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Synthetic Ecologies: A Content Analysis of AI-Generated Environmental Disaster Videos on TikTok and YouTube Shorts

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Abstract

Background: The proliferation of generative artificial intelligence across algorithmic short-form video platforms has democratised the production of photorealistic environmental disaster simulations, introducing novel challenges to public risk perception.

Objectives: This study examined the disaster typologies, visual threat frames, multimodal sensory realism devices, audience engagement metrics, and platform governance interventions associated with AI-generated disaster videos on TikTok and YouTube Shorts.

Method: A cross-platform content analysis was conducted on 400 short-form videos (200 from TikTok; 200 from YouTube Shorts) published between July 2024 and June 2025. Data were coded using an instrument with robust inter-coder reliability (Krippendorff alpha = .84–.94) and evaluated using descriptive statistics, independent-samples t-tests, one-way ANOVA with Tukey HSD tests, and Chi-square tests of independence.

Results: Hydrological hazards constituted the predominant disaster category (41.0%), followed by meteorological events (25.5%). Narrative framing privileged immediate survival terror (37.3%) and sublime natural wrath (31.5%), with conspiratorial geo-engineering accounting for 12.0%. Rather than polished CGI aesthetics, creators relied heavily on simulated citizen-camera realism, including handheld shake (67.0%), visceral Foley acoustics (62.8%), and intentional pixel noise (45.8%). Videos incorporating citizen-camera cues generated significantly higher mean views (p

< .001) and shares ($p < .001$) than clean CGI. Conspiratorial narratives elicited the highest comment-to-view ratios (0.49%), significantly outperforming conventional disaster framing ($p < .001$). Governance interventions varied significantly across platforms ($p < .001$); automated warning labels covered 39.0% of TikTok videos but only 22.0% on YouTube Shorts, leaving 29.0% of the sample wholly undisclosed. Unlabelled synthetic videos achieved significantly higher share-to-view ratios than labelled content ($p < .001$).

Conclusion: Creators emulate grassroots citizen journalism to exploit algorithmic engagement, while platform oversight remains inconsistent. Urgent implementation of cryptographic watermarks, algorithmic de-amplification of unlabelled catastrophe spectacles, and expanded critical AI literacy are essential to safeguard disaster communication.

Keywords: Generative AI, Disaster Communication, TikTok, YouTube Shorts, Short-Form Video, Synthetic Media, Algorithmic Engagement.

Introduction

The rapid evolution of digital media environments has altered the mechanisms through which environmental crises and natural hazards are communicated, visualised, and interpreted by the public. Within contemporary digital ecologies, algorithmic short-form video architectures—predominantly TikTok and YouTube Shorts—have emerged as central conduits for visual communication, altering traditional consumption patterns through hyper-compressed formats, endless scrolling interfaces, and rapid feedback loops (Jung et al., 2025; Roberts & David, 2025; Violot et al., 2024). Concurrently, profound breakthroughs in generative artificial intelligence, particularly advanced text-to-video diffusion frameworks, have democratised the synthesis of photorealistic motion pictures (Hayawi & Shahriar, 2026). These systems facilitate automated pipelines capable of engineering emotionally charged, algorithmically optimised viral video content with minimal operational friction (Gautham & Somasundaram, 2025).

When deployed in the domain of ecological and environmental hazards, this generative capacity introduces a complex communicative paradox. While legitimate crisis management systems rely on rapid, authentic visual disclosures to assess damage and coordinate humanitarian relief (Oliveira et al., 2024), social media feeds are increasingly saturated with synthetic ecologies—AI-generated simulations of catastrophic deluges, mega-tsunamis, anomalous forest fires, and atmospheric upheavals. Short-form video platforms inherently incentivise high-arousal emotional stimuli, compelling users to interact with vivid, sensationalised depictions of natural hazards (Liu et al., 2024; Roberts & David, 2025). Emerging evidence reveals that user engagement with short-form video is heavily governed by multimodal sensory elements, such as dynamic visual aesthetics and colour grading, which generative models can precisely manipulate to capture visual attention (Wen et al., 2025).

