *Spatial Autocorrelation*. Pion, London (1973).

56 Luc Anselin, “Thirty Years of Spatial Econometrics,” *Papers in Regional Science*, 89 (2010), 3–25.

57 Luc Anselin, “A test for spatial autocorrelation in seemingly unrelated regressions,” *Economics Letters*, 28, no. 4 (1988), 335–341.

58 Patrick A. P. Moran, “The interpretation of statistical maps,” *Journal of the Royal Statistical Society, Series B (Methodological)* 10, no. 2 (1948), 243–251.

59 Robert C. Geary, “The contiguity ratio and statistical mapping,” *The incorporated statistician* 5, no. 3 (1954), 115–146.

60 Arthur Getis and J. Keith Ord, “1992: The analysis of spatial association by use of distance statistics,” *Geographical Analysis*, 24, (1992), 127–145.

61 Luc Anselin, “Exploratory spatial data analysis and geographic information systems,” *New tools for spatial analysis*, 17, (1994), 45–54; Luc Anselin, “Local indicators of spatial association—LISA,” *Geographical analysis* 27, no. 2, (1995), 93–115.

62 Getis and Ord, “1992: The analysis of spatial association by use of distance statistics,” 130.

63 Luc Anselin, *The Moran scatterplot as an ESDA tool to assess local instability in spatial association*, (Morgantown, WV: Regional Research Institute, West Virginia University, 1993).

64 Anselin, “Exploratory spatial data analysis and geographic information systems,” 45–54.

statistic to show groups of clusters and outliers.⁶⁵ The local Moran's I statistic⁶⁶ groups the results into four patterns. Areal units denoted as *high-high* have statistically significant high values for a given variable and the surrounding areal units also have high values. Conversely, *low-low* values denote statistically significant low values surrounded by neighboring areal units that also have low values. Values of *low-high* exemplify areal units that have statistically significant low values but are surrounded by neighboring areal units with high values. Lastly, *high-low* values identify areal units that have statistically significant high values while their neighbors have low values. These last two categories are often, but not always, the most interesting because they are *spatial outliers*. In the context of the spatial analysis of terrorism and political violence, spatial outliers can be particularly telling because islands of passivity or exceptional violence warrant further investigation. Are interesting – is there a policy that is working or not working? In sum, LISA maps can help identify what locations are deserving of further investigation.

While Anselin's local Moran's I has been used previously in terrorism analysis, we have also chosen to investigate the utility of the recently introduced multivariate Geary's c statistic.⁶⁷ The local univariate Geary's c is less commonly used than the Getis-Ord Gi and Gi* or the Local Moran's I. This is largely due to the difficulty of interpreting the results. Whereas the Getis-Ord local statistics clearly describe positive, significant autocorrelation as *hot spots* and negative, significant autocorrelation as *cold spots* and the local Moran's I details clusters (*high-high*, *low-low*) and outliers (*high-low*, *low-high*), Geary's c has both a higher tolerance for what is cluster and cannot identify outliers as such.⁶⁸ Overall, when using univariate and multivariate Geary's c, the identification of "interesting locations", that is locations that have some indication of difference from the background, is the paramount utility of the statistic.⁶⁹

2.1 Limitations

Anselin's direction that finding a significant Geary's c results in an "interesting location" cannot be underappreciated. The discovery of interesting locations is at the heart of spatial autocorrelation. Some methods, like the Gi and Gi* can show

⁶⁵ Anselin, "Local indicators of spatial association-LISA," 93–115.

⁶⁶ Ibid., 93–115.

⁶⁷ Luc Anselin, "A local indicator of multivariate spatial association: extending Geary's C," *Geographical Analysis* 51, no. 2 (2019), 133–150.

⁶⁸ Ibid., 133–150.

⁶⁹ Ibid., 133–150.

trends while others, like the local Moran's I can show clusters and outliers. What remains lacking in spatial autocorrelation is an explanation of the underlying relationship. In data rich environments, this means that the identification of interesting areal units can then be further analyzed with traditional OLS regression analysis and/or a geographically weighted regression. Unfortunately, administrative data at any level is not uniformly available. This results in the inability to fully examine and explain potential relationships that may exist.

