

AS25–1204 - Development of a School Seismic Observatory in Southeastern Sicily Using Raspberry Shake Stations

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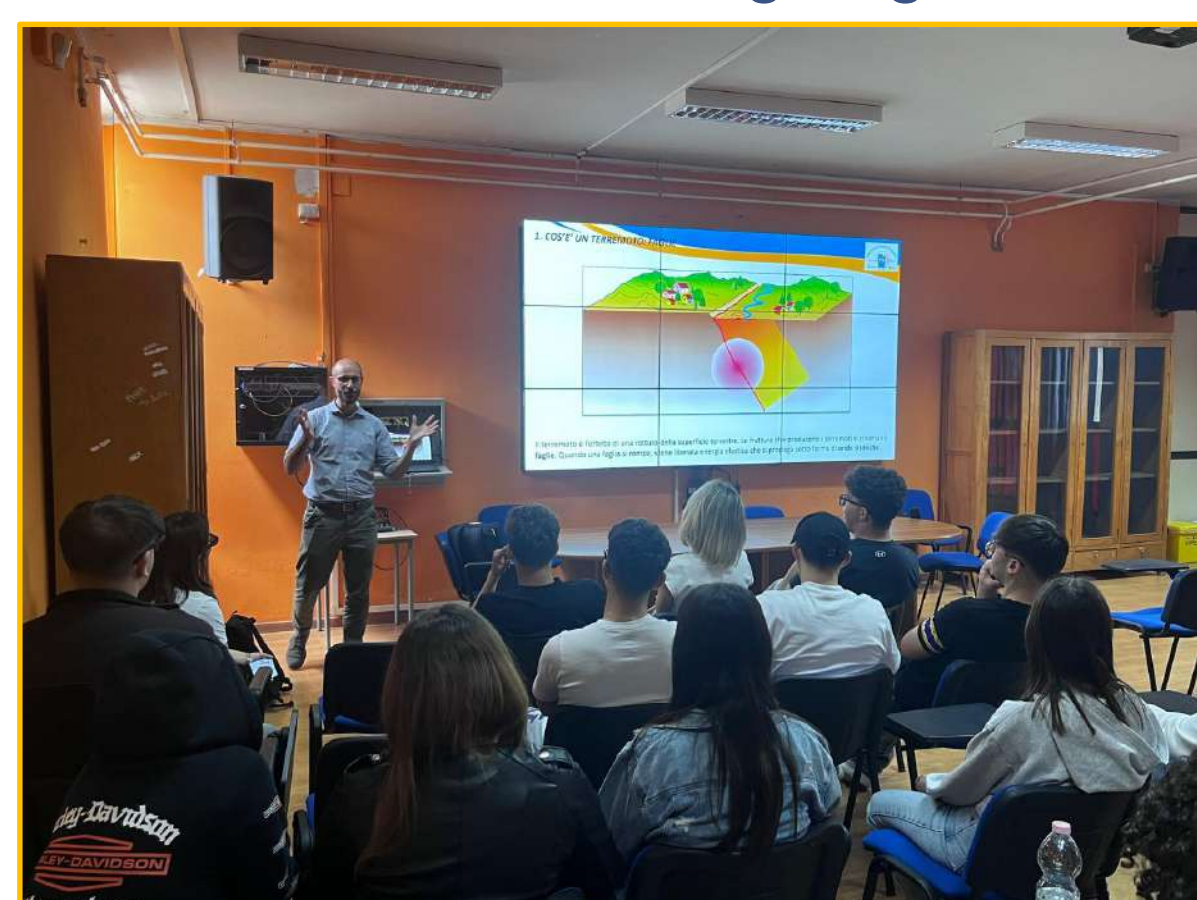
Abstract

