# Characterization of The Temporal and Spatial Evolution of Terrorist Attacks in The China-Pakistan Economic Corridor

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**Abstract:** The construction of China-Pakistan Economic Corridor (CPEC) project is of great significance, but the terrorist threat facing Pakistan brings a series of security risks to it. Based on the Global Terrorism Database (GTD), this paper investigates the spatial and temporal evolution characteristics of terrorist attacks in the China-Pakistan Economic Corridor. The spatial autocorrelation method and standard deviation ellipse method are applied to comprehensively evaluate the distribution of different terrorist attacks. The results show that in terms of time evolution, the terrorist risk value of terrorist attacks in the China-Pakistan Economic Corridor presents four stages of surge, active, sharp drop and slow drop ; in terms of spatial distribution, terrorist attacks are concentrated in the upper and lower reaches of the west line of the corridor, the lower reaches of the east line and the middle and lower reaches of the middle line, and the degree of danger shows positive spatial autocorrelation. In terms of spatial and temporal evolution characteristics, the positive spatial autocorrelation of the degree of danger in each stage is stable, and the distribution range, trend and center of gravity of the attack show specific rules.

**Keywords:** Overseas Security; Terrorist Attacks; China-Pakistan Economic Corridor; Spatio-Temporal Evolution Characteristics; GIS

## 1. Introduction

China-Pakistan Economic Corridor was proposed by Premier Li Keqiang during his visit to Pakistan in May 2013, aiming to promote and deepen the cooperation between the two countries in the fields of energy, security, economy, etc., and realize the effective docking of the development of the all-weather strategic cooperative partnership, which is a key element of the practical cooperation between China and Pakistan to build a community of destiny together. It is a key element of China-Pakistan practical cooperation to jointly build a community of destiny, and is also a model project and flagship project of the Belt and Road initiative. [1] According to the statistics of the Ministry of Planning and Development of Pakistan, as of May 24, 2023, there are 95 cooperation projects under the framework of China-Pakistan Economic Corridor [2].

However, the long-standing terrorist threat in Pakistan poses a non-negligible security risk to the construction of the China-Pakistan Economic Corridor project. [3] According to statistics, from 2001 to 2020, there were 13,638 terrorist attacks in Pakistan, resulting in a total of 21,862 deaths [4]. The frequent occurrence of terrorist attacks undoubtedly poses a serious threat to the safe operation of the China-Pakistan Economic Corridor and the smooth progress of cooperation between the two countries in various fields.

The occurrence of terrorist attacks is closely related to specific social, political and economic environments. Hou Zhiwen et al. point out that the network structure of terrorist organizations has an important impact on the spatial and temporal distribution of attacks, especially in the context of globalization, which has significantly increased the speed and scope of the spread of terrorist activities. [5] Shen Yukun et al. emphasized the spatio-temporal evolution of geopolitical fragmentation zones along the Belt and Road route, and concluded that these areas have become high incidence zones of terrorist attacks due to their complex political situation and social unrest. [6] Gao Hongliang et al. found that the attacks have obvious aggregation in time and space and are closely related to specific social events by constructing a spatio-temporal multi-graph convolutional network model. [7] Xu Shuncong et al. conducted a spatial distribution characterization of terrorist attacks in Pakistan and found that the frequency of terrorist activities in a specific region was significantly correlated with the local socio-economic conditions. [8] Zhao Guanzhou et al. explored the spatial and temporal evolution of terrorist attacks in the Gulf of Guinea region, and pointed out that the terrorist activities in the region showed obvious seasonal and cyclical characteristics [9].

These studies provide important theoretical support and empirical evidence for understanding the complexity of terrorist attacks, and emphasize the importance of fully considering spatio-temporal factors when formulating anti-terrorism strategies in order to improve the effectiveness of responding to terrorist attacks. Based on the global terrorism database, this paper applies hierarchical analysis and gray correlation analysis to comprehensively evaluate the degree of danger of terrorist attacks, constructs a global autocorrelation model, and carries out the analysis of spatio-temporal factors for terrorist attacks in the China-Pakistan Economic Corridor, and the flow of the study is shown in Figure 1.

