Bringing Together Student Collaboration and Research Opportunities to Promote Scientific Understanding and Outreach Through a Seismological Community

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Abstract : China has been the site of some of the most significant earthquakes in history; however, earthquake monitoring has long been the provenance of universities and research institutions. The China Digital Seismographic Network was initiated in 1983 and improved significantly during 1992-1993. Data from the CDSN is widely used by government and research institutions, and, generally, this data is not readily accessible to middle and high school students. An educational seismic network in China is needed to provide collaboration and research opportunities for students and engaging students around the country in scientific understanding of earthquake hazards and risks while promoting community awareness. In 2022, the Tsinghua International School (THIS) Seismology Team, made up of enthusiastic students and facilitated by two experienced teachers, was established. As a group, the team's objective is to install seismographs in schools throughout China, thus creating an educational seismic network that shares data from the THIS Educational Seismic Network (THIS-ESN) and facilitates collaboration. The THIS-ESN initiative will enhance education and outreach in China about earthquake risks and hazards, introduce seismology to a wider audience, stimulate interest in research among students, and develop students' programming, data collection and analysis skills. It will also encourage and inspire young minds to pursue science, technology, engineering, the arts, and math (STEAM) career fields. The THIS-ESN utilizes small, low-cost RaspberryShake seismographs as a powerful tool linked into a global network, giving schools and the public access to real-time seismic data from across China, increasing earthquake monitoring capabilities in the perspective areas and adding to the available data sets regionally and worldwide helping create a denser seismic network. The RaspberryShake seismograph is compatible with free seismic data viewing platforms such as SWARM, RaspberryShake web programs and mobile apps are designed specifically towards teaching seismology and seismic data interpretation, providing opportunities to enhance understanding. The RaspberryShake is powered by an operating system embedded in the Raspberry Pi, which makes it an easy platform to teach students basic computer communication concepts by utilizing processing tools to investigate, plot, and manipulate data. THIS Seismology Team believes strongly in creating opportunities for committed students to become part of the seismological community by engaging in analysis of real-time scientific data with tangible outcomes. Students will feel proud of the important work they are doing to understand the world around them and become advocates spreading their knowledge back into their homes and communities, helping to improve overall community resilience. We trust that, in studying the results seismograph stations yield, students will not only grasp how subjects like physics and computer science apply in real life, and by spreading information, we hope students across the country can appreciate how and why earthquakes bear on their lives, develop practical skills in STEAM, and engage in the global seismic monitoring effort. By providing such an opportunity to schools across the country, we are confident that we will be an agent of change for society.

Keywords : collaboration, outreach, education, seismology, earthquakes, public awareness, research opportunities

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