Educational seismology plays a crucial role in raising awareness of seismic risk, especially in tectonically active regions. We present the establishment of a School Seismic Observatory in Southeastern Sicily, aimed at promoting real-time seismic monitoring and fostering a deeper understanding of seismology among students and the wider community. By engaging schools, we seek to create a ripple effect, extending earthquake awareness beyond classrooms and into society. The project, developed through a collaboration between the **INGV - Osservatorio Etneo** and the Solid Earth Geophysics lab at the Department of Biological, Geological and Environmental Sciences of the **University of Catania**, involves the deployment of **Raspberry Shake RS3D seismometers** in selected schools across Catania, Acireale, Siracusa, Modica, and Adrano. This initiative represents a natural progression of the **Urban Seismic Observatory of Catania (OSU-CT)**, established in 2019 through the eWAS Project, which develops cost-effective, smart monitoring solutions for cultural heritage protection. These efforts contribute to a Smart City model for assessing natural and man-made hazards in urban areas. Raspberry Shake stations, compact and easy to install, require only power, internet, and a quiet environment. They continuously record seismic signals, sharing data in real time with schools and the scientific community. Beyond education, this initiative strengthens seismic monitoring, supporting event detection, hazard assessment, and structural health monitoring (SHM) of school buildings. It also promotes STEM education, citizen science, and seismic awareness, enhancing community preparedness in a high-risk region. This experience underscores the value of low-cost seismic networks for both research and public awareness.

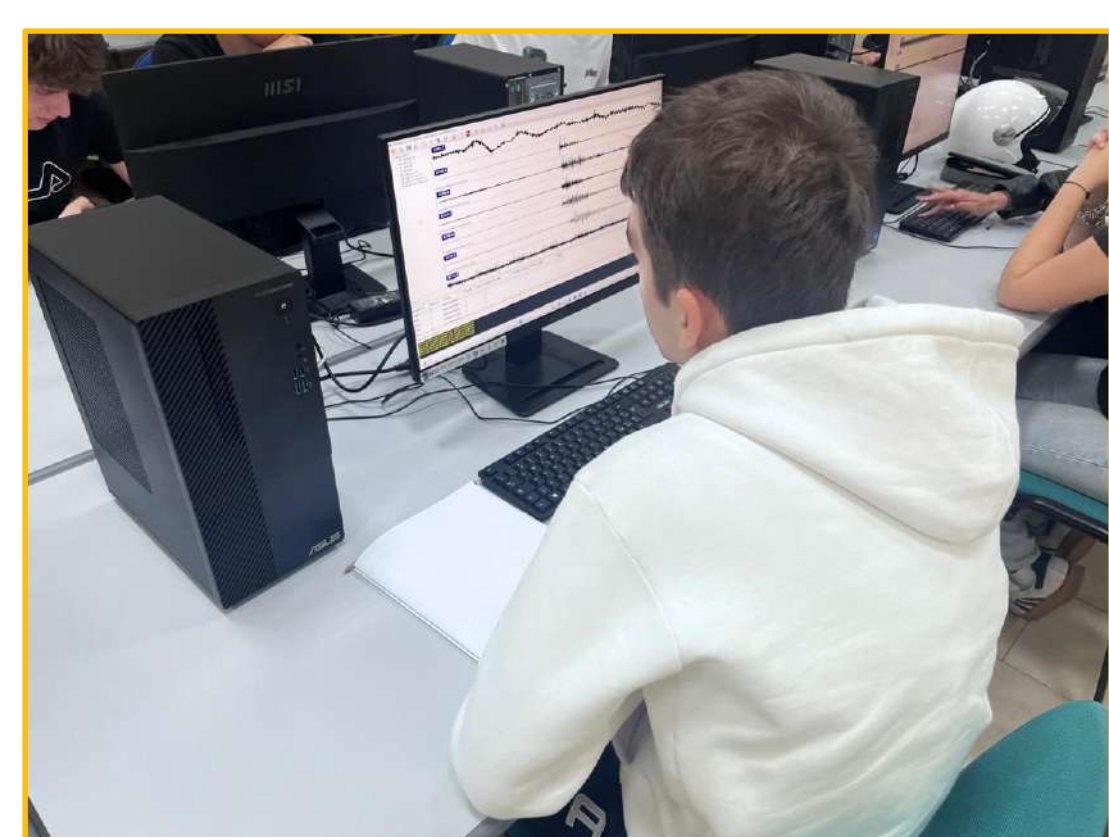
1. Introduction

Southeastern Sicily is one of the most seismically active regions in Italy, located near the complex boundary between the African and Eurasian plates. Historical records document several destructive earthquakes, including the catastrophic 1693 event, which devastated large areas of the Val di Noto. Today, the region remains exposed to significant seismic risk due to ongoing tectonic activity.

In this context, educational seismology plays a key role in raising awareness, fostering risk reduction, and building a culture of preparedness—especially among younger generations. School-based seismic observatories offer a valuable opportunity to engage students in real-time monitoring, data interpretation, and direct interaction with Earth sciences.