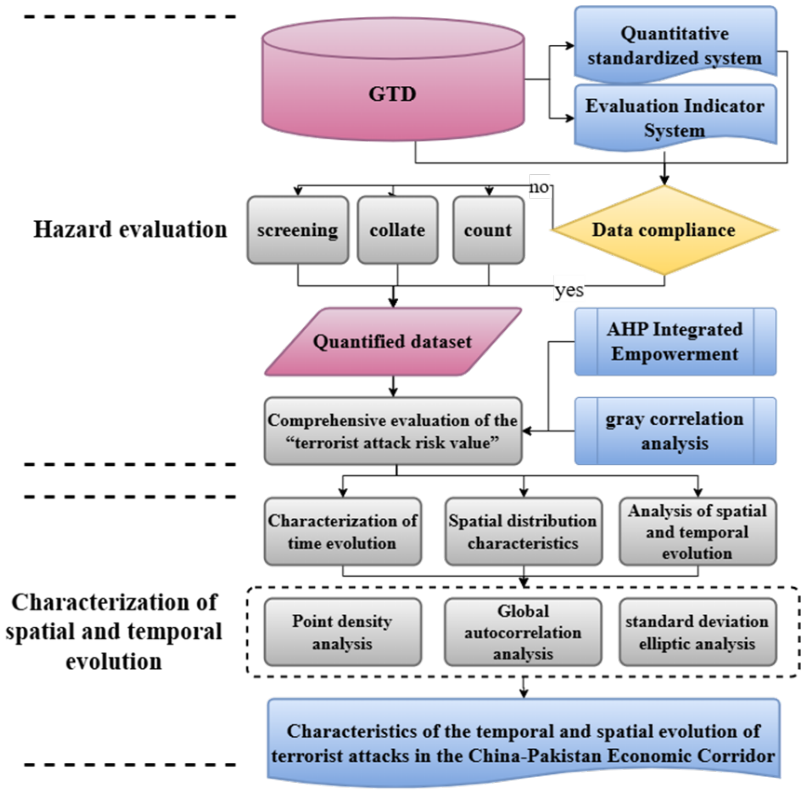



**Figure 1:** Flow Chart of The Study.

## 2. Quantification of The Degree of Risk of a Terrorist Attack

In analyzing the spatial and temporal evolutionary characteristics of terrorist attacks, it is crucial to quantify the degree of danger of an event. Numerical quantification can accurately distinguish the dangerous differences between events, provide accurate data support for spatial and temporal analysis, and enhance the persuasiveness of conclusions. For example, when studying the temporal trend of terrorist attacks in the China-Pakistan Economic Corridor, the quantitative value can clearly present the dangerous changes in each stage and reduce the error of subjective judgment.

### *2.1 Construction of Evaluation Indicators*

Hierarchical analysis (Analytic Hierarchy Process, AHP) is a systematic, hierarchical method of analysis that combines qualitative and quantitative methods of systematic hierarchical analysis. It was proposed by operations research fellow TL Saaty in the 1970s. [10] The indicator system established in this paper using hierarchical analysis is shown in Figure 2.

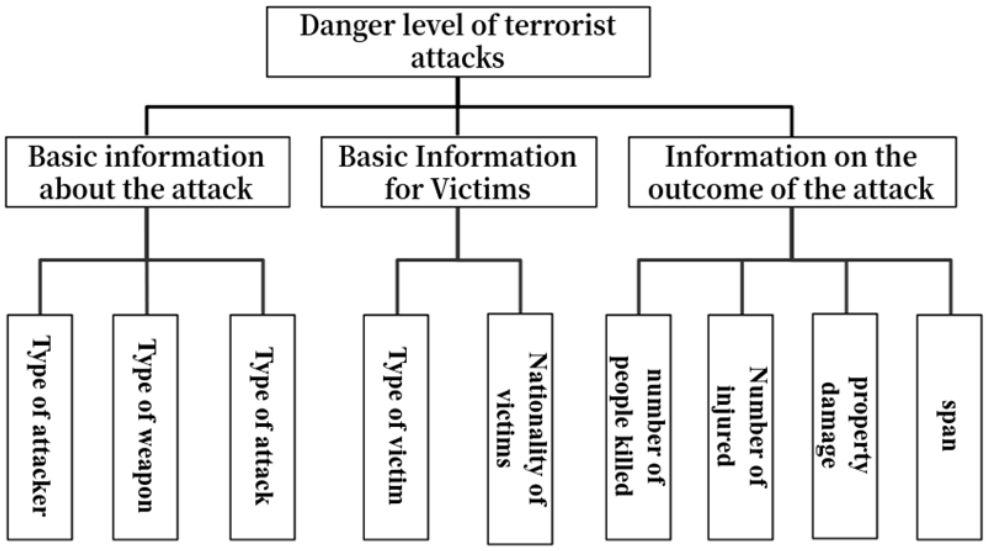



**Figure 2:** System of Indicators for Evaluating The Degree of Danger of Terrorist Attacks.

The judgment matrix $A = (a_{ij})_{n\times n}$ is constructed by comparing each upper element in the hierarchy, two by two, to the elements in the level below it.

The geometric mean is then applied to calculate the geometric mean of the elements in each row, and this geometric mean is normalized to get the weight vector W.

$$\overline{a_i} = \sqrt[n]{\prod_{j=1}^{n} a_{ij}} \tag{1}$$

$$w_i = \frac{\overline{a_i}}{\sum_{k=1}^{n} \overline{a_k}} \tag{2}$$

After the evaluation of the different indicators by 10 experts on these indicators were comprehensively weighted, the weights of the indicators were obtained as shown in Table 1.

