

# Based on Atmosphere Field Theory, the Evolution of Online Public Opinion of Accident Disasters: A Case Study of the "March 13 Major Gas Deflagration Accident"

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**Abstract:** Revealing the emotional evolution mechanism of online public opinion of accident disasters is the key to improving the precision of emergency management and public opinion governance. In response to the limitation of traditional research that often separates "emotion" from "logic", this paper introduces the "Atmosphere Field Theory" and takes the "March 13" major gas deflagration accident in Yanjiao, Hebei as a case study to deeply analyze the emotional dynamic chain of public opinion evolution. The research finds that the public opinion of the accident fully presents the progressive logic of "structure problem → moral shock → generalized belief → secondary stimulus → situational mobilization → ultimate stimulus" and contains two main evolutionary threads: first, the "Safety-Accountability Chain", which is triggered by structural risks of urban gas safety, propelled by improper emergency response behaviors, and ultimately points to deep institutional accountability; second, the "Rights-Trust Chain", which originates from the tension between information control and the public's right to know, is ignited and escalated after the intervention of authoritative professional institutions, and profoundly impacts government credibility. In response, this paper proposes a four-in-one governance strategy of "forward-looking, collaborative, procedural, and empathetic" qualities, aiming to provide a theoretical basis and practical reference for the precise governance of public opinion that equally emphasizes emotion and logic.

**Keywords:** Atmosphere Field Theory, accident disasters, online public opinion, emotional evolution, governance strategies

## Introduction

Since the beginning of the 21st century, with the deep intertwining of rapid industrialization, urbanization, and informatization in Chinese society, public security risks have taken on new characteristics such as complexity, chain effects, and cross-domain nature. The tension between aging infrastructure, industrial restructuring, and the modernization of the governance system has led to a high incidence of accident disasters. The immediacy of social media and its cross-circle communication characteristics<sup>[1]</sup> enable local contradictions in emergencies to quickly spread from physical spaces to the online field, which can easily ferment into nationwide public opinion and even reversely affect emergency response and policy processes<sup>[2]</sup>. Against this background, deeply revealing the evolution mechanism of online public opinion of accident disasters has become an important issue jointly faced by academia and governance practice.

However, when analyzing such public opinion, existing research often faces the dilemma of separating "emotion" from "logic". On the one hand, although sentiment analysis can depict the accumulation and diffusion of public emotions<sup>[3]</sup>, it struggles to reveal the internal causality of event evolution. On the other hand, although structural analysis of communication models<sup>[4]</sup> or event logic graphs<sup>[5]</sup> can outline the development trajectory of public opinion, it lacks an in-depth explanation of the generation, transformation, and release of emotions. This both restricts the grasp of the complete picture of public opinion evolution and affects the precision of governance strategies.

## 1. Theoretical Foundation: Atmosphere Field Theory and Its Analytical Framework

The "Atmosphere Field Theory" provides an integrated perspective for understanding the dynamic mechanisms of public opinion<sup>[6]</sup>. This theory breaks through the traditional "structure-action" dualistic framework. Through the accumulation, transformation, and release of emotional energy, it systematically explains the evolutionary process from individual emotions to collective actions. It constructs the logical chain of "structure problem → moral shock → generalized belief → secondary stimulus → situational mobilization → ultimate stimulus"<sup>[7]</sup>. In this chain, structure problem refers to deep-rooted contradictions embedded in the social system or governance system. Moral shock refers to the impact of an emergency on the socially recognized moral bottom line, which injects initial emotional energy into public opinion. Generalized belief is a generalized collective cognition formed by the public regarding the event, providing cognitive support for emotional accumulation. Secondary stimulus refers to a specific event that sharply escalates the emotional energy of public opinion, acting as a critical node for the turn or intensification of public opinion. Situational mobilization refers to individuals forming a consensus of public opinion through online interactions, generating a direction for collective action. Ultimate stimulus is the final outcome or official response that determines the ultimate direction of public opinion.

The core advantage of the Atmosphere Field Theory lies in its profound explanation of emotional dynamics. First, it reveals the moral and social implications of emotional energy, explaining that atmosphere is not individual emotion but a collective emotional dynamic rooted in structural injustice. Second, it provides a staged mechanism of emotional evolution, presenting the dynamic process of emotion from accumulation and diffusion to eruption. Third, it emphasizes the interaction between emotion and structure: emotional energy is not only triggered by structural contradictions but also shapes the structure of the public opinion field in reverse through group mobilization. Therefore, the Atmosphere Field Theory offers an analytical framework that "integrates form and atmosphere" for the study of accident disaster public opinion, explaining both "why public opinion intensifies" and "how it unfolds", thus achieving an integrated explanation of the entire evolutionary process.

