

# Existing Tsunami and Geohazard Early Warning Systems in Caribbean SIDS: Status, Challenges, and Ongoing Initiatives



UWI SEISMIC RESEARCH CENTRE

**Erouscilla Joseph, Director  
The UWI Seismic Research Centre**



# The UWI Seismic Research Centre

Primary source of information for earthquakes and volcanoes in the English-speaking Eastern Caribbean with the largest geophysical network of >60 stations in the region.

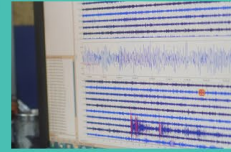
Provide services and expert advice to 9 territories that host 17 of the region's 21 volcanoes. **Role in the multi-hazard early warning systems**

Support disaster management agencies with public education efforts.

Conduct research on geological processes in the region.

## Monitor

Earthquakes, volcanoes and tsunamis



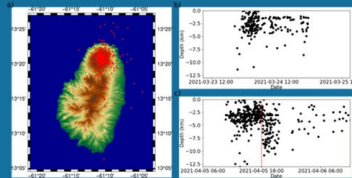
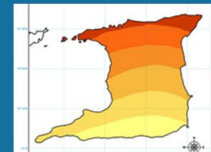
## Research

Improve understanding of earthquakes, volcanoes and tsunamis and their effects



## Mitigate

Provide the contributing territories with information and advice on geologic hazards

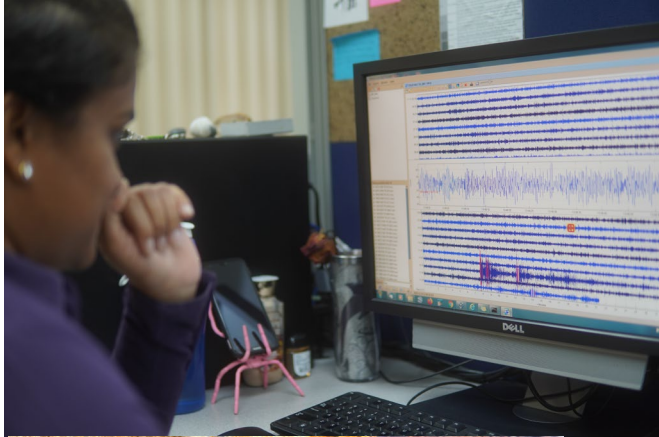


## Educate

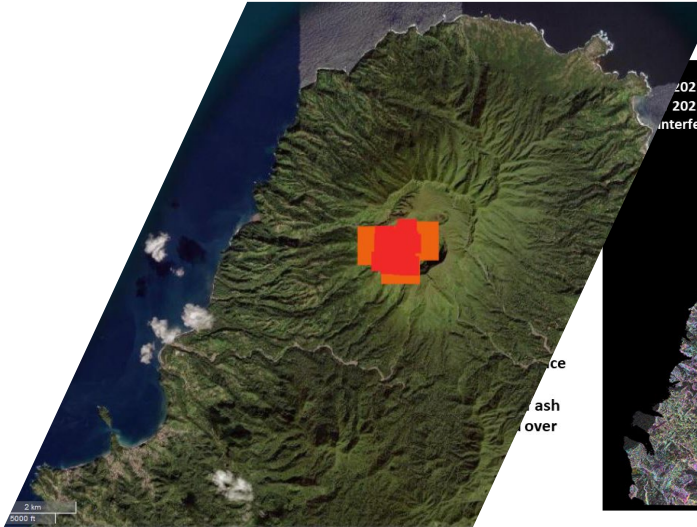
Increase public awareness and understanding of the geohazards monitored