**Table 1:** Table of Weights of Indicators in The System of Indicators of Terrorist Attacks.

| Evaluation Objective | Level 1 Indicators | Tier 1 Indicator Weights | Secondary Indicators | Weighting of Secondary Indicators | Final Weighting |
|---|---|---|---|---|---|
| Danger level of terrorist attacks | Basic information on the attack | 0.3139 | Type of attacker | 0.2833 | 0.08892787 |
| | | | Type of weapon | 0.169 | 0.0530491 |
| | | | Type of attack | 0.5477 | 0.17192303 |
| | Basic Information for Victims | 0.2275 | Type of victim | 0.3395 | 0.07723625 |
| | | | Nationality of victims | 0.6605 | 0.15026375 |
| | Information on the outcome of the attack | 0.4587 | Number of people killed | 0.4417 | 0.20260779 |
| | | | Number of injured | 0.3329 | 0.15270123 |
| | | | Property damage | 0.1241 | 0.05692467 |
| | | | Span | 0.1013 | 0.04646631 |

### 2.2 *Construction of Quantitative Criteria*

The nine different evaluation indicators were categorized into four hazard classes, as shown in Table 2, and the basis for determining the hazard class for each indicator was as follows.

1) The number of deaths, injuries, and property losses indicators are classified in accordance with the criteria of Article 3 of the Regulations on Reporting and Investigation of Production Safety Accidents.[11]

(2) The attacker type, weapon type, attack method, victim type, and duration indicators were calculated using the hierarchical analysis method with reference to the research of scholars such as Li Zhongbei and others, and their danger scores were calculated.[12]

(3) Terrorist attacks targeting the construction of the China-Pakistan Economic Corridor project, placing those whose victims' nationality is Chinese in the high-risk category.

**Table 2:** Hazard Rating Scale for Each Indicator.

| **Hazard Class** | | **High** | **Relatively High** | **Relatively Low** | **Lowe** |
|---|---|---|---|---|---|
| **Hazard Rating** | | **4** | **3** | **2** | **1** |
| Descriptive | Type of attacker | Organized criminal groups | Non-criminal groups | Null | Null |
| | Type of weapon | Biological, chemical, nuclear, missile and radiological weapons | Light weapons, explosives/bombs/explosives, incendiary weapons | Fake weapons, vehicles, etc. | Null |
| | Type of attack | Assassinations, armed attacks, explosions/bombings | Facility/infrastructure attacks, kidnapping and hijacking | Roadblocks, unarmed assaults | Null |
| | Type of victim | Government, police, military, diplomatic | Utilities, transportation, telecommunication, educational institutions, airports and airplanes | Businesses, journalists, citizens themselves as well as private property, religious figures/institutions, tourists | Null |
| | Whether the nationality of the victim is Chinese | Yes | Null | No | Null |
| | Number of victims killed | 3 0 and above | 10-29 persons | 3-9 persons | Less than 3 persons |
| | Number of victims Injured | 100 and above | 50-99 | 10-49 | Less than 10 persons |
| | Property Damage | 100 million dollars and above | 50-99.99 million dollars | 10-49.99 million dollars | Less than 10 million dollars |
| | Span | 30 days-1 year | 7-30 days | 1-7 days | Within 1 day |

### *2.3 Calculation of Risk Level Values for Terrorist Attacks*

Grey Relation Analysis (GRA) is a mathematical method used for the analysis and evaluation of multi-factor and multi-indicator systems. [13] For systems with ambiguous and uncertain influencing factors like terrorist attacks, Grey Relation Analysis can better deal with the complex and uncertain

relationships in them. The principle of calculation is as follows.

Let the original dataset matrix be $X = (x_{ij})_{n\times m}$ and determine the reference sequence$ref_j$=$max_{i=1}^{m} z_{ij}$ by taking the maximum value of each column. The matrix$X$ is normalized in rows and columns to obtain the matrix Q= $(q_{ij})_{n\times m}$ , and the reference sequence $ref_j$ is normalized to obtain$ref_j{}'$ .

Compute the absolute difference matrix$\Delta$

$$\Delta_{ij} = \left|q_{ij} - ref_j'\right| \ i = 1,2,\cdots,n; j = 1,2,\cdots,m \tag{3}$$

Calculate the gray correlation coefficient matrix$\xi$

$$\zeta_{ij} = \frac{\Delta(min\ ) + \rho\Delta(max\ )}{\Delta ij + \rho\Delta(max\ )} \tag{4}$$

where -$\rho$ is the resolution factor

Finally, the hazard level matrix S is obtained for each evaluated object.

$$s_i = \xi \times w^T \tag{5}$$

By using specific numerical values to represent the level of danger of terrorist attacks, it is possible to accurately measure the nuances of the level of danger between different events, which in turn improves the accuracy and persuasiveness of the analysis of the spatial and temporal evolution of the characterization of terrorist attacks in the China-Pakistan Economic Corridor.