3 Results

We began with a Ripley's K function to determine a distance threshold for spatial autocorrelation of the second order administrative boundaries. The results show that the observed K remained smaller than the expected K across 10 distance bands. This suggests that the dispersion of the centroids of second order administrative boundaries in Southeast Asia is more dispersed than a random distribution. We selected the observed distance at the 10th distance band to maximize inclusion. While, in general, it is not typically advisable to run spatial autocorrelation on areal units that cross bodies of water, the countries within our study are bound by cross-border linkages that include the exchange of people and goods across waterways. In the explicit context of terrorism, we have significant empirical evidence of cross-border movement of militant Islamist organizations throughout the region.

Taken country by country, the results of the local Moran's I of terrorist attacks (Figure 2) show the diversity of the distribution of Southeast Asian terrorism. The bulk of Thailand, Indonesia, and the Malaysian state of Sarawak on the island of Borneo have values of low–low. The locations with high–high clusters are to be expected – the Malay–Thai border, Eastern Sabah on Borneo, Kuala Lumpur, Southern Philippines, and the Western tip of Indonesia. High–low outliers exist only in Indonesia and Thailand. Low–high outliers are present throughout Malaysia and Indonesia. The local Moran's I result for the protest variable (Figure 3) suggest high–low outliers in Sabah and the Southern Philippines. The low–high outliers are present in Western Indonesia, much of peninsular Malaysia, and Southern Thailand. High–high values are present in Western Indonesia, peninsular Malaysia, and Southern Thailand. Lastly, low–low clusters are prevalent in both Malay and Indonesian Borneo. The local Moran's I for the riot variable (Figure 4) result in low–high outliers in much of Southern Thailand, peninsular Malaysia, and Indonesia. High–low outliers exist in both Indonesian and Malay

Figure 2: The Anselin Local Moran's I GTD clustering results.

Borneo. High-high clusters are evident in Southern Thailand, peninsular Malaysia, and much of Indonesia, including West Papua. Low-low clusters are present in Indonesian and Malay Borneo.

Figure 3: The Anselin Local Moran's I clustering results for the protest variable.

Figure 4: The Anselin Local Moran's I clustering for the riot variable.

Taken collectively, the three local Moran's I maps suggest certain trends. There are clear clusters of riots and protests in certain second-order administrative boundaries. Likewise, there are trends in the outliers as well. This is demonstrative of Anselin's earlier claim that spatial autocorrelation can direct researchers to interesting locations. However, there appears to be no evident correlation between the local Moran's I findings for riots and protests with terrorist attacks. This is where the local multivariate Geary's c becomes useful.

The multivariate Geary's c examined the spatial relationship between terrorist attacks and protests and terrorist attacks and riots (Figure 5). Both maps show the same second level administrative districts highlighted as significant. This is telling because despite the overall uneven distribution of terrorist attacks and very little overlap in the local Moran's I results, the multivariate Geary's c presents a quite clear pathway for future research. We now know that protests, riots, and terrorist attacks – so political unrest and political violence – correlate in just 24 of the possible 3221 administrative districts. While the locations in Southern Philippines are more easily explained due to decades of conflict between the government of the Philippines and various Moro separatist groups and now Islamists, the violence on the Malay–Thai border is more complex and less intuitive.

Figure 5: The multivariate Geary's c significance test for riots and protests.

3.1 Geospatial Analysis of Militant Islamist Activity along the Malaysia–Thailand Border

In consideration of the results of our spatial statistics and autocorrelations, we proceed with an empirical mapping of potential cross-border movement of militant Islamists along the Malaysia–Thailand border. An empirical mapping of radicalization in Malaysia must consider Malaysia's spatial proximity to hot spots of militant Islamist activities. Our multivariate Geary's c indicates the Malaysia–Thailand border as a location where clusters of social unrest and political violence merge. The spatial arrangements of radicalization along the Malaysia–Thailand border evidences distinctive spatial phenomena and patterns where historical and socio-political relations converge and literally transgress borders. Considering the geospatial relations of the most active militant Islamist organization along the border, the Barisan Revolusi Nasional Coordinate (BRN-C), a splinter group of the Barisan Revolusi Nasional Patanai (BRN), our geospatial approach illustrates that radicalization and terrorism activities along the Malaysia–Thailand border are complex but relational and indicate cross-border movement of militant Islamist organizations. This of course represents significant security concerns for Malaysia

as possibilities of exogenous factors fuel increased terrorist activity along the border.⁷⁰ Beyond national security concerns, the Malaysia–Thailand border illustrates the complexities of the spatial arrangements of radicalization and terrorism across Southeast Asia more broadly.