2. What is a school seismic observatory?



A school seismic observatory is a hands-on learning environment where students actively explore earthquakes and seismic phenomena. With tools like a seismometer and access to real-time data, they learn how to visualize, record, and interpret seismic signals using scientific software.

This educational approach combines Earth sciences, technology, and risk awareness, empowering students to become directly involved in the observation and understanding of seismic activity.



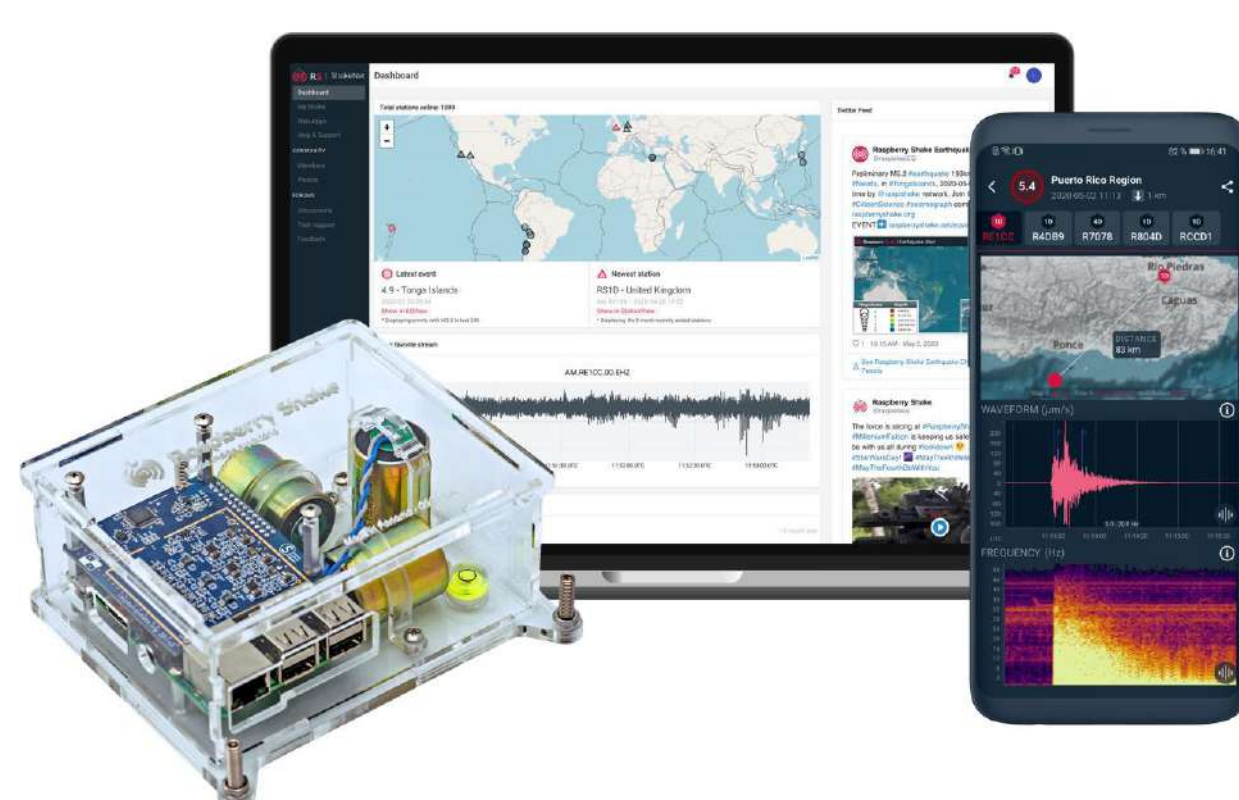
3. Who is involved in the project?



Students from **five high schools** across Southeastern Sicily — in **Catania**, **Acireale**, **Adrano**, **Siracusa**, and **Modica** — are actively involved in the project, working directly with seismic data and instruments.