## 3. Characterization of The Spatial and Temporal Evolution of Terrorist Attacks

### *3.1 Characterization of The Temporal Evolution of The Attacks*

In this paper, we define the sum of the risk level of each terrorist attack in a year as the Terrorist Attack Risk Value (TARV) for that year. Changes in Terrorist Attack TARV for Terrorist Attacks in the vicinity of the China-Pakistan Economic Corridor during the period 2010-2020 are shown in Figure 3. The situation is shown in Figure 3. There are four phases: surge, active, plunge and slow decline.

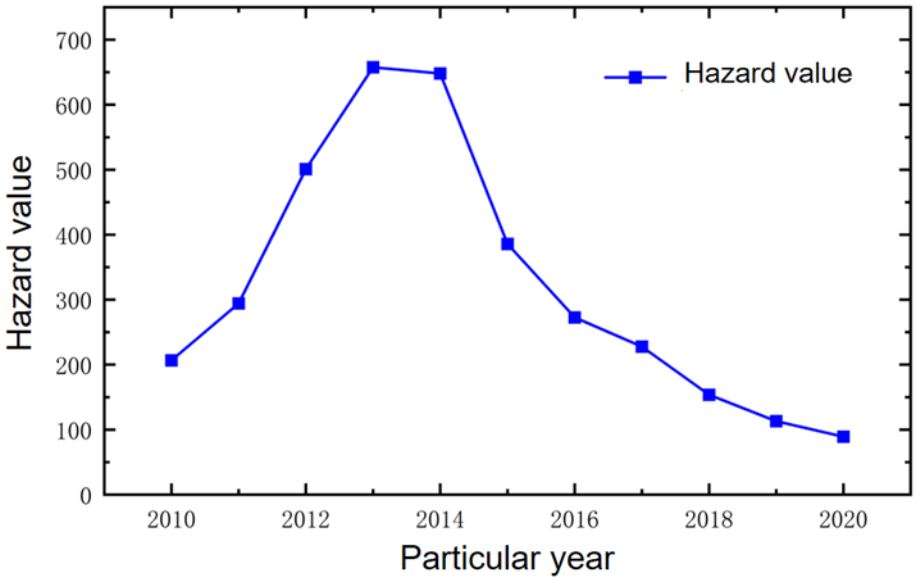



**Figure 3:** Line Graph of Changes in The Risk of Attack Value for Terrorist Attacks Near The China-Pakistan Economic Corridor.

Surge phase (2010-2013): During the period 2010-2013, the risk of terrorist attacks in the vicinity

of the China-Pakistan Economic Corridor rose rapidly. After the United States launched the war in Afghanistan in 2001, extremist forces such as the Taliban and Al-Qaeda were cracked down, and some of them fled to the tribal areas of Pakistan, where they continued to launch attacks from 2010 to 2013. In addition, the United States military presence in Afghanistan and its tactics have indirectly led to the deterioration of the security situation in Pakistan's border areas. For example, although military operations such as drone strikes are aimed at combating terrorists, they sometimes cause casualties among the local civilian population and intensify local anti-American and anti-government sentiments, which are then exploited by terrorist organizations to launch more terrorist attacks.

Active phase (2013-2014): The risk of terrorist attacks did not rise significantly during this phase, but remained at a high level overall, with more active terrorist attacks. There are a number of reasons for this situation. On the one hand, after the Pakistan Muslim League (Sharifist) won the general election held on May 11, 2013, the conflict with the Pakistani military deepened. The Sharifs advocated negotiations with the forces of the Tehrik-i-Taliban Pakistan (TTP), which are entrenched in the Federal Tribal Areas, and to a certain extent, this negotiation has affected the Pakistani military's crackdown on the terrorist organization, resulting in a respite for the terrorist forces. On the other hand, Pakistan's economic growth in 2013-2014 fell short of expectations, the scale of foreign direct investment, the total amount of imports and exports fell, the recovery of large-scale manufacturing industries was slow, the government's revenues decreased, and funds for improving people's livelihoods and strengthening security were limited, leading to increased poverty and unemployment, and some people were forced to join terrorist organizations or provide support for them. The China-Pakistan Economic Corridor project, as a key component of the China-Pakistan Economic Corridor, is being implemented. At this time, the China-Pakistan Economic Corridor project has been proposed as a visionary project of win-win cooperation between China and Pakistan, which will surely contribute greatly to the economic development of the region where the project is located, and this has aroused the jealousy and dissatisfaction of some external forces and terrorist organizations. They are attempting to achieve their own developmental or political objectives by creating terrorist attacks, sabotaging the construction of the China-Pakistan Economic Corridor and interfering with the friendly cooperation between China and Pakistan.