However, the hyper-realistic visual fidelity of synthetic video threatens epistemic vigilance. Young demographics, notably Generation Z, exhibit intricate emotional responses and shifting trust thresholds when encountering AI-generated short videos, often struggling to delineate authentic

eyewitness footage from algorithmically manufactured simulations (Duong & Vo, 2025). Despite the known influence of visual short-form content on public risk perception, adaptive behaviours, and disaster preparedness (Zhang et al., 2025), empirical investigations addressing how AI-generated environmental catastrophe videos are framed, constructed, and received across competing short-form architectures remain sparse. This study addresses this gap by presenting a content analysis of AI-generated environmental disaster videos on TikTok and YouTube Shorts, examining their manifest visual properties, threat narratives, algorithmic affordances, and public engagement dynamics.

Literature Review

Disaster Communication, Citizen Sensing, and Information Flows

Effective disaster management depends on the structured dissemination and bidirectional flow of risk information among institutions, first responders, and affected populations (Sagun et al., 2009). Classical disaster models conceptualise risk perception as an evolving process shaped directly by the accessibility, timing, and perceived credibility of incoming threat signals (Wei et al., 2016). Over the past two decades, the rise of network society transformed this dynamic through crowdsourcing, sensor web frameworks, and citizen sensing, enabling everyday individuals to document local environmental disruptions and relay critical ground-truth data in real time (Kamel Boulos et al., 2011).

In acute crises, informal communication flows routinely challenge or supplement institutional channels. As Chiimba and Verne (2022) observed during Cyclone Idai, community-level information networks and informal intermediaries often negotiate complex barriers of trust and distrust when official communication falters. Digital video has accelerated this mediation. Video recordings captured via mobile devices and public monitoring infrastructures provide indispensable visual evidence of environmental failure, enabling computational models to infer cascading infrastructural damage across built and natural ecosystems (Guo et al., 2024; Oliveira et al., 2024). Social media has thus evolved into a primary space where public perceptions of hazards—such as tunnel infernos or localised wildfires—are constructed, shared, and evaluated (Lai et al., 2024).

Short-Form Video Platforms and Algorithmic Crisis Engagement

The ascendancy of short-form video platforms has introduced novel communicative affordances that distinguish them from legacy social networks. TikTok and YouTube Shorts rely on distinct structural architectures, content recommendation algorithms, and creator cultures (Jung et al., 2025). While YouTube traditionally privileged long-form, archival content, the introduction of Shorts provoked fundamental shifts in creator production habits and user engagement dynamics, yielding significantly higher interaction frequencies driven by bite-sized visual formats (Violot et al., 2024). These short-form interfaces operate through potent technological affordances that stimulate compulsive viewing cycles, sustained social media engagement, and emotional vulnerability (Roberts & David, 2025).

In crisis and environmental contexts, short videos function as powerful instruments of public mobilisation and civic interaction. Guo et al. (2026) demonstrate that short videos significantly heighten citizen engagement with government authorities during disaster scenarios, translating administrative alerts into digestible, visually compelling calls to action. Furthermore, empirical inquiries by Zhang et al. (2025) confirm that exposure to natural hazard depictions within short-form videos directly shapes psychological intentions and adaptive behaviours, such as the purchase of disaster insurance.

Nevertheless, the compressed nature of short-form storytelling frequently privileges dramatic emotional spectacles over measured scientific context. During the 2023 Maui wildfires, streaming crisis narratives on TikTok became epicentres of intense affective reactions, where user engagement was driven by distressing visual documentation and raw emotional displays (Liu et al., 2024). When visual appeal is augmented through computational variables—such as the non-linear, U-shaped effects of colour saturation and contrast documented across short-form multimedia (Wen et al., 2025)—disaster footage achieves exceptional algorithmic reach, commanding user attention irrespective of its factual veracity.

Generative AI, Text-to-Video Systems, and Synthetic Environmental Realism

The integration of generative artificial intelligence into multimedia ecosystems has radically disrupted visual authenticity. Contemporary text-to-video generative frameworks leverage complex deep learning architectures to convert textual prompts into high-resolution, temporally coherent video sequences (Hayawi & Shahriar, 2026). In parallel, automated production systems have emerged that harness large language models and computer vision to script, render, and edit viral short-form videos autonomously, drastically reducing production overheads for digital creators (Gautham & Somasundaram, 2025).

These technological advancements permit the synthesis of plausible yet entirely fictitious environmental catastrophes. Creators can generate spectacles of extreme geophysical violence—such as imaginary seismic rifts or impossible mega-storms—that exhibit the visual texture of genuine documentary footage. This development poses acute epistemic risks. In their investigation of Generation Z audiences, Duong and Vo (2025) found that while young users display an awareness of synthetic media, their emotional immersion and affective responses often bypass analytical scepticism, leading to fluctuating levels of trust in AI-generated video.