## 2. Research Design

### 2.1 Case Selection

On March 13, 2024, a gas deflagration accident occurred at a shop in Yanjiao Town, Sanhe City, Hebei Province, causing 7 deaths and 27 injuries. After the incident, related topics quickly appeared on the Weibo trending list. As the rescue efforts progressed, on-site communication methods that roughly expelled journalists triggered a controversy over "obstruction of interviews", giving rise to secondary public opinion. That evening, the All-China Journalists Association published an article publicly criticizing the incident and raising three major questions, further intensifying public opinion. In the early morning of March 14, the accident disposal headquarters issued a notice acknowledging shortcomings and apologizing, but it was still questioned due to delayed responses. On the afternoon of March 14, the authorities clarified the cause of the accident, and public opinion gradually entered a low-level period. This event presents an evolutionary trajectory of "initial outbreak, secondary fermentation, official response, and gradual subsidence", which highly aligns with the six-stage emotional evolution revealed by the Atmosphere Field Theory, thus holding typical research value.

### 2.2 Data Sources

To comprehensively capture the overall picture of the public opinion, this study uses "Yanjiao, explosion" as keywords to systematically collect microblog texts, media reports, and official notifications from the Sina Weibo platform from March 13 to March 31, 2024. As an important channel for public information acquisition and opinion expression, Weibo contains rich event details and emotional expressions, which holds significant value for perceiving public opinion situations. This study obtains a total of 8,370 valid pieces of data. After preprocessing such as cleaning and word segmentation, the study lays a foundation for subsequent qualitative analysis.

### 2.3 Research Approach

This study adopts a qualitative case analysis method, taking the six-stage progressive chain of the Atmosphere Field Theory as the analytical axis to systematically examine the emotional evolution

process of online public opinion regarding this incident. The analysis does not simply apply the theoretical stages but uses the collected textual information as empirical materials to identify, stage by stage, the key nodes, dominant issues, core actors, and their emotional expressions in the evolution of public opinion, thereby revealing the dynamic changes and intrinsic driving logic of the emotional energy of public opinion. Specifically, it includes: identifying the emotional triggers of each stage; analyzing the transformation mechanisms of emotional energy; and exploring the interaction between emotional dynamics and structural factors.

First, the study conducts stage division and text anchoring. Based on the six stages of the Atmosphere Field Theory and combined with the time nodes of the event development and key public opinion incidents (such as the explosion occurrence, the obstruction of interviews, the statement from the All-China Journalists Association, and official notifications), the study divides the evolution of public opinion into several stages. On this basis, the study categorizes and organizes the textual data within each stage to form a stage-divided analytical corpus.

Second, the study performs dominant issue and emotion identification. Through fine-grained text analysis of the corpus at each stage, the study adopts methods such as high-frequency word extraction, issue clustering, and emotion word annotation to identify the dominant public opinion issues (e.g., "casualty situation", "reporters' right to interview", "government response") and the public emotional tone (e.g., shock, anger, doubt, understanding) at each stage. By comparing issue changes and emotional intensity across different stages, the study outlines the fluctuation trajectory of the emotional energy of public opinion.

Third, the study conducts a discourse-action analysis of key actors. In the stage-divided analysis, the study focuses on the statements and behaviors of different types of actors (such as ordinary netizens, opinion leaders, media, and local governments). By analyzing their discursive strategies, emotional mobilization methods, and interactive relationships at each stage, the study reveals the driving or turning role of core actors in the evolution of public opinion.

Fourth, the study performs cross-stage comparison and inductive analysis of dynamic mechanisms. On the basis of completing the independent analysis of each stage, the study conducts cross-stage comparisons to identify the transformation nodes and driving factors (such as the triggering of secondary public opinion, the intervention of authoritative institutions, and the pace of official responses) of emotional energy during the process of public opinion from "outbreak" to "subsidence", thereby inducing the internal dynamics of public opinion evolution.