Plummeting phase (2014-2016): This phase saw a sharp decline in the Risk of Terrorist Attacks, and during 2014-2015, relations between Pakistan, Afghanistan and India eased to a certain extent. India, Pakistan and Pakistan and Afghanistan held several summit meetings, which to a certain extent had a positive impact on improving Pakistan's neighboring security environment, but also created conditions for Pakistan to focus on counter-terrorism domestically. For example, after April 2014, the Pakistan Army, under the leadership of General Raheel Sharif, launched Operation Sharp Sword against the North Waziristan region aimed at purging the terrorist armed forces, and the scale, duration and striking effect of this military operation were unprecedented. Moreover, since the official construction of the China-Pakistan Economic Corridor in 2015, the construction of the corridor has led to the development of a large number of related industries in Pakistan, creating a large number of employment opportunities. For example, the construction of energy projects has absorbed the local labor force, and the improvement of transportation infrastructure has lowered logistics costs, promoted trade development, and boosted the economic prosperity of the regions along the corridor, which, to a certain extent, has alleviated the pressure of terrorism triggered by poverty and social inequality, and has reduced the breeding ground for terrorism from the root.

Slowdown phase (2016-2020): From 2016 to 2020, the Terrorism Risk Value will continue to

decline, but at a slower rate than during the plunge phase. During this period, Pakistan has strengthened controls along its border with Afghanistan by installing a large number of additional military posts and checkpoints along the border, and by installing advanced surveillance equipment, such as thermal imagers and unmanned aerial vehicle patrol systems, to effectively monitor the movement of people and goods along the border. For example, in the border areas of Balochistan, these measures have resulted in the successful interception of terrorists attempting to infiltrate into Pakistan from Afghanistan on a number of occasions, preventing them from entering Pakistani territory with weapons and ammunition to carry out terrorist activities. On the other hand, China and Pakistan have strengthened counter-terrorism cooperation in the context of the construction of the China-Pakistan Economic Corridor, and China has provided Pakistan with advanced security equipment and technical training. For example, at the Gwadar Port, China has assisted the Pakistani side in installing an intelligent port security system, which is capable of effectively detecting explosives and weapons hidden in cargo and vehicles. At the same time, China has also carried out counter-terrorism intelligence exchanges with Pakistan, and the two sides have shared information on terrorist organizations and extremists, which has enabled Pakistan to prevent in advance some terrorist attacks against Chinese citizens and Chinese-funded enterprises.

### *3.2 Characteristics of The Spatial Distribution of Terrorist Attacks in The Vicinity of The China-Pakistan Economic Corridor*

#### *3.2.1 Description of The Segments of The China-Pakistan Economic Corridor Route*

The China-Pakistan Economic Corridor is 3,000 kilometers long, starting from Kashgar, Xinjiang, in the north and ending at Gwadar, Pakistan's outlet to the sea, in the south. The existing literature only describes in detail the starting and ending points and routes of the western route, but there is no detailed description of the central and eastern routes. In this paper, the section from Hongqi Lap to Islamabad is called China-Pakistan cross-border road section, Islamabad to Gwadar Harbor section is called Western Route section, from Islamabad to Karachi section is called Eastern Route section, Western Route section is called Eastern Route section, Western Route section is called Eastern Route section. The section from Islamabad to Gwadar Port is called the Western Route and the section from Islamabad to Karachi is called the Eastern Route, while the section between the Western Route and the Eastern Route is called the Central Route, as shown in Figure 4.