Research on political violence and terrorism along the Malaysia–Thailand border primarily focus on Thailand.⁷¹ This is due to the vast majority of violent attacks occurring within the geographic region known as “Patani”, or the “Deep South”, encompassing Thailand’s southernmost provinces, Pattani, Yala, and Narathiwat, and four districts of the province of Songkla. The Deep South Watch Database (DSW) indicates that since the outbreak of major violence in 2004–October 2018 there were 20,029 violent incidents, 6871 deaths, and 13,460 people injured from violence and counter violence.⁷² The violence within the Deep South has emerged as one of the most politically unstable regions in Southeast Asia, with competing militant Islamist organizations, transnational organized crime networks, and mass undocumented migration.⁷³ The almost exclusively Thai focus in research on the Deep South provides only a partial view. Our more nuanced geo-spatial approach recognizes and illustrates the fluidity of spatial arrangements and realities of radicalization and terrorism along the Malaysia–Thailand border. It is important to note that the border between Malaysia and Thailand has not been an obstacle to movement. In fact, thousands of Malay-Muslims cross, work, and live over the border freely, both with documentation and without.⁷⁴ Many hold dual-citizenship, regardless of Malaysia’s prohibition of dual citizenship, a practice that is not sustained in this region.⁷⁵ Verily, the tri-province region of the Deep South is 80 percent Malay-Muslim who have intractable language, ethnic, religious, and familial links to Malaysia.

At one time the Patani Sultanate, a regional power and leading center of Islam in Southeast Asia, spanned the provinces of the Deep South and the Malaysian states of Kedah, Perlis, Kelantan, and Terengganu.⁷⁶ The fall of the Patani

⁷⁰ Zachary Abuza, “The Role of Foreign Trainers in Southern Thailand’s Insurgency,” *Terrorism Monitor*, 5, no. 11 (2007).

⁷¹ See Special Issue Quagmire of Violence in Thailand’s Southern Borderlands, *Asian Affairs: An American Review*, 45, no. 2, (2018) for more in-depth scholarship on the issue.

⁷² Anders Engvall, “Violent Incidents in Southern Thailand/Patani,” (Situation Report, Deep South Watch and the Center for Conflict Studies and Cultural Diversity, Thailand, 2018).

⁷³ Duncan McCargo, *Tearing Apart the Land: Islam and legitimacy in Southern Thailand*, (Ithaca, NY: Cornell University Press, 2008).

⁷⁴ *Ibid.*

⁷⁵ John Funston, “Malaysia and Thailand Southern Conflict: Reconciling Security and Ethnicity,” *Contemporary Southeast Asia*, 32, no. 2 (2018), 236–237.

⁷⁶ *Ibid.*, 235.

Sultanate came with its defeat by Siamese forces and its partition under the Anglo-Siamese Treaty of 1901 which turned over the modern Malay states of Kedah, Perlis, Kelantan, and Terengganu to British Malaysia.⁷⁷ As such, the violence of the Deep South militant Islamist insurgency is embedded in the historical legacies of Thai (at the time Siamese) and Malay state-building and colonialism as a struggle for power between Malay-Muslim movements and the Thai state. From the 1960s onwards, separatist and militant Islamist organizations such as the Patani United Liberation Organization (PULO) and BRN, and their splintered forms (like the BRN-C), have carried out significant terror attacks including mass coordinated attacks across the Deep South perpetrated by radicalized Malay-Muslim youth who feel marginalized in a Buddhist-dominated state. The local contexts of these militant Islamist organizations struggle cannot be overstated, but the BRN-C does use a flexible mixture of Malay-Muslim loyalism and jihadist ideology in both recruitment and radicalization practices.⁷⁸ This has generated concern in Malaysia, and across the region as the BRN-C growing success appears to be garnering attention across the Muslim world.

