The future strong motion national seismic networks in Central America designed for earthquake early warning.

Frederick Massin\textsuperscript{1}, John Clinton\textsuperscript{1}, Roman Racine\textsuperscript{1}, Maren Bose\textsuperscript{1}, Yara Rossi\textsuperscript{2}, Griselda Marroquin\textsuperscript{3}, Wilfried Strauch\textsuperscript{4}, Mario Arroyo\textsuperscript{5}, Lepolt Linkimer\textsuperscript{5}, Esteban Chavez\textsuperscript{6}, Marino Protti\textsuperscript{6}, and Robin Yani\textsuperscript{7}

\textsuperscript{1}ETHZ-SED, Swiss Seismological Service, Zurich, Switzerland
\textsuperscript{2}ETHZ, Zurich, Switzerland
\textsuperscript{3}Ministerio de Medio Ambiente y Recursos Naturales, San Salvador, El Salvador
\textsuperscript{4}Instituto Nicaragüense de Estudios Territoriales Managua, Nicaragua
\textsuperscript{5}University of Costa Rica, San Jose, Costa Rica
\textsuperscript{6}Universidad Nacional de Costa Rica, San Jose, Costa Rica
\textsuperscript{7}Instituto Nacional de Sismología, Vulcanología, Meteorología e Hidrología, Guatemala City, Guatemala

The national seismic networks in Central America have been developing network-based early warning since 2016 for Nicaragua, 2018 for El Salvador and 2019 for Costa Rica. This effort is part of a project with the Swiss Seismological Service (ETH Zurich) including funds for accelerograph deployment. At each network, delay for first earthquake parameter estimations have been significantly reduced by optimizing data acquisition, metadata quality, and configuration of the EEW algorithms implemented in SeisComP3, i.e. Virtual Seismologist and the Finite fault rupture Detector. Issues remain with significant numbers of deployed instrumentation that for a variety of reasons, do not optimally contribute to the EEW systems. Building on our experience so far, we design national network upgrades that will optimize the earthquake early warning performance in the Central America region, mitigating the current issues with velocimeter clipping during large events, datalogger delays, and incomplete network coverage. The new instruments have been selected after testing all available EEW-capable accelerographs natively compatible with SeisComP3 including class A force balance accelerometers as well as MEMs. To justify our instrument selection, we summarize the performance of these different instruments. We model and discuss reference maps for performance expectations, and present planned instrument vaults. Our primary focus is on minimizing first alert times but we also wish to accentuate the broad value of the network upgrade for seismological monitoring showing changes in the magnitude of completeness in the region. We demonstrate the value of the network upgrade for earthquake early warning with real-time processing simulation using synthetic data for the maximum magnitude earthquake expected for the Central America subduction zone.