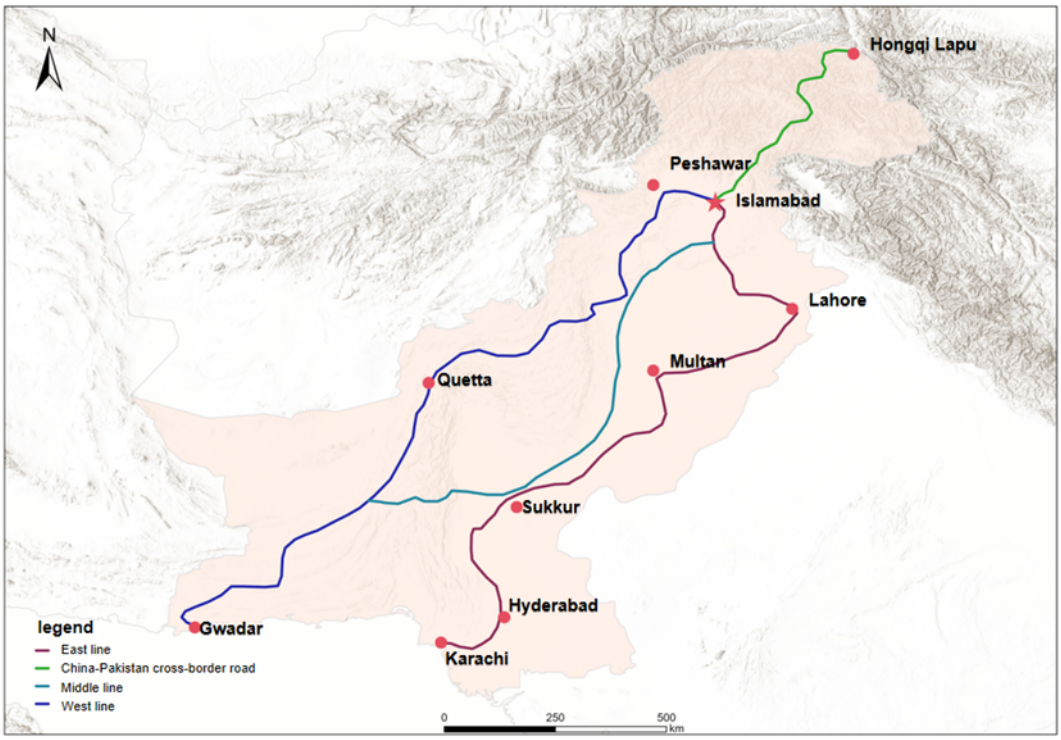



**Figure 4:** Route definition map for the China-Pakistan Economic Corridor

### *3.2.2 Global Autocorrelation of Terrorist Attacks near the China-Pakistan Economic Corridor*

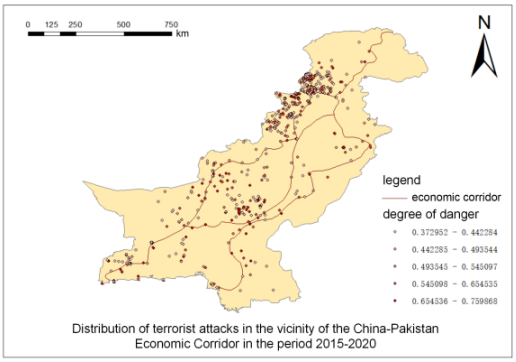
Based on the global autocorrelation model to measure the Moran's I of the terrorist attacks near the China-Pakistan Economic Corridor with respect to the Danger of Terrorist Attack Value, the results are shown in Table 3. The positive spatial autocorrelation of the risk level of terrorist attacks near the China-Pakistan Economic Corridor can be inferred that the high-risk level of terrorist attacks in the CPEC may have a driving or synergistic growth effect on the neighboring regions. The reason for this is that Pakistan shares a long border with Afghanistan, and the chronic volatility in Afghanistan has made the border areas a major conduit for terrorist organization infiltration. These areas are densely populated by terrorist organizations, such as the Tehrik-e-Taliban Pakistan and the Khorasan branch of the Islamic State, which take advantage of the geographic location of the border to operate on both sides of the border, making the Pakistani areas near the border a high-risk zone for terrorist attacks. This has made the Pakistani region near the border a high-risk zone for terrorist attacks.

**Table 3:** Spatial Autocorrelation of The Level of Risk of Terrorist Attacks in The Vicinity of The China-Pakistan Economic Corridor.

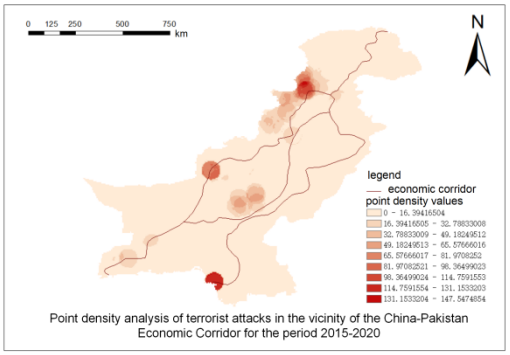
| **Directorate-Wide Self-Relevance** | |
|---|---|
| **Moran's I Index** | 0.029487 |
| **Expectation Index** | -0.000806 |
| **Variance** | 0.000008 |
| **Z-Score** | 10.766017 |
| **P-Value** | 0.000000 |

Terrorist organizations are active in these areas and, because they can spread the effects of terrorist activities to adjacent areas through transportation networks, movement of people, etc., the level of danger in the surrounding areas increases.

Since the implementation of the China-Pakistan Economic Corridor project officially began in 2015, terrorist attacks near the CPEC between 2015 and 2020 are analyzed here. The distribution of terrorist attacks with different levels of risk and their point density are analyzed as shown in Figure 5, from which it can be seen that during the period from 2015 to 2020, terrorist attacks are mainly concentrated in the upstream, midstream and downstream of the Western Route and a small number of terrorist attacks are concentrated in the downstream of the Eastern Route, while a small number are concentrated in the upstream, midstream and downstream of the Western Route. It can be seen from the figure that during the period 2015-2020, terrorist attacks will mainly be concentrated in the upstream and midstream of the Western Front and the downstream of the Eastern Front, with a small number of them concentrated in the downstream of the Western Front and the midstream and downstream of the Central Front.




Distribution of Terrorist Attacks.