# How is activity monitored?



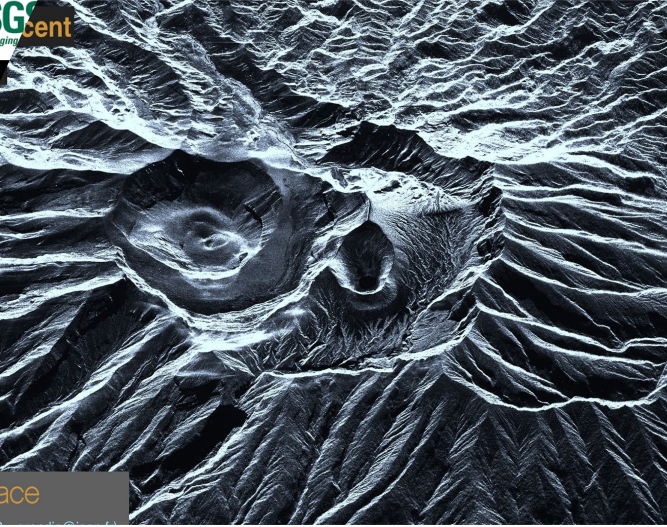
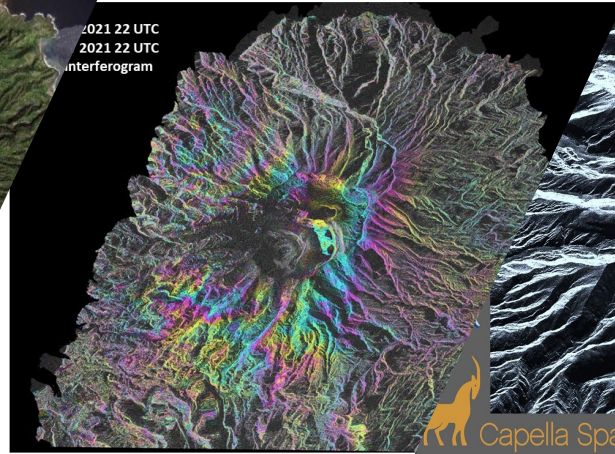
Monitoring and research helps us to better understand volcanoes, earthquakes and tsunami hazards in the region.



Vincent and the Grenadines



2021 22 UTC  
2021 22 UTC  
interferogram



# EDUCATION & OUTREACH



Geohazard Pages

Island Profiles

WEBSITE

EVENTS

RESOURCES

SOCIAL MEDIA

MULTI MEDIA



Stakeholder Science & Safety Sessions

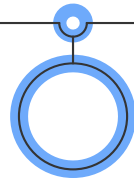
Public/ Private Industry Sessions



Interactive Map



Educational Downloads



School Outreach (all levels)



Special Campaigns



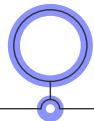
Updated Geohazard Info

Latest News/Press releases

Photos/Reels



Auto Solutions



Educational Content



Services/ Research



Animations



Educational Videos



Information Material



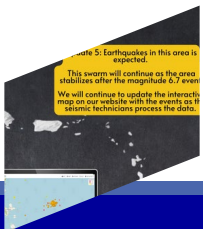
Presentations



Short Films



Special Products



# Regional EWS Architecture

- UWI-SRC and other regional institutions: monitors volcanoes and earthquakes in the Caribbean.
- Caribbean Tsunami Early Warning System – IOC/UNESCO.
- Pacific Tsunami Warning Centre, Hawaii – issue of warning messages
- NOAA International Tsunami Information Centre Caribbean Office (ITIC-CAR), Puerto Rico.
- United Nations Office for Disaster Risk Reduction (UNDRR) - Early Warning for All, Regional Office for the Americas and the Caribbean
- Caribbean Disaster Emergency Response Management Agency (CDEMA) – Regional Response Mechanism
- National Disaster Emergency Organisations leading country responses

# Support provided by SRC to CTEWS

## National Warning Focal Points

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- Designated agencies: e.g., Barbados Met Service, Trinidad & Tobago ODPM.
- Connect national systems with PTWC and regional alerts.
- Role in verification and initiation of national alerts.

## Monitoring Infrastructure

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- Seismic and GPS networks operated by UWI-SRC.
- Regional coordination: Real-time data sharing with regional and international partners (e.g. PTWC).
- Role in verification and initiation of national/regional EQ alerts (hazard analysis and advisories)
- CARIBE WAVE Exercise 2026: KeJ scenario

# Support provided by SRC to CTEWS

## Community Preparedness & Education

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- Tsunami Ready Program – UNESCO-IOC.
- ❖ Public education & outreach
- ❖ Hazard mapping
- ❖ Support to national committees
- Training & exercises - evacuation drills etc.