### **3. Case Analysis**

Through an in-depth examination of the online public opinion data, this study finds that the evolution process of this incident completely reproduces the six-stage model of the Atmosphere Field Theory and presents two intertwined but clearly structured core emotional evolution chains. One is the "Safety-Accountability Chain" triggered by structural risks of urban public safety, and the other is the "Rights-Trust Chain" ignited by the conflict of information rights.

#### ***3.1 Structure Problem***

In this accident, the structure problem manifests itself in two intertwined levels.

The first level is the systemic risk of public safety in urban governance. As a typical "dormitory town", Yanjiao accommodates a large number of people who work in Beijing. The aging pipeline networks of the city's lifeline systems, their inadequate maintenance, and the formalism and blind spots of grassroots safety supervision constitute long-standing hidden safety hazards. Behind the direct trigger of "gas leakage" lie deep governance issues such as insufficient investment in public safety during urbanization and unclear division of responsibilities among multiple authorities. This level serves as the deep soil of the "Safety-Accountability Chain".

The second level is the institutional tension of information rights in crisis communication. In emergency response, the media's right to interview carries the public's right to know and the right to supervise, while the official information control is based on security considerations and the logical need for the release of authoritative information. A natural tension exists between these two logics of rights. When control actions are presented in a simple and crude manner, this tension may transform into intense public opinion conflicts. This level serves as the potential source of the "Rights-Trust Chain".

### ***3.2 Moral Shock***

When structural risks eventually trigger a specific accident, the event escalates into a "moral shock" with a strong moral impact. The explosion on the morning of March 13 resulted in 7 deaths and 27 injuries. The rapid spread of this information through social media strongly impacts the public's bottom line of life safety, triggering the public's instinctive emotions of sympathy, fear, and anxiety. At this stage, the focus of public opinion centers on the shock over the disaster itself and the mourning for the victims. This stage injects enormous initial emotional energy into the entire public opinion field and constitutes the common starting point of the two evolution chains.

### ***3.3 Generalized Belief***

As information is gradually disclosed, the public's emotions begin to seek attribution, and a universalized "generalized belief" quietly takes shape. Under the cumulative influence of past cases of non-transparent information in some workplace safety accidents, some netizens begin to develop suspicions such as "the truth may be covered up" or "the authorities may try to minimize the matter". This cognitive framework based on past experiences leads to doubts in the public opinion field about the cause of the accident and the number of casualties. This provides cognitive support for the subsequent sharp escalation of public opinion: once a new stimulus that confirms this belief appears, the accumulated emotional energy will be rapidly released and will act on the two evolution chains simultaneously.

### ***3.4 Secondary Stimulus***

The secondary stimulus is a critical turning point in the evolution of the atmosphere, verifying and reinforcing the generalized belief and sharply escalating the emotional energy of public opinion. In this accident, the secondary stimulus manifests as improper on-site emergency response, which simultaneously ignites the two evolution chains.

On the "Safety-Accountability Chain": To ensure rescue safety, the command center "persuades" the reporting journalists to leave. Although this measure is originally a safety management measure, its crude manner, lack of explanation, and lack of human consideration lead the public to interpret it as "obstruction" of the right to know and the right to supervise. As a result, the authorities are alienated from a "solution" to the problem into a "problem" that creates new contradictions. The focus of public opinion then shifts from "how did the accident happen" to "why is the response so chaotic", undermining the trust capital accumulated by the authorities in the early stage.

On the "Rights-Trust Chain": The "persuasion" action is presented in a crude manner, and its nature is widely interpreted as a blatant violation of press freedom and the public's right to know, directly challenging socially recognized values. This action instantly activates and confirms the public's generalized belief that "the authorities are trying to cover up the truth". Consequently, the previously scattered suspicions rapidly converge into a powerful force of questioning, providing the key spark for the outbreak of secondary public opinion.

### ***3.5 Situational Mobilization***

After the secondary stimulus, public opinion enters the stage of "situational mobilization", where public emotions complete a qualitative shift from grief and anger to accountability, and dispersed individuals form a consensus of public opinion through online interactions. On the two evolution chains, mobilization presents different directions, but together they constitute a powerful collective force of condemnation.

On the "Safety-Accountability Chain": Situational mobilization manifests as the public combining their dissatisfaction with the "persuasion" action with their demands for "accountability" for the accident itself, thereby forming a collective action targeting institutional accountability. Public opinion directly points to deeper levels of government governance and institutional justice, demanding full-chain accountability ranging from gas safety supervision to improper emergency response. The emotional energy of public opinion ultimately transcends the specific case and points to a deep interrogation of the capacity for systemic risk prevention and the governance capacity for procedural justice.