The Deep South conflict has become a source of tension between Malaysia and Thailand and other regional partners, particularly Indonesia and Singapore. There are claims of complicity leveraged against Malaysia by Thailand. Sympathy in Malaysia is high for Malay-Muslims in Thailand and Malaysia provides safe-havens for many militant Islamist group leaders and members (primarily in Kelantan) where strategy is coordinated but, there is little evidence to support Malaysian state involvement.⁷⁹ Rather, the Malaysian state employs a careful balancing act between securitizing against what they perceive as a potential contagion threat of Islamic radicalization down the Malay Peninsula, low-key support and refuge for Malay-Muslims from the Deep South, and outright ambivalence in facilitating negotiations between Thailand and Malay-Muslim militant organizations. The intricacies of the cross border linkages along the Malay–Thai border illustrate why employing a geospatial approach builds a more nuanced layering and comprehensive understanding of the spatial arrangements of radicalization in Malaysia. Moreover, examining the spatial arrangements of radicalization along the Malaysia–Thailand border illustrates Malaysia’s role as a transit and operational hub for militant Islamist organizations.

We begin our empirical mapping engaging known spatial strategies and practices of the BRN-C. While the BRN-C is notoriously secretive, access to

⁷⁷ Ibid., 235.

⁷⁸ Sascha Helbardt, *Deciphering Southern Thailand's Violence: Organization and Insurgent Practices of BRN-Coordinate*, (Singapore: ISEAS- Yusof Ishank Institute, 2015).

⁷⁹ See McCargo, *Tearing Apart the Land: Islam and legitimacy in Southern Thailand*, (2008), xii.

information about their structure, operational strategies, and ideology has become more available in recent years through better intelligence gathering and research. First, the BRN-C carefully selects individuals of their military wing and tactical units (Runda Kumpulan Kecil [RKK]) to receive specialized command training in Indonesia to study insurgency techniques.⁸⁰ In 2009, the BRN-C attempted to ascertain Indonesian passports in order to infiltrate the Indonesian Military and gain more access to military knowledge.⁸¹ Also, there appears to be increasing links between BRN-C and JI in training practices, particularly related to training suicide bombers in Indonesia that then travel back to the Deep South.⁸² Second, after conducting militant operations and terrorist attacks BRN-C members elude Thai security forces by crossing into Malaysia seeking shelter in the jungle, villages and/or cities in Kelantan, Perak, and Kedah.⁸³ Thai security forces' relative lack of success in capturing BRN-C militants is a result of this cross-border movement. Finally, political and economic operational support for BRN-C transpires across the Malaysia–Thailand border, principally in the form of smuggling illicit goods and cash exchanges.⁸⁴ The BRN-C leverages their extensive connections with a range of radicalized Malay-Muslims, from wives and sisters of BRN-C members to sympathetic shop owners, across the region to generate resources for their operations. Keeping these three spatial logics and practices in mind, we conduct an empirical modeling and mapping of potential cross-border movements by the BRN-C.

A geospatial analysis of least-cost paths is achieved through proper data preparation to ensure the creation of a topologically accurate network model. Factors such as accuracy and precision of the origin and destination points, the spatial resolution of elevation data, and assumptions made regarding the impedance impact that various land cover types have on traversability all affect the resulting routes produced when performing a least-cost path network analysis.⁸⁵

80 Sascha Helbardt (2015), 69.

81 *Ibid.*, 69.

82 Rohan Gunaratna, "Mastermind of Terror: The Life and Death of Bahrin Naim," *Counter Terrorist Trends and Analyses*, 10, no. 10, 1–5.

83 See Funston 2010; Sascha Helbardt 2015; and Wassana Nanuam, "Engagement of Malaysia and Indonesia on Counterinsurgency in the South of Thailand," *Asia Pacific Center for Security Studies*, (2015).

84 Helbardt, *Deciphering Southern Thailand's Violence: Organization and Insurgent Practices of BRN-Coordinate*, 153.

85 David H. Douglas, "Least-cost path in GIS using an accumulated cost surface and slopelines," *Cartographica: the international journal for Geographic Information and Geovisualization*, 31, no. 3 (1994), 37–51.; Frank Adriaensen, J.P. Chardon, Geert De Blust, Else Swinnen, S. Villalba, Hubert Gulinck, and Erik Matthysen, "The application of 'least-cost' modeling as a functional landscape model," *Landscape and Urban Planning*, 64, no. 4 (2003), 233–247; 233–247.