# Ongoing Projects and other Initiatives

- **UNDP-CDEMA EWS Strengthening Project:** implemented in Antigua and Barbuda, Dominica, the Dominican Republic, Haiti, Saint Lucia, Saint Vincent and the Grenadines and Cuba over an 18-month period, seeks to strengthen disaster preparedness and risk reduction through Integrated Early Warning Systems (EWS)
- **CREWS-Caribbean (WMO, IFRC).** First phase: designing a strategy to strengthen hydromet and Early Warning Systems in conjunction with regional agencies and global partners. IOC-UNESCO Tsunami Ready programme.
- **EW4All (Early Warnings for All)** – SDG and Sendai-aligned efforts. EW4All leverages existing efforts like CREWS Initiative and the regional strategic roadmap to create synergies and streamline investments
- **Humanitarian Assistance and Disaster Relief (HADR) Academy** - The Caribbean Academy for Humanitarian Assistance and Disaster Relief (HADR), based in Martinique, held its inaugural seminar from March 23–30, 2026, in Fort-de-France. The initiative was led by the Armed Forces of the Antilles (FAA) in partnership with the Caribbean Disaster Emergency Management Agency (CDEMA), the Regional Security System (RSS), and the European Union. It trained 35+ civilian and military professionals to enhance regional disaster response, focusing on coordination between French- and English-speaking Caribbean nations. UWI SRC was invited to participate in the academy, with Dr. Erouscilla Joseph serving as an instructor. The academy aims to provide theoretical and practical knowledge in HADR, to develop and deepen a regional network able to be activated in case of a crisis, as Melissa, and to share best practices and experiences among participants
- **EW4All in Volcanology-Case Study 2: The UWI Seismic Research Centre's Response to the 2020-2021 La Soufriere Eruption, St. Vincent.** IAVCEI Newsletter. This case study reflects on the 2020–2021 eruption of La Soufrière demonstrates how EW4All principles can be operationalised during a complex volcanic crisis in a small island developing state. The experience highlights the value of integrated, multi-pillar early warning systems that link scientific monitoring to decision-making and community action. As EW4All is advanced globally, lessons from St. Vincent offer transferable insights for volcanic regions worldwide, particularly those facing compounded vulnerabilities and resource constraints.  
[https://www.iavceivolcano.org/content/uploads/2026/04/iavcei\\_newsno1\\_march2026\\_final\\_edited.pdf](https://www.iavceivolcano.org/content/uploads/2026/04/iavcei_newsno1_march2026_final_edited.pdf)

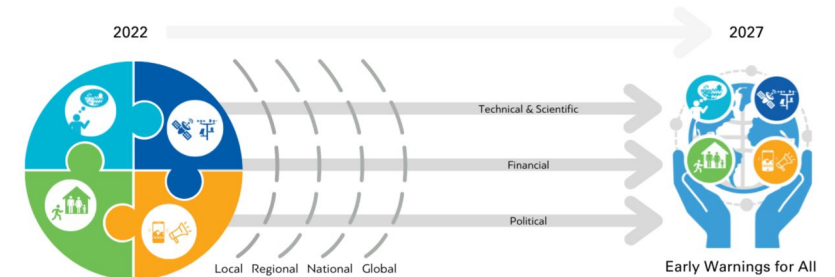
# Ongoing Projects and other Initiatives

- **Trinidad and Tobago Multi-hazard Early Warning System Pilot Project (MHEWS):** SRC was awarded the contract funded by the InterAmerican Development Bank (IDB) to provide consulting services for the development and implementation of an EWS related pilot for selected communities in the islands of Trinidad and Tobago, in collaboration with the Office of Disaster Preparedness and Management (ODPM) and the Tobago Emergency Management Agency (TEMA). The project value is US\$145,000 with the project period being June 2025 to October 2026. Currently the procurement of the system equipment and infrastructure implementation is in process. Stakeholder consultations in Roxborough, Tobago and St. Helena, Trinidad were conducted.
- **EW4All in Volcanology-Case Study 2: The UWI Seismic Research Centre's Response to the 2020-2021 La Soufriere Eruption, St. Vincent.** IAVCEI Newsletter. This case study reflects on the 2020–2021 eruption of La Soufrière demonstrates how EW4All principles can be operationalised during a complex volcanic crisis in a small island developing state. The experience highlights the value of integrated, multi-pillar early warning systems that link scientific monitoring to decision-making and community action. As EW4All is advanced globally, lessons from St. Vincent offer transferable insights for volcanic regions worldwide, particularly those facing compounded vulnerabilities and resource constraints.  
[https://www.iavceivolcano.org/content/uploads/2026/04/iavcei\\_newsno1\\_march2026\\_final\\_edited.pdf](https://www.iavceivolcano.org/content/uploads/2026/04/iavcei_newsno1_march2026_final_edited.pdf).
- **Enhancing the resilience of fisheries and offshore infrastructure to impacts from recurrent lahars offshore St. Vincent and the Grenadines (SVG):** Research led by the National Oceanography Centre (NOC) and UWI Seismic Research Centre. This project will provide the first characterisation of the offshore behaviour and impacts of hazardous volcanic sediment flows known as lahars; providing a currently absent evidence base from which to develop appropriate mitigation and adaptation strategies and enhance the future resilience of key but vulnerable fishery sites, critical offshore internet cables and other marine infrastructure that underpin the blue economy. These efforts are vital because lahars in this region have been shown to deliver massive sediment volumes to the ocean, causing delayed, long-lived impacts on marine ecosystems and critical offshore assets, rather than just short-term damage. It is funded through the UK International Development grant and is valued at £200,000. The project period is February 2025 to March 2026. A larger follow up project **Hazardous and extreme lahar driven sediment fluxes: Addressing the gap between land and deep-sea (LAHAR2SEA)** has now secured funding and will be executed between 2026 to 2029.