Terrorist Attack Point Density.

### *3.2.3 Spatial Distribution of Terrorist Attacks in The Vicinity of The China-Pakistan Economic Corridor*

The upper reaches of the Western Front are located in Khyber Pakhtunkhwa Province, close to the Afghan border, which is the gateway to Afghanistan and Pakistan. Owing to its proximity to the war-torn areas of Afghanistan, it is easy for terrorist organizations such as the Taliban to make use of this area for infiltration and activities. In addition, the complex mountainous terrain of the area makes it easy for terrorists to hide and operate.

Terrorist attacks on the middle reaches of the Western Front have been centered around Quetta in Balochistan, the capital and strategic location of the province. Rich in mineral resources, terrorists have frequently launched attacks, capitalizing on local tribal tensions and poverty to foment popular discontent with the central Government. In addition, the region's proximity to the Iranian and Afghan borders makes it a complex geography with high levels of cross-border activity.

Terrorist attacks on the lower reaches of the Western Front have centered around the port of Gwadar in Balochistan, an important node of the China-Pakistan Economic Corridor and one of the ports at the heart of the Belt and Road Initiative. Terrorists have targeted the area with the intention of disrupting major China-Pakistan economic projects and weakening Pakistan's cooperation with China. In addition, local separatist organizations, such as the Balochistan Liberation Army (BLA), are

active in the region, launching terrorist attacks on the pretext of opposing the central Government's policy of resource control.

Terrorist attacks along the lower Eastern Front have been concentrated near the port of Karachi in Sindh province, which is Pakistan's largest city and economic hub, and its dense and diverse population makes it a high-value target for terrorist attacks, as destabilizing Karachi's security can have significant economic and social repercussions. In addition, as a major port city, Karachi's security challenges are compounded by the problem of illegal arms and drug smuggling.

Terrorist attacks in the middle and lower reaches of the Middle Line have been concentrated in eastern Balochistan and along the borders of Balochistan, Sindh and Punjab, where economic backwardness and poverty are relatively high. Part of the local population lives in hardship and lacks adequate employment opportunities and stable sources of income. Terrorist organizations often take advantage of this economic plight and use money and materials as bait to recruit members. Some young people, forced by life, are easily compelled by extremist ideas to join terrorist organizations and participate in terrorist attacks. Moreover, these junction areas are major transportation routes that connect different parts of Pakistan. For example, the main highway connecting Sindh and Punjab passes through the junction areas, and terrorists can use these transportation routes for the movement of people and materials.

### *3.3 Spatial and Temporal Evolution of Terrorist Attacks in The Vicinity of The China-Pakistan Economic Corridor*

The global spatial autocorrelation of terrorist attacks at each stage of the Danger of Attack is shown in Table 4, and analyzing the data in the table, it is clear that the danger of terrorist attacks near the China-Pakistan Economic Corridor shows a positive spatial autocorrelation at each stage.

**Table 4:** Spatial Autocorrelation Parameters for Various Stages of Terrorist Attacks Near China-Pakistan Economic Corridor.

| Timing | Moran's I Index | Expectation Index | Variance | Z-Score | P-Value |
|---|---|---|---|---|---|
| Surge Phase (2010-2013) | 0.117257 | -0.000179 | 0.000002 | 90.116899 | 0.000000 |
| Active Phase (2013-2014) | 0.010870 | -0.000230 | 0.000002 | 7.249260 | 0.000000 |
| Plateau (2014-2016) | 0.009281 | -0.000236 | 0.000003 | 5.095733 | 0.000000 |
| Retarded Descent (2016-2020) | 0.031702 | -0.000349 | 0.000018 | 7.533668 | 0.000000 |

The correlation weakened from the surge phase to the active phase and stabilized over the next three phases. This may be due to the fact that the Government of Pakistan has strengthened its counter-terrorism measures after 2013 by increasing military investment, carrying out special counter-terrorism operations and targeting terrorist hideouts in the tribal areas with precision strikes, which has effectively weakened the viable forces of terrorist organizations and disrupted their local networks of activities, making it difficult for terrorist attacks to form a clustering effect in a specific region, thus reducing the spatial autocorrelation.

To further understand the changes in the directional distribution of terrorist attacks near the China-Pakistan Economic Corridor, this paper utilizes the standard deviation ellipse method. The directional distribution of terrorist attacks near the China-Pakistan Economic Corridor at various stages and its parameters are shown in Figure 6.