When synthetic disaster simulations intersect with the viral mechanics of TikTok and YouTube Shorts, the boundary between speculative environmental art, entertainment, and digital misinformation dissolves. Viewers confronting AI-generated environmental trauma in algorithmic feeds may misinterpret synthetic spectacles as breaking ecological crises, thereby distorting collective perceptions of climate hazards and diluting public trust in authentic crisis communication channels (Chiimba & Verne, 2022; Duong & Vo, 2025; Liu et al., 2024). A systematic content analysis is therefore necessary to map the typologies, framing mechanisms, and engagement signatures of AI-generated disaster videos across contemporary short-form video ecosystems.

Objectives of the Study

This study aims to examine the visual construction, threat framing, sensory realism, and audience engagement dynamics of AI-generated environmental disaster simulations across algorithmic short-form video platforms.

The specific objectives are to:

1. Identify the predominant ecological and natural disaster typologies (such as hydrological deluges, mega-tsunamis, wildfire infernos, volcanic eruptions, and speculative climate collapses) depicted in AI-generated short-form videos on TikTok and YouTube Shorts.
2. Analyse the primary visual and narrative frames (including immediate survival terror, sublime natural wrath, conspiratorial geo-engineering, and post-apocalyptic ruin) utilised in synthetic disaster videos.
3. Examine the multimodal credibility cues and sensory devices (such as simulated citizen-camera shake, lo-fi aesthetic degradation, synthetic news chyrons, emergency sirens, and automated narration) deployed to heighten perceived authenticity.
4. Determine the relationship between synthetic disaster features (typology, narrative framing, and visual cues) and audience engagement metrics (views, likes, shares, bookmarks, and comment velocity) across both platforms.
5. Evaluate the prevalence and effectiveness of platform governance interventions (creator self-disclosures versus automated platform labels and contextual warning flags) in moderating synthetic disaster media across TikTok and YouTube Shorts.

Methodology

Research Design

This study employed an empirical quantitative content analysis design to systematically code, quantify, and interpret AI-generated environmental disaster videos on short-form video platforms. Content analysis offers a replicable, objective methodology for evaluating multimodal video artefacts, breaking down dynamic visual elements, auditory design, textual overlays, and engagement metrics into measurable analytical categories.

Sampling Population, Search Protocol, and Inclusion Criteria

The target population comprised publicly accessible short-form vertical videos (under 60 seconds) uploaded to TikTok and YouTube Shorts depicting AI-generated environmental and natural disasters.

Data collection followed a two-stage purposive and criterion-based sampling procedure:

- *Keyword and Hashtag Querying:* Videos were retrieved using a predefined string of Boolean and platform search queries targeting synthetic environmental media, combining

disaster identifiers with generative markers: #AIdisaster, #Aistorm, #Aitsunami, #Aiearthquake, #AIclimate, #AIgenerateddisaster, AI natural disaster, AI flood simulation, and AI apocalypse video.

- *Inclusion Criteria:* Videos were incorporated into the final sample if they met five conditions:
 - Visual content featured a simulated natural, ecological, or meteorological hazard generated through text-to-video or image-to-video artificial intelligence engines.
 - Formatted natively as vertical short-form video (9:16 aspect ratio) on TikTok or YouTube Shorts.
 - Published within a 12-month window (1 July 2024 to 30 June 2025).
 - Accompanied by captions or audio in English, or containing purely instrumental/ambient sound design.
 - Surpassed an interaction threshold of at least 1,000 total views to exclude inactive bot accounts and ensure measurable audience reach.

The screening process yielded an initial corpus of 540 candidate videos. After screening out non-AI CGI footage from video games or commercial cinema, duplicate cross-posts, and purely static slide decks, the final analytical corpus comprised 400 unique video units (n = 200 from TikTok; n = 200 from YouTube Shorts).

Unit of Analysis

The unit of analysis was the individual video post, encompassing the complete multimodal composition: the dynamic video footage, ambient sound design, musical soundtrack or synthesised voiceover, on-screen textual overlays and chyrons, creator captions, hashtags, and public engagement metadata.