On the "Rights-Trust Chain": Situational mobilization exhibits a stronger explosive force due to the

intervention of authoritative professional institutions. On the night of the accident, the All-China Journalists Association publishes an article titled "Legitimate Interviewing is a Journalist's Right", publicly criticizing the crude obstruction behavior and raising three major questions: "Should journalists conduct interviews?", "Are journalists causing trouble?", and "Can a single press release truly replace on-site reporting?". As an authoritative professional institution, its intervention elevates the "obstruction of interviews" incident into a defense of universal values such as "press freedom" and "the public's right to know", providing a legitimate framework for the accumulated public emotions. This action catalyzes the generalized belief that "the authorities are trying to cover up the truth", amplifying emotional energy exponentially and accelerating the escalation of public opinion.

### ***3.6 Ultimate Stimulus***

Facing the continuously escalating pressure of public opinion, the authorities issue a notification in the early morning of March 14, acknowledging shortcomings in ensuring journalists' interview access and offering an apology. This "ultimate stimulus" responds to the core demands to a certain extent, pushing the intensity of public opinion to gradually decline. However, the apology does not completely quell the doubts, as it is perceived by some members of the public as "blaming the grassroots level" and "delayed response", failing to meet the expectations for substantive accountability and institutional improvement. This reflects a common dilemma in current public opinion governance: a response model characterized by passive reaction rather than proactive communication, and formal apology rather than substantive accountability, can only temporarily ease surface-level contradictions, but can hardly fundamentally restore public credibility, nor can it effectively prevent the recurrence of similar public opinion incidents. The incomplete dissipation of emotional energy in public opinion means that the restoration of governance trust still has a long way to go.

## **4. Countermeasures and Suggestions**

This paper proposes a four-in-one governance strategy of "forward-looking, collaborative, procedural, and empathetic" qualities, aiming to achieve a paradigm shift from "passive response" to "active guidance" at the key nodes of public opinion evolution.

### ***4.1 "Forward-looking Governance" Oriented Toward Structural Problems***

Addressing structural problems as the total source of emotional energy, the focus of governance must be shifted forward from "post-incident response" to "pre-incident prevention". Structural risks constitute the fundamental source of emotional energy in public opinion, and the root solution to structural problems lies in reducing the occurrence of major safety accidents. This paper recommends transcending the traditional "event-driven" governance model and shifting toward a "data-driven" risk prevention model. Specifically, it suggests improving the "One Map" digital platform for urban emergency management, integrating multiple data sources from emergency response, fire control, public security, health, and other departments, and conducting regular, dynamic risk assessment and monitoring of major risk sources such as urban pipeline networks and old buildings. At the same time, it suggests establishing a social disclosure mechanism for risk assessment, regularly publishing white papers on urban safety risks, opening some public data, and proactively guiding public cognition. By placing risk communication in daily practice, the strategy nurtures social rationality at the source and builds governance consensus, thereby fundamentally reducing the incidence of major safety accidents.

### ***4.2 "Collaborative Governance" for Guiding Generalized Belief***

Addressing the key mechanism of the formation and reinforcement of generalized belief, governance strategies should shift from defensive confrontation to constructive collaboration. The intervention of authoritative professional institutions plays a decisive role in the formation of generalized belief. This paper suggests the following. On the one hand, in the emergency response mechanism at the accident site, it is imperative to mandate the establishment of a unified on-site news center. The center should serve as the core hub for information distribution, service support, and communication coordination, providing verified authoritative information to the media in a timely and proactive manner and integrating the center into the "collaborative network" of emergency management. On the other hand, it is necessary to establish regular communication mechanisms with authoritative institutions, industry organizations, and opinion leaders. Through periodic briefings, thematic seminars,

and invitations to participate in drills, mutual understanding and trust should be enhanced. The goal is to strive to make these actors clarifiers of facts and advocates of rationality during critical moments, thereby guiding the "generalized belief" in a positive and constructive direction.

