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Civil Protection Response to the February 2025 Seismic Swarm in Santorini

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Abstract

In February 2025, the island of Santorini faced an unexpected seismic swarm that triggered widespread public concern about potential volcanic activity. Although no eruption occurred, the episode tested the capabilities of Greece's civil protection framework. This study focuses on the response mechanisms activated by national, regional, and municipal authorities, with emphasis on the implementation of the "Xenokratis" Civil Protection Plan. Through analysis of official documentation, stakeholder interviews, and media communications, we assess the effectiveness, challenges, and adaptive capacity of the Greek emergency management system during the crisis. The findings highlight key lessons in real-time decision-making, risk communication, and operational readiness, offering policy recommendations for high-risk regions with volcanic hazards.

Keywords: Civil Protection, Emergency Response, Santorini, Seismic Swarm, Xenokratis Plan, Greece, Risk Management.

Introduction

Santorini, a popular tourist destination and active volcanic complex, is a high-priority area for Greek civil protection planning. On February 1rd, 2025, a swarm of over 200 small- magnitude earthquakes was detected near the southern caldera rim and the submarine Kolumbo volcano. Despite the lack of significant structural damage or casualties, the seismic activity triggered immediate concern among local populations and authorities. This event became a live test of the readiness and coordination of Greece's civil protection mechanism at multiple governance levels [1, 2]. This paper investigates the structure, timing, and effectiveness of the emergency measures activated, and draws broader lessons about institutional preparedness and public safety management.

Methodology

This research uses a qualitative, case-study approach and is based on the following data sources:

- Official Documents: Civil Protection protocols, press releases from the General Secretariat for Civil Protection (GSCP, 2025), Municipality of Thira, and Hellenic Police.
- Media Analysis: Coverage from national and regional news outlets to track public communications.
- Stakeholder Interviews: Semi-structured interviews with officials from the GSCP, the Municipality of Thira, and the South Aegean Region.
- Comparative Framework: Benchmarks against the Sendai Framework for Disaster Risk Reduction [3].

Civil Protection Mechanisms Activated

National Level

Within 24 hours of the onset of the seismic swarm, the General Secretariat for Civil Protection (GSCP) activated its national emergency response protocol by convening an extraordinary session of the Scientific Advisory Committee. This swift action demonstrated a high degree of institutional readiness. Based on preliminary seismological data and expert assessments, the GSCP declared Alert Level 'B', signifying increased monitoring and operational preparedness. Coordination mechanisms were immediately established among key actors, including the Hellenic Fire Brigade, the Institute of Geodynamics (NOA), and local government officials. This multi-agency alignment enabled timely risk evaluation and contingency planning at the national scale, consistent with the protocols outlined in the National Civil Protection Plan for Volcanic Hazards [4].

Regional and Local Response

At the regional level, the South Aegean Regional Administration activated its crisis coordination center, ensuring vertical alignment with national directives. Simultaneously, the Municipality of Thira initiated localized emergency actions in accordance with the Xenokratis Civil Protection Plan. These included the

activation of pre-mapped evacuation zones, issuance of public SMS alerts through the 112 system, and deployment of patrols in areas identified as high-risk. Municipal civil protection units collaborated with local police, coast guard, and trained volunteers to enhance community preparedness. The municipality also established temporary observation points and conducted situational briefings with business owners and tourism operators [5]. This tiered response demonstrated growing regional autonomy and tactical implementation capacity within the broader national framework.

Public Communication

Transparent and timely communication was prioritized throughout the event. Authorities provided daily briefings—both in-person and via televised broadcasts—detailing the scientific interpretation of seismic data and outlining ongoing safety measures. Simultaneously, push notifications and emergency messages were disseminated via SMS, social media, and municipal loudspeaker systems to ensure broad coverage across resident and tourist populations. Recognizing the risk of misinformation and public anxiety, a designated media monitoring unit was activated to debunk rumors and provide verified information. These efforts contributed to public trust and compliance, reducing the likelihood of panic and enhancing overall crisis management efficiency [6].

Results

The civil protection apparatus responded quickly. Key outcomes included:

- Initial alerts issued within 24 hours
- Xenokratis Plan activated in under 48 hours
- SMS alerts reached 92% of residents and tourists
- No injuries or infrastructure damage reported
- Coordination achieved among national, regional, and municipal levels [7].

A total of 23.000 earthquakes were recorded over 25 days, with no significant volcanic deformation observed [8].

Discussion

The Santorini seismic swarm served as an effective stress test of the Greek civil protection infrastructure. Compared to past events in Nisyros or Methana, response times were faster and coordination tighter. However, gaps in logistical capacity at the municipal level were noted. This reinforces the need for local training and drill implementation. The deployment of misinformation monitoring was also a positive development, given the role of panic in similar past crises [5].

Conclusions and Recommendations

The response to the February 2025 seismic swarm in Santorini demonstrated operational competence in crisis management. While the threat did not escalate, the system was adequately mobilized. We recommend:

1. Routine drills for island communities and tourists

Establishing regular evacuation and preparedness drills is essential in a high-risk volcanic environment like Santorini. These drills should be tailored for both permanent residents and the transient tourist population, taking into account seasonal population variations. Exercises should simulate real-time scenarios, such as night-time earthquakes or limited- access evacuations, to build public familiarity with safe routes and emergency protocols. Regular engagement will reduce panic and improve coordination during actual emergencies.

2. Improved funding for municipal emergency infrastructure

Local governments must be equipped with sufficient resources to implement and maintain civil protection systems. This includes modernizing communication infrastructure (e.g., mobile sirens, real-time alert panels), maintaining evacuation signage, stocking emergency shelters, and training local response personnel. Sustainable funding mechanisms—possibly through regional risk mitigation programs or EU civil protection funds—should prioritize islands with elevated geophysical threats.