Operationalisation and Codebook Design

A comprehensive codebook was constructed across five core analytical domains:

- *Basic Post Metadata:* Platform (TikTok vs YouTube Shorts), post URL, upload date, video duration (seconds), and audience engagement indicators (view count, like count, comment count, share/repost count, and bookmark/save count).
- *Disaster Typology:*
 - *Hydrological Hazards:* Mega-tsunamis, freak tidal waves, catastrophic inland flash floods, bursting dams.
 - *Meteorological and Atmospheric Hazards:* Anomalous super-tornadoes, hypercanes, global freeze fronts, severe lightning storms.
 - *Geophysical Hazards:* Massive tectonic rifts, catastrophic volcanic eruptions, urban earthquakes, destructive landslides.
 - *Wildland and Thermal Hazards:* Firestorms, continental forest fires, extreme drought heatwaves.

- *Speculative Climate Apocalypses*: Fictional biosphere collapse, submergence of iconic world landmarks, toxic atmospheric storms.
- *Visual and Narrative Threat Frames*:
 - *Immediate Survival Terror*: Close-up eyewitness perspectives showing imminent peril, fleeing crowds, or personal survival struggles.
 - *Sublime Natural Wrath*: Distant, panoramic, high-scale visual spectacles capturing the majestic, untameable violent beauty of nature.
 - *Conspiratorial Geo-Engineering*: Narratives attributing the disaster to deliberate weather modification, HAARP operations, cloud seeding, or shadow government interventions.
 - *Post-Apocalyptic Ruin*: Depictions of silent devastation, destroyed civilisations, abandoned submerged cities, and ecological extinction.
- *Multimodal Sensory and Credibility Cues*:
 - *Visual Realism Emulators*: Simulated smartphone camera shake, simulated lens flare, intentional pixelation/compression noise, pseudo-dashcam or CCTV perspectives.
 - *Simulated Broadcast Markers*: Fake breaking news tickers, emergency alert system banners, countdown clocks, forged television channel logos.
 - *Acoustic Design*: Synthetic or cloned narrator voiceover, blaring emergency sirens, visceral rumble/wind/water Foley effects, ominous ambient music scores.
- *Platform Governance and Provenance Transparency*:
 - *Creator Self-Disclosure*: Explicit textual admission of AI generation in caption, title, or on-screen text (e.g. #AIart, #midjourney, #sora, #generativeai).
 - *Platform Automated Labels*: System-level metadata badges applied by the platform (e.g. AI-generated label on TikTok; altered or synthetic content badge on YouTube Shorts).
 - *Absence of Transparency*: Zero visual, textual, or systemic disclosure of artificial origin.

Inter-Coder Reliability

To ensure coding stability and instrument reliability, two independent coders were trained using the detailed codebook on a randomly selected pilot sample of 60 videos (15 per cent of the total dataset, split equally between platforms).

Inter-coder agreement was calculated using Krippendorff alpha. Across all nominal variables—including disaster typology ($\alpha = .89$), narrative framing ($\alpha = .84$), sensory credibility cues ($\alpha = .86$), and moderation/transparency status ($\alpha = .94$)—the coefficients exceeded the acceptable empirical threshold of .80. Discrepancies identified during the pilot phase were discussed and resolved through joint codebook refinement prior to final coding.

Data Analysis Plan

The coded dataset was exported into SPSS for statistical processing:

- Descriptive Statistics: Frequencies and percentages were computed to evaluate the distribution of disaster typologies (Objective 1), narrative frames (Objective 2), sensory credibility cues (Objective 3), and platform governance interventions (Objective 5).

Bivariate and Inferential Testing:

- Independent-samples t-tests and one-way Analysis of Variance (ANOVA) with post-hoc Tukey HSD tests were deployed to examine differences in audience engagement metrics (views, likes, shares, saves, and comments) across disaster typologies, visual framing strategies, and sensory credibility cues (Objective 4).
- Chi-square tests of independence (chi-square) were utilised to determine whether significant differences exist in platform governance interventions, creator disclosures, and automated labels between TikTok and YouTube Shorts (Objective 5).

Results

The findings of this empirical inquiry are presented sequentially in accordance with the five established research objectives. The complete analytical sample comprised 400 unique AI-generated short-form disaster videos, divided equally between TikTok (n = 200; 50.0%) and YouTube Shorts (n = 200; 50.0%).

Objective 1: Predominant Ecological and Natural Disaster Typologies

To address the first objective, we calculated frequency and percentage distributions of manifest hazard categories across the combined sample and within each platform interface.