#### ***4.3 "Procedural Governance" for Blocking the Secondary Stimulus***

Addressing the secondary stimulus as a key node in the turn of public opinion, governance must elevate procedural justice and emotional communication to the same strategic importance as technical response. Improper emergency response behaviors are the critical factor triggering the secondary stimulus. To this end, this paper suggests formulating and routinely drilling emergency response plans that include standardized procedures for media coordination, information release, and public communication. The plan should explicitly stipulate the establishment of a media reception area at the emergency site, clarify the authority and timeliness of information release, and standardize communication language and behavioral guidelines for interacting with affected populations and social media. During on-site response, the implementation of any management action (such as cordoning off or persuasion to leave) must be accompanied by a simultaneous explanation of its legal basis, safety considerations, and rational necessity. Through sincere and respectful language, the authorities should explain these actions to maximize public and media understanding and cooperation, thereby effectively blocking the "secondary stimulus" chain in the evolution of online public opinion.

#### ***4.4 "Empathetic Governance" for Repairing the Ultimate Stimulus***

Addressing the residual emotional energy of public opinion and the difficulty of trust repair after the ultimate stimulus, authorities must abandon the stereotyped response model, accurately align with the public's demands at different stages, and achieve an upgrade from "information notification" to "trust repair". This paper suggests establishing a phased and focused response strategy. In the "moral shock" stage, the response should highlight the supremacy of life and humanistic care, demonstrating the government's warmth and sense of responsibility. In the stage of "generalized belief" formation, when faced with widespread doubts about the right to know and procedural justice, the response must directly confront these core value questions and provide institutional and principled explanations. The core of the response lies in rebuilding emotional connection and institutional trust. Therefore, the entire response process should consistently present a governance posture of responsibility, transparency, and modesty. Through substantive accountability and commitments to corrective action, the authorities can achieve a fundamental dissipation of emotional energy in public opinion and a substantial restoration of governance trust.

### **5. Conclusion**

This study introduces the Atmosphere Field Theory into the analysis of online public opinion of accident disasters. Taking the "March 13 Major Gas Deflagration Accident" as a case study, the study verifies the explanatory power of the six-stage framework of "structure problem → moral shock → generalized belief → secondary stimulus → situational mobilization → ultimate stimulus". The case reveals two core evolution chains: the "Safety-Accountability Chain", which is triggered by structural risks and propelled by improper emergency response, and the "Rights-Trust Chain", which is ignited by the tension of information rights and escalated under the intervention of authoritative institutions. The former highlights the risk of emergency behaviors becoming "alienated" into a trigger for public opinion outbreaks, while the latter reveals the leveraging role of authoritative opinion leaders in emotional aggregation. Based on these findings, this paper proposes a four-in-one governance strategy of "forward-looking, procedural, collaborative, and empathetic" qualities, aiming to promote a paradigm shift in online public opinion governance from "passive control" to "collaborative risk governance".

### **Fund Projects**

Tianjin Philosophy and Social Science Planning Project: Research on the Path to Improving the Risk Management and Control Capability of Tianjin Grassroots Emergency Response from the Perspective of Overall National Security (TJGLQN24-013).

## References

- [1] Zhang Xinrui, Zhang Haitao, Pang Yufei, et al. *Research on Intelligence Needs Perception of Public Cognition in Major Emergencies*. *Information Science*, 2025, 43(02): 46-56.
- [2] Chen Jinghao. *Research on the Evolution of Online Public Opinion in Public Emergencies*. Intellectual Property Publishing House: 201809: 156.
- [3] Jin Dongxue, Xia Yixue, Zhu Panlong. *Research on the Dynamic Mechanism of Group Polarization in Online Public Opinion from the Perspective of Emotional Evolution*. *Information Science*, 2023, 41(3): 57-65.
- [4] Yin Fulian, Wang Jinxia, Pan Yanyan. *Construction and Analysis of Intervention Models for the Spread of Social Hot Events under Environmental Influence*. *Information Science*, 2024, 42(05): 21-34.
- [5] Li C, Zhao Y M, Gao L, et al. *Evolution and response of flood disaster network public opinion based on an event logic graph: A case study of rainstorms in Henan, China*. *International Journal of Disaster Risk Reduction*, 2025, 116: 105027.
- [6] Ying Xing. *"Atmosphere Field" and the Occurrence Mechanism of Mass Incidents: A Comparison of Two Cases*. *Sociological Studies*, 2009, 24(06): 105-121+244-245.
- [7] Ying Xing. *"Qi" and the Politics of Resistance*. *Social Sciences Academic Press*: 201610: 307.