

Developing Rapid Response Protocols for Rapidly Intensifying Tropical Cyclones

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Tropical cyclones;
Decision making;
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Fast Response Protocols to Rapidly Intensifying Tropical Cyclones

What: Meteorology, disaster management, coastal engineering, and health professionals discussed the needs, requirements, and priorities to develop fast-response protocols to rapidly intensifying tropical storms.

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Where: Online

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At 0125 LT 25 October 2023, Hurricane Otis, a category 5 storm, made landfall in Acapulco, Mexico. This rare occurrence, being the most severe hurricane to impact the region, underscores a crucial challenge faced by areas prone to tropical cyclones. What is particularly alarming is that Otis intensified so rapidly, transforming from a tropical storm to a category 5 hurricane within just 12 h. This swift intensification did not allow sufficient time to execute civil protection procedures, thereby exposing a significant shortcoming in our readiness for such events. Considering the increasing frequency of rapid cyclone intensification (Bhatia et al. 2019), it is imperative to develop new strategies to mitigate their impact and protect vulnerable communities. To address this challenge, a gathering was arranged on 13 November 2023, wherein a small group of experts from diverse fields, including meteorology, disaster management, and coastal engineering, convened to address the pressing need to establish rapid response protocols tailored to the unique challenges posed by rapidly intensifying tropical cyclones. The meeting commenced with an acknowledgment of the urgency and necessity for prompt action, particularly in light of recent events such as Hurricane Otis.

Participants shared invaluable insights based on their extensive experience in the field. Emphasis was placed on the challenges of forecasting rapid intensification on a global scale, underlining the importance of public education in bridging the gap between forecast community knowledge and public awareness. Addressing rapidly intensifying storms and involving the World Meteorological Organization (WMO) staff in the process was highlighted as a necessity. The current limitations of civil protection authorities were highlighted, emphasizing the critical role of increased measurements and weather radars in refining forecasts. Attention was drawn to the often-overlooked long-term effects of storms, particularly their environmental impact. Challenges in civil protection capabilities at the local level were noted, and comprehensive training initiatives were suggested. Emphasis was placed on the lack of public awareness, informal construction, and inefficiencies in the chain of command as factors contributing to disaster vulnerability. Valuable insights from Japan proposed a comprehensive approach to early warning systems, evacuation planning, and long-term infrastructure improvements.

The importance of fast-response protocols for storms was emphasized, as current protocols are implemented between 72 and 24 h before landfall, whereas in some instances, such as in Japan, 12 h before landfall, when all public transport is shut down. In contrast, tsunami response protocols are implemented minutes after a seismic event, which shows the need to learn from the tsunami community represented at the meeting. For events such as Otis, where intensification can occur within hours, it is crucial to establish complementary rapid response protocols that supplement existing protocols typically implemented 24–48 h before landfall. These new protocols should be part of comprehensive plans, including early warning systems, evacuation strategies, and resource allocation tailored to the unique challenges posed by rapidly intensifying events.

The following actions were proposed concerning the different aspects that must be addressed.

- 1) Consider installing a high-resolution regional weather radar network to improve forecast models for more accurate measurements. Additionally, promote regular operational Hurricane Hunter aircraft surveys, especially in regions with limited flight coverage. Collaborate with the WMO to establish agreements for mandatory flights financed by a dedicated fund.
- 2) To enhance early warning systems, consider implementing push–pull notifications and systematic information for real-time updates through cellular networks, introducing alert systems that utilize sirens in densely populated coastal areas, establishing voluntary registrations for targeted notifications, and incorporating efficient response protocols within existing disaster response frameworks.
- 3) Ensure annual training for civil protection and emergency response staff and conduct public awareness campaigns before and during the hurricane season. Additionally, facilitates cross-training between communities with different levels of cyclone exposure.
- 4) To promote long-term planning, it is important to assess and learn from past events, such as the measures taken following Hurricane Paulina. This includes capitalizing on postdisaster opportunities to build resilient tourism infrastructure, enforce stronger land use and construction regulations, and bolster local civil protection capabilities.

The meeting concluded with unanimous agreement on the paramount importance of ongoing collaboration.

Hurricane Otis in Acapulco is a stark reminder of the urgency of our situation. Enhancing preparedness is critical as climate change contributes to more frequent, rapid intensification events (Bhatia et al. 2022; Garner 2023). We can fortify our responses and protect our communities by adopting insights from tsunami protocols and by crafting specific strategies for rapid cyclone intensification.

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