Crowd-Sourcing Seismic Data for Research and Education Opportunities with the Quake-Catcher Network

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The Quake Catcher Network (QCN; quakecatcher.net) uses low cost micro-electro-mechanical system (MEMS) sensors hosted by volunteers to collect seismic data. Volunteers use accelerometers internal to laptop computers, phones, tablets or small (the size of a matchbox) MEMS sensors plugged into desktop computers using a USB connector to collect scientifically useful data. Data are collected and sent to a central server using the Berkeley Open Infrastructure for Network Computing (BOINC) distributed computing software.

Since 2008, sensors installed in museums, schools, offices, and residences have collected thousands of earthquake records. We present and describe the rapid installations of very dense sensor networks that have been undertaken following several large earthquakes, including the 2010 M8.8 Maule, Chile, the 2010 M7.1 Darfield, New Zealand, and the 2015 M7.8 Gorkha, Nepal earthquake. These large data sets allowed seismologists to develop new rapid earthquake detection capabilities and closely examine source, path, and site properties that impact ground shaking at a site. In addition, we show how QCN has engaged a wide sector of the public in scientific data collection, particularly through the QCN-EPICenter Network and NASA Mars InSight teacher programs. QCN provides the public with information and insight into how seismic data are collected and used for research purposes. Furthermore, we describe how students use data recorded by QCN sensors installed in their classrooms to explore and investigate earthquakes that they felt, as part of ‘teachable moment’ exercises.