

Low-cost seismometer for earthquake risk reduction in Nepal

S. Subedi^{1,2,3} and G. Hetényi³

¹Nepal Academy of Science and Technology, Lalitpur, Nepal

²Seismology at School in Nepal, Pokhara, Nepal

³Institute of Earth Sciences, University of Lausanne, Lausanne, Switzerland



INTRODUCTION AND MAIN RESULTS

We introduced seismology into 33 secondary schools in Nepal by installing low-cost seismometers and integrating earthquake education into the lectures. This combines classroom learning with real seismic data collection. The program has raised earthquake awareness and preparedness among students and teachers, leading to a shift in risk perception and the adoption of safer behavior. Importantly, participants have been motivated to share earthquake-related knowledge with their families and communities, extending the impact of the initiative far beyond the schools. The school-based network successfully records local and regional earthquakes, producing event locations, magnitudes, and frequency–magnitude distributions that are broadly consistent with professional catalogs. These results demonstrate that low-cost school networks can provide meaningful scientific data while also complementing national seismic monitoring efforts.

Introduction

Nepal sits above the convergent boundary between the Indian and Eurasian plates, making it one of the most seismically active regions in the world. The country has experienced devastating earthquakes through the history. Despite this, Nepal remains critically unprepared over 75% of constructions are not earthquake-resistant (Census, 2021), and public awareness of earthquake safety is low. To address these challenges, we initiated the Seismology at School in Nepal program providing schools with low-cost seismometers and educational resources. This initiative integrates earthquake education into classrooms and engages students in citizen seismology, creating a pathway for knowledge transfer to families and communities, and contributing to long-term earthquake risk reduction.

Activities

Objectives:

- (1) an operational low-cost seismic network in schools
- (2) teaching earthquake-related topics in classrooms

We provide earthquake education to school students using materials adapted to the Nepali school system and language. Freely available, these resources are complemented by lectures, teacher trainings, material distribution, and demonstration events.



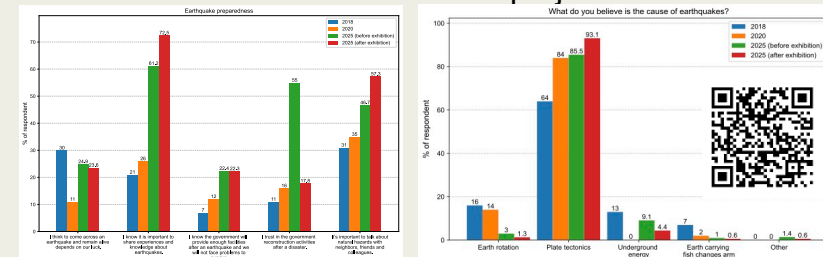
At the same time, students play with seismic data which are later analyzed for basic seismology research. We also provide earthquake waveforms to teachers for classroom discussion. Having local seismic data motivates students to engage with earthquakes, and they can even locate earthquakes using our tutorials.



Impact

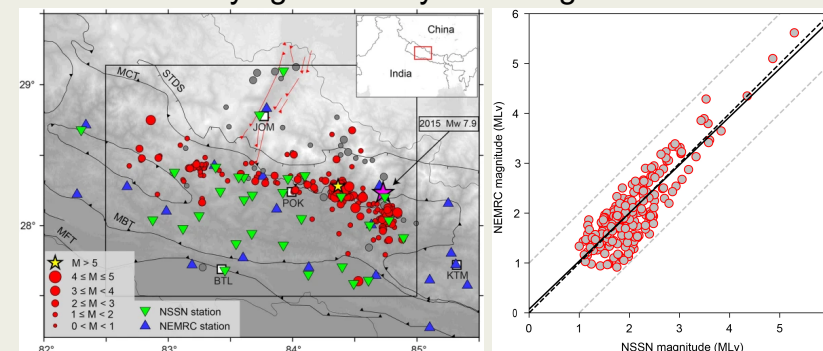
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We have evaluated the impact of the program and observed significant improvements in earthquake knowledge, awareness, risk perception, and the spread of information into the community through students. These results motivate us to continue the project in the future.



Research Results

We found magnitude of completeness $M_L 1.8$ the same as for the national catalog. Such a low cost network are useful for studying seismicity in the region.



Conclusions

The educational seismology program in Nepal is contributing towards both reducing seismic risk and also for studying microseismicity.

Map showing the Nepal School Seismology Network stations with USGS earthquakes.