Table 1: Distribution of AI-Generated Disaster Typologies Across Platforms

Disaster Typology	TikTok (n = 200)	YouTube Shorts (n = 200)	Total Sample (N = 400)	Percentage (%)
Hydrological Hazards (Mega-tsunamis, flash floods)	88	76	164	41
Meteorological Hazards (Super-tornadoes, hypercanes)	49	53	102	25.5
Geophysical Hazards (Tectonic rifts, volcanic eruptions)	27	31	58	14.5
Speculative Climate Apocalypses (Submerged landmarks)	24	26	50	12.5
Wildland and Thermal Hazards (Continental firestorms)	12	14	26	6.5
Total	200	200	400	100

As outlined in Table 1, hydrological hazards constituted the single largest proportion of synthetic disaster media, accounting for more than four out of every ten examined videos (41.0%, $n = 164$). Within this category, synthetic depictions of towering mega-tsunamis overwhelming modern coastal metropolises were particularly ubiquitous across both platforms. Meteorological catastrophes ranked second, representing 25.5% ($n = 102$) of the corpus, dominated by hyper-vivid representations of anomalous multi-vortex tornadoes sweeping through suburban environments.

Geophysical hazards accounted for 14.5% ($n = 58$), followed by speculative climate apocalypses (12.5%, $n = 50$), which primarily visualised dystopian scenarios such as global landmarks engulfed by rising sea levels. Wildland and thermal events represented the smallest individual proportion (6.5%, $n = 26$). Cross-platform distribution remained largely symmetrical, indicating that creators across both ecosystems disproportionately exploit high-volume fluid dynamics and extreme oceanic displacement to craft visually arresting generative simulations.

Objective 2: Primary Visual and Narrative Threat Frames

The second objective examined the dominant storytelling techniques and visual lenses deployed to frame synthetic environmental catastrophes.

Table 2: Distribution of Visual and Narrative Threat Frames in Synthetic Disaster Videos

Visual / Narrative Frame	TikTok ($n = 200$)	YouTube Shorts ($n = 200$)	Total Sample ($N = 400$)	Percentage (%)
Immediate Survival Terror	82	67	149	37.3
Sublime Natural Wrath	57	69	126	31.5
Post-Apocalyptic Ruin	36	41	77	19.2
Conspiratorial Geo-Engineering	25	23	48	12
Total	200	200	400	100

The data in Table 2 demonstrate that immediate survival terror was the leading narrative frame, utilised in 37.3% ($n = 149$) of the sampled videos. This framing strategy positioned the viewer directly within the path of physical destruction, simulating urgent escape scenarios and panic. The sublime natural wrath frame appeared in 31.5% ($n = 126$) of the sample, prioritising wide-angle, awe-inspiring compositions that highlight the overpowering spectacle of environmental violence rather than individual human suffering.

Post-apocalyptic ruin emerged in 19.2% ($n = 77$) of the posts, focusing on static, melancholic aftermaths characterised by flooded metropolises and abandoned infrastructure. Lastly, conspiratorial geo-engineering frames appeared in 12.0% ($n = 48$) of videos. Although less

frequent overall, these videos explicitly embedded narrative text or voiceovers that attributed the depicted catastrophic weather patterns to covert human intervention, weaponised cloud seeding, or clandestine governmental weather-control operations.

Objective 3: Multimodal Credibility Cues and Sensory Devices

The third objective evaluated the technical, visual, and acoustic devices embedded within the synthetic videos to emulate realism and bolster perceived documentary authenticity. Because individual videos frequently combined multiple sensory devices, categories were coded as non-mutually exclusive presence indicators.

Table 3: Prevalence of Multimodal Sensory and Credibility Devices

Sensory / Credibility Device	Frequency (n)	Percentage of Total (N = 400)
Simulated Smartphone Camera Shake / Jitter	268	67
Visceral Acoustic Foley Effects (Wind, roaring water, thunder)	251	62.8
Ominous Ambient Musical Scoring	224	56
Intentional Aesthetic Degradation (Grain, compression, pixel noise)	183	45.8
Synthetic / Cloned Voiceover Narration	146	36.5
Simulated Broadcast Elements (News chyrons, breaking banners)	94	23.5
Auditory Crisis Cues (Emergency sirens, alert klaxons)	87	21.8
Pseudo-Surveillance View (Simulated CCTV or vehicular dashcam)	52	13

The empirical breakdown in Table 3 indicates that creators systematically employ low-fidelity mobile camera cues to obscure the artificial origin of generative video. Two-thirds of the analysed corpus (67.0%, n = 268) exhibited simulated handheld camera shake or erratic panning, mimicking an eyewitness fleeing an acute disaster. Furthermore, 45.8% (n = 183) intentionally incorporated visual artefacts, lens distortion, or heavy compression noise to replicate low-grade smartphone footage.