Figure 6: Cross border routes across Malaysia.

Figure 7: Cross border routes along the Malaysia–Thailand border.

Using our multi-modal network model,⁸⁶ we consider a scenario where BRN-C members land at Malaysian airports, to avoid travel restrictions and difficulties in Thailand, after receiving training in Indonesia and then traveling across the border into Thailand to carry out attacks (Figure 6). The same network affords an opportunity to examine the most probable routes that BRN-C members are likely to take following a successful attack in the Deep South subsequently fleeing to Malaysia to avoid Thai security forces (Figure 7). The network dataset consists of two different modes of transportation, roads and walking paths. Roads dataset is downloaded from the Global Roads Infrastructure Project (GRIP) and weighted based on the average speed limits associated with various road types including Highway, Primary, Secondary, Tertiary, and Urban\Local. The off-road walking paths are modeled using Tobler’s hiking function weighted with slope and land cover data.

First, we used elevation data from NASA’s 30 m SRTM dataset and constructed a Digital Elevation Model (DEM) for the study area. The raster DEM is then converted to a Triangulated Irregular Network (TIN) in order to extract the polyline

⁸⁶ See Steve Sin and Marcus Boyd, “Searching for the Nuclear Silk Road: Geospatial Analysis of Potential Illicit Radiological and Nuclear Material Trafficking Pathways,” in *Nuclear Terrorism: Countering the Threat*, ed. Brecht Volders and Tom Sauer, 1st ed. (Abingdon-on-Thames: Routledge, 2016), 159–181.

edge features to be used as the basis for the off-road walking path network. Next, we calculate the geometry for each polyline edge feature to obtain the length of each segment, and elevation values that correspond to each start and end node. Using this information, we are able to calculate the slope input that is necessary to implement Tobler's hiking function on to the network dataset. After preparing the tin edge line features with the proper geometry and elevation values, we calculate the impedance impact of different land cover types using a land cover raster downloaded from the European Space Agency (ESA). Once all these values are computed, the final step is to calculate the time it takes to traverse each edge segment of the network, in minutes. The two network datasets are merged together to create one comprehensive multi-modal transportation network we can use to model least-cost path routes across the study area.

We used GTD data to identify attacks that occurred in the Malaysia–Thailand border region. We aggregated attacks by year from 2012 to 2017, using the locations of these events as the destination points for the least-cost path analysis. The origin points for the analysis, Malaysian peninsular airports, were downloaded from the OpenStreetMap (OSM) transportation points dataset. In addition to the underlying weights implemented during the construction of the network dataset, there are a few other important weights included to support the reality of this particular scenario. Rivers in Malaysia and Thailand were added as either restrictions, meaning they cannot be intersected by any route, or as scaled-cost, which allows the route to cross the river at the expense of more time. Although less favorable, these network segments are still traversable and may result in a possible route between origin and destination points. It was assumed that large named rivers would be impassable on foot and are treated as restrictions preventing any of the routes from crossing these areas. The remaining smaller rivers were treated as a scaled-cost, imposing a cost-multiplier of 20 on the network segments that intersect with these features.

We identified border patrol crossing stations and geocoded them using openly available satellite imagery. A 0.5 km buffer was created around these points and added as a restriction preventing any routes from passing through these areas. We also conducted a viewshed analysis on the surrounding terrain to determine what regions of the study area within 10 miles of a border patrol point are visible to security personnel working at these locations. The regions determined to be visible were added as a scaled-cost with a cost-multiplier of two on the network segments that intersect with these areas. Once the network dataset with all of the corresponding weights is complete, a custom tool written in Python utilizing the ESRI Network Analyst API was created to determine all of the possible routes based on the input parameters. Once we have determined all of the possible routes, we use

the kernel density spatial statistics tool in ArcGIS to identify which routes have the highest probability of being traversed to undertake a terrorist attack.