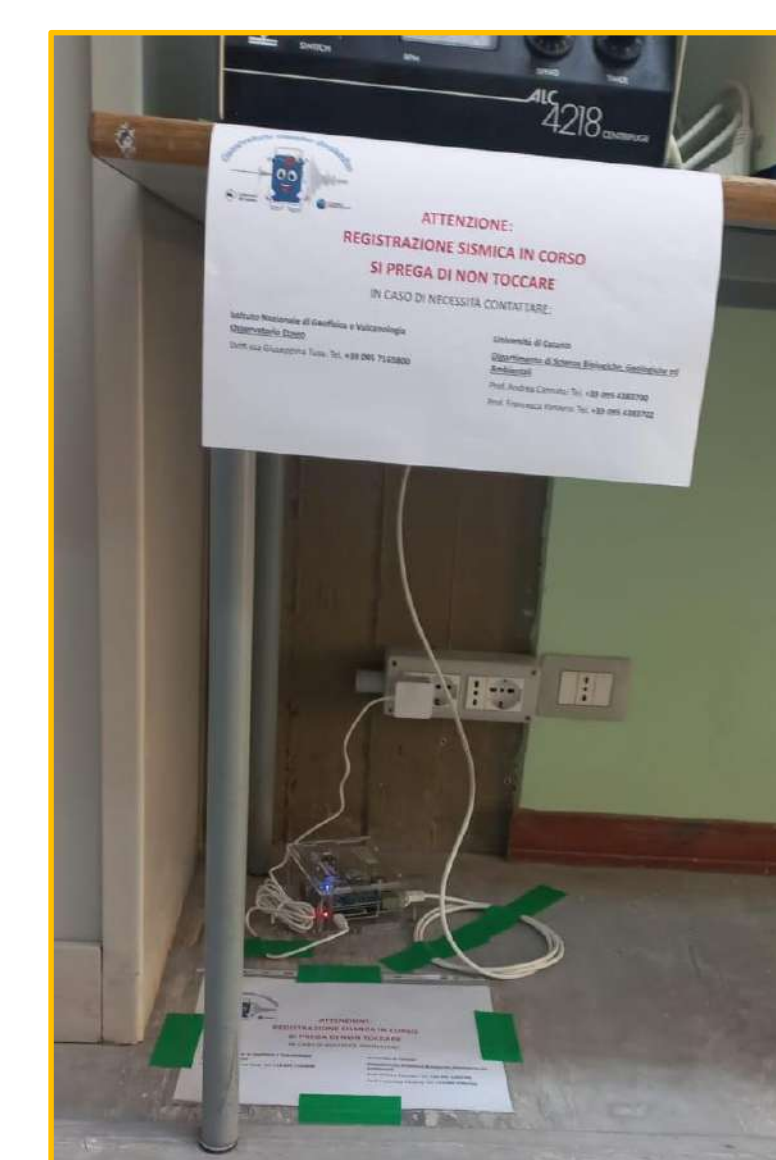
4. Inside the School: The Raspberry Shake RS3D

The heart of each school seismic observatory is the **Raspberry Shake RS3D**, a compact, low-cost seismometer designed for easy installation and continuous seismic data recording.



Requiring only power, internet, and a quiet environment, the station allows students to observe ground motion in real time, detect local and distant earthquakes, and contribute to the global Raspberry Shake network.

The RS3D records motion along three components and streams data directly to both the school's computers and the international scientific community. This hands-on tool transforms schools into real seismic laboratories, empowering students to explore real-world geophysical processes.



5. Student Activities and Educational Engagement

The project offers a wide range of hands-on and theoretical activities designed to actively involve students in seismology and Earth science. These include:

- ❖ **Seismogram analysis workshops:** students learn how to read and interpret real-time recorded by their school's Raspberry Shake station.
- ❖ **Classroom lessons on seismology:** frontal lectures introduce students to the basics of earthquakes, seismic waves, plate tectonics, and seismic hazard.
- ❖ **Data management and interpretation:** students access, organize, and explore seismic data using open-source tools and scientific software.
- ❖ **Earth science experiments:** Simple classroom experiments help visualize seismic wave propagation, ground motion, and building response.
- ❖ **Connection with the scientific network:** Schools are integrated into the Raspberry Shake community, with data shared globally and used for scientific outreach.



What We Achieved and What Comes Next

Through the **School Seismic Observatory** project, we have:

- Actively involved students in seismic monitoring, data analysis, and Earth science education.
- Fostered the culture of risk awareness and scientific curiosity.
- Integrated schools into the international Raspberry Shake network, contributing real-time seismic data.

Next steps

- Expanding the network to more schools.
- Developing educational materials and training modules for teachers.
- Exploring applications for structural health monitoring and local hazard assessment.