Auditory realism played an equally prominent role: 62.8% (n = 251) embedded physical Foley sound effects synchronised to visual wave crashes or wind shears, while 56.0% (n = 224) relied on atmospheric musical scores. Notably, 23.5% (n = 94) deployed fabricated institutional markers—such as crawling breaking news chyrons and simulated emergency broadcast alerts—to stage synthetic events as live, unfolding news events.

Objective 4: Relationship Between Synthetic Features and Audience Engagement Metrics

To evaluate the fourth objective, inferential analyses were conducted to determine how disaster typologies, visual framing strategies, and sensory cues influenced audience interaction. Because engagement data were positively skewed, we applied logarithmic transformations before parametric testing; untransformed mean values are reported below for direct interpretability. A one-way Analysis of Variance (ANOVA) revealed significant omnibus differences in mean view counts across the five disaster typologies: $F(4, 395) = 8.74$, $p < .001$, partial eta squared = .081.

Table 4: Mean Audience Engagement Metrics Across Disaster Typologies

Disaster Typology	Mean Views	Mean Likes	Mean Shares	Mean Comments
Hydrological Hazards	1,482,100	94,320	18,450	3,110
Meteorological Hazards	915,400	61,200	11,280	2,040
Geophysical Hazards	642,800	44,150	7,630	1,380
Speculative Climate Collapse	580,200	38,900	8,110	1,490
Wildland / Thermal Hazards	412,500	29,400	4,200	890

Post-hoc comparisons using the Tukey HSD test indicated that hydrological hazard videos achieved significantly higher mean views ($M = 1,482,100$, $SD = 812,400$) and share volumes ($M = 18,450$, $SD = 9,340$) than geophysical hazards ($p = .002$) and wildland hazards ($p < .001$). Examining narrative framing through one-way ANOVA also yielded significant differences across interaction metrics: $F(3, 396) = 14.12$, $p < .001$, partial eta squared = .097.

Table 5: Mean Audience Engagement and Comment-to-View Ratio Across Narrative Frames

Visual / Narrative Frame	Mean Views	Mean Likes	Mean Shares	Mean Comments	Comment-to-View Ratio (%)
Immediate Survival Terror	1,320,400	88,700	16,500	2,420	0.18
Conspiratorial Geo-Engineering	1,180,600	74,300	17,900	5,840	0.49
Sublime Natural Wrath	845,200	56,100	8,920	1,280	0.15
Post-Apocalyptic Ruin	512,300	33,600	5,800	1,060	0.21

As illustrated in Table 5, videos utilising immediate survival terror generated the highest absolute view counts. However, an independent-samples t-test indicated that videos framed with

conspiratorial geo-engineering elicited a significantly higher mean comment volume ($M = 5,840$, $SD = 2,710$) and comment-to-view ratio (0.49%) than videos framed with conventional natural disaster narratives ($M = 1,980$, $SD = 1,140$; $t(398) = 8.63$, $p < .001$), indicating that conspiratorial speculation serves as an algorithmic catalyst for intense user debate.

An independent-samples t-test was also conducted to compare engagement between videos incorporating simulated citizen-camera cues (handheld shake, intentional noise) and those presenting clean, cinematic CGI aesthetics without simulated eyewitness artefacts:

- *Views*: Videos featuring simulated citizen-camera realism achieved significantly higher views ($M = 1,284,500$, $SD = 741,200$) compared to clean cinematic presentations ($M = 592,400$, $SD = 388,100$; $t(398) = 10.42$, $p < .001$, Cohen's $d = 1.05$).
- *Shares / Reposts*: Videos with citizen-camera realism generated greater viral sharing ($M = 16,840$, $SD = 8,900$) than non-realistic presentations ($M = 6,710$, $SD = 4,120$; $t(398) = 12.18$, $p < .001$, Cohen's $d = 1.23$).

Objective 5: Prevalence and Effectiveness of Platform Governance Interventions

The final objective evaluated the distribution of transparency mechanisms across TikTok and YouTube Shorts, contrasting creator-driven self-disclosures against automated, platform-enforced systemic labels.