The routes and corresponding kernel density heat maps identify likely pathways that may be taken by those looking to cross the Malaysia–Thailand border while avoiding detection. It is important to note that the routes themselves are sensitive to the underlying structure of the network dataset and the weights that are included. The overall accuracy of the generated walking paths is dependent on the accuracy of the information used when constructing the network model, such as the data used to construct the digital elevation model and the assumptions made about which of the rivers are traversable or which areas can be seen from the border patrol points. Variations in these factors would likely affect how the weights are applied to the model and may change the outputs depending on how significantly they are altered. Other considerations include how to accurately model the effects of corruption, how bribery impacts the mobility of militants as they attempt to cross the border and how natural features like vegetation and local weather may significantly hinder visibility. As input precision and accuracy increases better route predictions are made possible.

Overall, in an effort to begin empirically mapping the spatial arrangements of radicalization in Malaysia it becomes clear that the scope of radicalization and the threat of terrorism in Malaysia is evolving. These trends are exacerbated by contingent socio-political changes and historical contexts. Understanding these relationships and the spatial arrangements of radicalization is paramount for any degree of success in dismantling radicalization efforts, terrorist networks, and countering violent extremism in Southeast Asia.

4 Concluding Remarks

We forward a geospatial perspective and approach to better understand socio-political relations and spatial arrangements of radicalization and terrorism in Southeast Asia. In particular, we offer a method of empirically mapping the spatial arrangements of radicalization in Malaysia. The reorientation of terrorism research towards Southeast Asia with the de-territorialization of ISIS in Syria and Iraq affords an opportunity for greater intellectual engagement in understanding militant Islamic radicalization across Southeast Asia. Geospatial analysis offers a conceptual and methodological framework to better engage research and practice in the region. Understanding geospatial relations of radicalization has the potential to advance knowledge of future places targeted by militant Islamist groups, spatial distribution of supportive populations, and spatial trajectories of terrorist operations.

As the groundwork to an empirical mapping of radicalization in Malaysia we offer these three concluding thoughts in relation to our geospatial analysis of Islamic militant radicalization. First, examining radicalization through a geospatial lens demonstrates how the possibilities for radicalization effect, and reflect, the spatialities of historical and socio-political conditions of Malaysia that can be applied elsewhere. Investigating local contexts, both historical and socio-political, as well as spatial relations in evaluating militant Islamist organizations in Southeast Asia provides a more comprehensive and nuanced research approach in understanding the spatial and strategic interconnections and interactions of militant Islamist radicalization efforts. Second, a geospatial analysis that employs spatial statistics and qualitative interpretation is a more complete approach in understanding the spatial manifestations of factors, phenomena, and experiences leading to radicalization that can be empirically mapped. Our geospatial analysis of potential terrorist routes along the Malaysia–Thailand border illustrates the potential of geographic perspectives to advance knowledge in terrorism studies and counter-terrorism practice in the ways terrorist networks and systems operate. Third, employing a geospatial analysis demonstrates how seemingly disparate information is linked and evaluated through the spatial arrangements of radicalization. As our analysis highlights, the spatial arrangements of radicalization assist in evaluating how and why certain places are more or less vulnerable to radicalization and terrorism's social and spatial trajectories.

Overall, approaching the study of terrorism and radicalization using a geospatial analysis leads to a greater understanding of the spatial arrangements of radicalization. Geographic perspectives offer spatial imaginaries and realities, “that investigate not only the specificities of place that can provoke terrorism, but also the vertical and horizontal linkages that implicate us all in the causes and consequences of terrorism”.⁸⁷ The next step is to enhance geospatial approaches to understand everyday practices and routines in spaces with high levels of radicalization patterns and rates to offer greater insights into the diverse and subjective ways in which people relate to and find value and or purpose in radicalization spaces/environments.⁸⁸

⁸⁷ Colin Flint, “Terrorism and Counterterrorism: Geographic research questions and agendas,” *The Professional Geographer*, 55, no. 2 (2008), 161–169.

⁸⁸ Sam R. Bell, K. Chad Clay, Amanda Murdie, and James Piazza, “Opening Yourself Up: The Role of External and Internal Transparency in Terrorism Attacks,” *Political Research Quarterly*, 67, no. 3 (2014), 603–614.