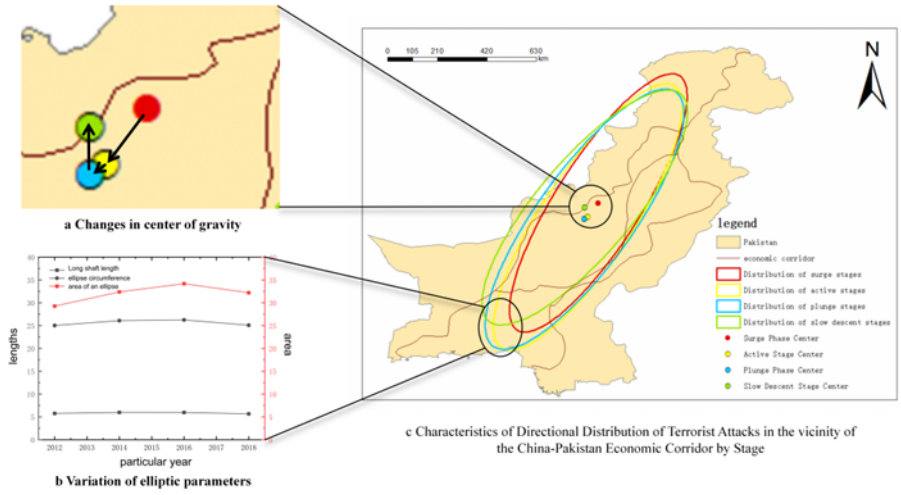



**Figure 6:** Directional Distribution and Parameters of The Phases of Terrorist Attacks in The Vicinity of The China-Pakistan Economic Corridor.

The area of the ellipse indicates the extent of the distribution of terrorist attacks. Overall, the difference in the area of each phase is relatively small because the terrorist attacks in each phase near the China-Pakistan Economic Corridor show a positive spatial correlation and the aggregation points are relatively fixed. The long axis of the ellipse represents the overall spatial direction of the terrorist attacks and the distance covered in that direction. Terrorist attacks in all phases near the China-Pakistan Economic Corridor basically show a northeast-southwest direction, and the length of the long axis is basically the same, which is related to the extreme imbalance between the east and west of Pakistan in the long term. The center of the ellipse represents the geometric center of the distribution of terrorism, and the center of the ellipse for each phase of terrorist attacks has shifted slightly, clustering in the Western Front region of the corridor, but the slight shift in the center is not enough to indicate a significant shift in the center of gravity of terrorist attacks near the China-Pakistan Economic Corridor.

## 4. Conclusion

Characteristics of the temporal evolution: from 2010 to 2020 the risk of terrorist attacks goes through four phases: surge, active, sharp decline and slow decline. The surge period is characterized by the flight of extremist forces from Afghanistan. During the surge period, extremist forces from Afghanistan fled to the tribal areas of Pakistan, and the deterioration of border security caused by the U.S. military operations led to an increase in terrorist attacks; during the active period, the conflict between political parties and the military in Pakistan, the difficult economic situation, and the corridor project triggered dissatisfaction among external forces, which led to an increase in terrorist attacks; during the active period, the surge period, the risk of terrorist attacks was reduced by four phases. active period, Pakistan's political party and military conflicts, economic difficulties and

corridor project caused dissatisfaction of external forces, which contributed to the active terrorist attacks; plummeting period, Pakistan's neighboring relations easing, military counter-terrorism operations and corridor construction to promote economic development, from the root cause of terrorism to reduce the breeding ground; slowing down period, Pakistan to strengthen the border control, deepening the Sino-Pakistani cooperation in counter-terrorism, and effective prevention of terrorist attacks. Terrorist attacks are effectively prevented.

Characteristics of spatial distribution: Terrorist attacks in 2015-2020 will be mainly concentrated on the upstream and downstream of the Western Front, the downstream of the Eastern Front and the Central Front. Middle and lower reaches. The upper reaches of the Western Front facilitate the infiltration of terrorist organizations because of their proximity to the Afghan border and their mountainous terrain; the middle reaches of the Quetta region have become a high incidence area because of their resources, tribal conflicts, and complex geographic location; and the lower reaches of the Gwadar port have been targeted by terrorists due to the impact of the project. The downstream port of Karachi on the eastern route has attracted terrorist attacks because of its economic status and security concerns. The lower and middle reaches of the Central Route are economically backward and easily accessible, providing conditions for terrorist organizations to recruit and operate. The global autocorrelation shows a positive spatial autocorrelation of the level of risk, which is related to the situation on the Pakistan-Afghanistan border and the spread of terrorist organizations' activities.

Spatial and temporal evolution: The level of risk of terrorist attacks showed positive spatial autocorrelation at all stages, with the correlation stabilizing after 2013, when it weakened from the surge to the active phase. The standard deviation ellipse method shows that the distribution of terrorist attacks varies little from stage to stage, with an overall northeast-southwest orientation and a stable length of the long axis, and with no significant shift in the center of gravity in the Western Front region.

This study systematically analyzes the temporal and spatial characteristics of terrorist attacks in the China-Pakistan Economic Corridor, providing a basis for an in-depth understanding of the patterns of terrorist activities in the region and laying the groundwork for China and Pakistan to formulate a precise counter-terrorism strategy and ensure the safe construction and operation of the corridor.

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