Table 6: Cross-Platform Distribution of Governance and Provenance Transparency Mechanisms

Governance / Provenance Mechanism	TikTok (n = 200)	YouTube Shorts (n = 200)	Total Sample (N = 400)	Percentage (%)
Creator Self-Disclosure Only (In caption or title)	88	74	162	40.5
Automated Platform Label Only (System badge)	42	26	68	17
Dual Disclosure (Both creator tag and platform label)	36	18	54	13.5
Complete Absence of Transparency (Undisclosed)	34	82	116	29
Total	200	200	400	100

Across the entire dataset (Table 6), 29.0% ($n = 116$) of the synthetic disaster videos contained no algorithmic or creator-based provenance disclosure whatsoever. When comparing moderation ecosystems, a Chi-square test of independence revealed a statistically significant difference between TikTok and YouTube Shorts: $\chi^2(3, N = 400) = 28.64$, $p < .001$, Cramer's $V = .268$.

TikTok showed markedly higher automated labelling coverage: system-level labels (either standalone or accompanied by creator disclosure) appeared on 39.0% of its sample ($n = 78$), compared with only 22.0% ($n = 44$) on YouTube Shorts. Correspondingly, YouTube Shorts showed a substantially higher rate of completely unlabelled synthetic disaster content (41.0%, $n = 82$) than TikTok (17.0%, $n = 34$).

Engagement across disclosure categories showed that videos lacking any transparency labels had significantly higher share-to-view ratios than videos marked with automated platform warning badges ($t(398) = 4.76$, $p < .001$), indicating that the absence of institutional verification labels facilitates broader algorithmic and user-driven circulation.

Discussion

The empirical findings of this inquiry demonstrate the communicative dynamics and epistemic vulnerabilities that emerge when generative artificial intelligence converges with algorithmic short-form video ecologies.

Regarding disaster typologies, the overwhelming prevalence of hydrological hazards (41.0%)—predominantly synthetic mega-tsunamis and catastrophic floods—demonstrates how algorithmic architectures incentivise visually dynamic fluid simulations. In contemporary text-to-video synthesis, fluid dynamics offer high visual movement, allowing creators to produce striking motion vectors that arrest user scrolling within the critical first three seconds (Gautham & Somasundaram, 2025; Violot et al., 2024). This structural bias aligns with earlier evidence showing that intense, dynamic motion patterns generate elevated algorithmic distribution on visual feeds (Wen et al., 2025). Furthermore, the pronounced focus on hydrological cataclysms mirrors citizen-sensing priorities observed during acute flood emergencies, where visual documentation serves as an immediate, high-arousal proxy for systemic environmental collapse (Kamel Boulos et al., 2011; Zhang et al., 2025).

The dominance of the immediate survival terror frame (37.3%) illustrates a fundamental shift from informational disaster communication to affective immersion. While institutional crisis models conceptualise hazard communication as a functional mechanism to inform public risk perception and coordinate adaptive responses (Sagun et al., 2009; Wei et al., 2016), synthetic short-form video prioritises sensory urgency. Creators deliberately construct first-person points of view that position viewers directly within unfolding destruction. This heightened affective framing aligns with observations during the 2023 Maui wildfires, where crisis communication on TikTok was largely mediated through distress, fear, and direct emotional confrontation (Liu et al., 2024). The substantial presence of conspiratorial geo-engineering frames (12.0%) confirms that synthetic disaster visuals are actively co-opted to challenge scientific consensus. As observed by Chiimba and Verne (2022), when official communication mechanisms are viewed with scepticism, informal and mediated networks become fertile ground for alternative, distrust-laden interpretations.

The deployment of multimodal credibility cues reveals a deliberate effort to mimic grassroots visual documentation. Two-thirds of the analysed videos incorporated simulated camera shake,

while nearly half embedded intentional visual noise and compression artefacts. By weaponising the visual aesthetics of authentic citizen journalism—shaky cameras, pixelation, and muffled acoustic Foley effects—synthetic creators deliberately emulate the informal visual signals that audiences traditionally associate with authentic eyewitness footage during real-time catastrophes (Guo et al., 2024; Oliveira et al., 2024). This finding provides an empirical explanation for the cognitive friction identified by Duong and Vo (2025), wherein young users, despite understanding that generative tools exist, frequently misread synthetic video as authentic documentation because its sensory presentation matches familiar user-generated mobile recordings.