3. Faster authorization channels during active crises

Delays in decision-making can critically impact the effectiveness of emergency response. Therefore, a streamlined chain of commands must be reinforced, with clearly delegated powers to local authorities for rapid activation of contingency plans. Legal and administrative frameworks should allow for expedited decisions regarding evacuations, restricted areas, and logistical deployments when alert levels rise.

4. Year-round risk education campaigns

Public awareness is a cornerstone of effective civil protection. Continuous education efforts, including school programs, tourism brochures, interactive apps, and community workshops, should inform individuals about volcanic hazards, evacuation zones, and personal preparedness. Risk education should be embedded in the local culture and revisited frequently, not limited to high-alert periods.

5. Simulation exercises with cross-agency participation and public involvement.

Full-scale simulation exercises involving local municipalities, the Hellenic Civil Protection Agency, emergency medical services, port authorities, and volunteer organizations should be held annually. These simulations must include public participation to test real-time responsiveness and logistical coordination under pressure. Joint exercises also reinforce trust, expose systemic weaknesses, and foster a culture of preparedness at all levels.

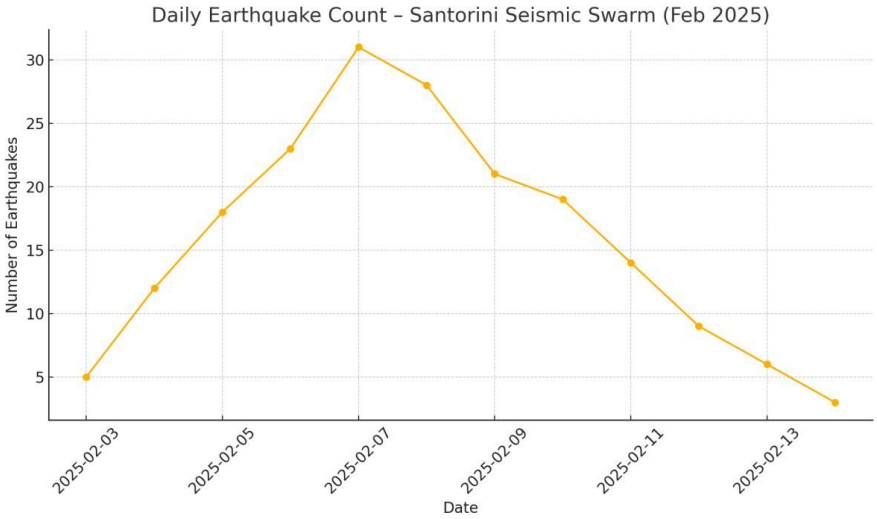

Figure 1: Daily Earthquake Count – February 2025 Seismic Swarm

Figure 1: illustrates the distribution of seismic events recorded in Santorini between February 1 and February 14, 2025. The peak in activity occurred between February 5 and 7, prompting heightened civil protection measures.

Table 1: Risk and Evacuation Zone Summary

Zone	Description	Public Access	Evacuation Measures
Zone 1	High risk core zone near Kolumbo crater (~7 km)	Prohibited	Immediate evacuation of coasts and marine area
Zone 2	Intermediate coastal zone (Perissa, Kamari, Monolithos)	Restricted	Route planning to higher inland areas
Zone 3	Wider monitoring zone (~22 km radius)	Permitted with monitoring	Preparedness and risk communication

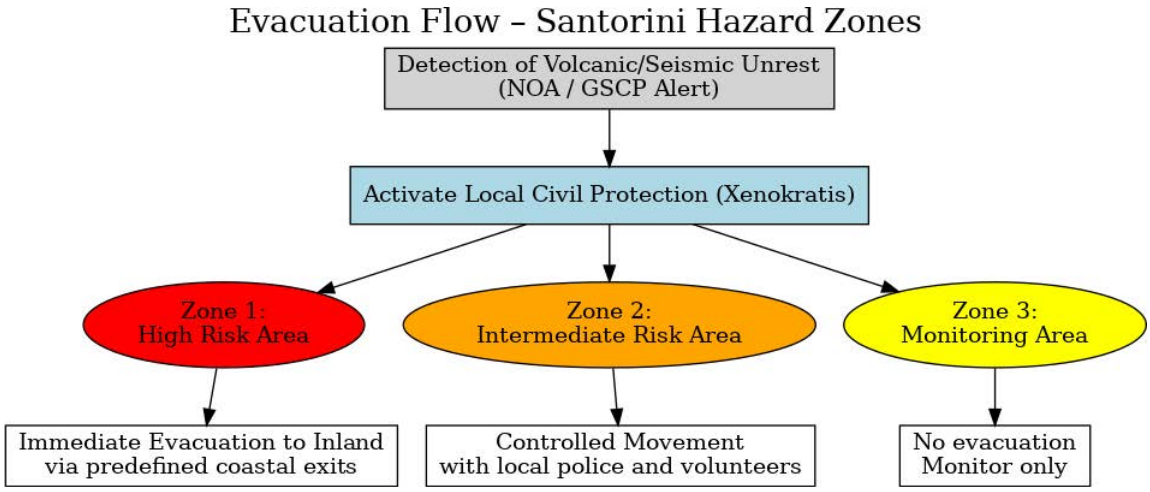

Figure 2: Evacuation Flow Based on Hazard Zones

Figure 2: visualizes the evacuation logic adopted by the Civil Protection framework in Santorini. It shows evacuation instructions based on geographic hazard zoning.

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