# Challenges and Gaps

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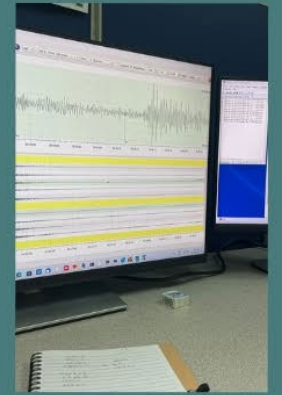
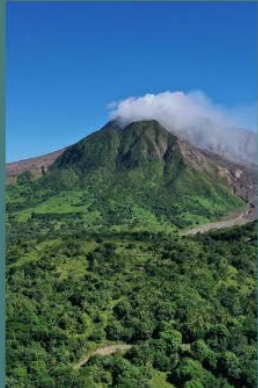
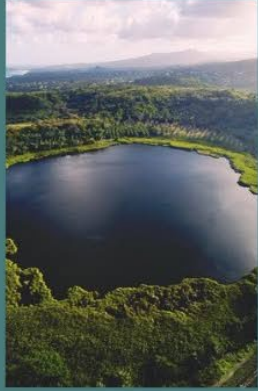
- Gaps in SOP operationalization and training: Lack of engagement from vulnerable groups like women and persons with disabilities.
- Uneven EWS infrastructure across islands: Insufficient technical and institutional capacity to support the development and implementation of MHEWS
- Financial sustainability: Sustainable funding is a challenge for both capital investment and ongoing operation, requiring a comprehensive approach.
- Communication System Gaps: Limited access to integrated alert mechanisms like cell broadcasting and mass media, along with a lack of tools to measure message effectiveness.
- Behavioral Analysis Limitations: Inadequate systems for capturing and analyzing community response behaviors, hindering evidence-based public engagement.



# Opportunities and Next Steps

- Regional capacity building through CDEMA, SRC, CTIC
- Need to mobilize & make visible the expertise of communities in strengthening resilience
- Leveraging tech (AI, EO, mobile apps) for better warning dissemination.
- Prioritizing SOP implementation and simulations.
- Aligning national efforts with EW4All framework: Need for balance in perspective between climate change and hydro-meteorological events and geophysical hazards
- Development, legislation and enforcement of land-use, building regulations and codes





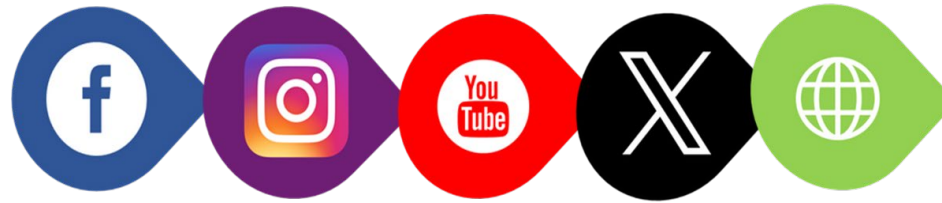
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SEVEN DECADES & MORE WORKING TO  
PROTECT CARIBBEAN PEOPLE

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