Inferential findings regarding audience engagement underscore how platform affordances reward sensation and conflict. The statistically significant elevation in view counts and viral sharing observed for videos utilising citizen-camera realism ($p < .001$) confirms that perceived visual authenticity directly amplifies algorithmic reach (Roberts & David, 2025). Similarly, the finding that conspiratorial geo-engineering narratives generated significantly higher comment volumes and comment-to-view ratios (0.49% vs 0.15–0.21% for conventional frames) confirms that controversy and epistemic ambiguity act as engagement catalysts. On platforms like TikTok and YouTube Shorts, algorithmic distribution engines interpret elevated comment velocity as an indicator of content value, inadvertently promoting conspiratorial speculation across broader public recommendation feeds (Jung et al., 2025).

Finally, the cross-platform comparison reveals significant discrepancies in governance enforcement. Although TikTok enforced system-level automated labels on 39.0% of its sample, YouTube Shorts lagged noticeably at 22.0%, leaving more than four out of ten synthetic disaster videos entirely unlabelled. This structural gap highlights the limitations of self-regulatory frameworks. Furthermore, the finding that unlabelled videos achieved significantly higher share ratios than labelled content demonstrates that automated provenance markers introduce friction, curtailing viral spread. When platforms rely predominantly on voluntary creator disclosures, economic incentives and algorithmic rewards discourage compliance, allowing deceptive environmental spectacles to circulate unchecked.

Conclusion

This study provides an empirical examination of AI-generated environmental disaster content across contemporary short-form video platforms. By analysing 400 videos across TikTok and YouTube Shorts, the investigation mapped how generative text-to-video capabilities are deployed within short-form media ecosystems.

The results establish that synthetic hazard communication is heavily skewed toward high-arousal hydrological spectacles, framed predominantly through urgent survival terror and conspiratorial weather-modification narratives. Rather than showcasing the pristine, cinematic fidelity typical of commercial CGI, creators routinely emulate the technical flaws of mobile citizen journalism—such as camera shake, sensor grain, and distorted audio—to enhance perceived documentary authenticity. These visual emulators, coupled with unverified conspiratorial claims, yield elevated algorithmic engagement, driving higher view counts, shares, and user debate. Contemporary

platform governance remains inconsistent; unlabelled synthetic videos circulate widely, demonstrating the inadequacy of voluntary creator disclosures and current algorithmic moderation mechanisms. Left unchecked, the proliferation of hyper-realistic, synthetic environmental trauma risks eroding the epistemic authority of authentic disaster reporting, distorting public risk perceptions, and complicating institutional emergency communication.

Recommendations

Based on the empirical findings, the following recommendations are proposed for social media platforms, emergency management authorities, and media literacy educators:

- Social media architectures must move beyond reliance on voluntary creator disclosures by integrating automated C2PA (Coalition for Content Provenance and Authenticity) cryptographic metadata standards. Recommendation algorithms on platforms like YouTube Shorts and TikTok should automatically parse ingested video files for generative watermarks and apply conspicuous, standardised visual tags directly onto the playback frame.
- Recommendation engines should be recalibrated to penalise unlabelled videos that exhibit multimodal markers of high-scale catastrophe. During acute real-world weather events or environmental emergencies, platform algorithms should restrict the algorithmic velocity of unverified short-form disaster simulations to prevent synthetic panics and visual misdirection.
- Emergency management authorities and meteorological agencies must actively establish a communicative presence on short-form platforms. By leveraging the visual and interactive affordances of TikTok and YouTube Shorts, official organizations can demystify complex atmospheric events, debunk conspiratorial geo-engineering claims, and proactively clarify synthetic imagery before viral saturation occurs.
- Educational programmes and public awareness campaigns should update digital literacy frameworks to focus specifically on synthetic video cues. Audiences must be trained to recognize the deliberate emulation of low-fidelity aesthetics—such as synthetic camera shake and pseudo-broadcast tickers—helping users develop healthy scepticism toward sensationalised mobile footage on their algorithmic feeds.

Declarations

Ethical Approval: Ethical approval was not applicable, as this research did not involve human participants, clinical trials, or animal experimentation.

Artificial Intelligence (AI) Use Statement: During the preparation of this work, the authors used Gemini to improve language, style, and clarity. Following the use of this service, the authors thoroughly reviewed, edited, and verified the content, and take full responsibility for the final intellectual integrity of the publication.

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