

UNAVCO and Its Role Supporting Global Geodesy for Science and Hazards: Some Recent Examples and Outlook for the Future



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UNAVCO supports several geodetic infrastructure projects across the Americas with US National Science Foundation (NSF) funding, including the EarthScope Plate Boundary Observatory (PBO), COCONet (Continuously Operating Caribbean GPS Observational Network) and TLALOCNet (Trans-boundary, Land and Atmosphere Long-term Observational and Collaborative Network). The goal for these NSF-funded networks, known collectively as the Network of the Americas (NOTA), is to provide high-quality, low-latency, open-format data, validated metadata, and data products for researchers, educators, students, and the private sector. UNAVCO currently streams data from over 800 real-time, 1-sps, GNSS sites (RT-GNSS) from NOTA stations.

While nearly all RT-GNSS users require high reliability, low latency, and research quality data, the requirements of earthquake and tsunami early warning systems are the most demanding. Recent work has shown that GNSS-defined peak ground displacements (PGD) provide a magnitude scaling relation that, unlike estimates based on the first seconds of the P-wave, does not saturate above M7. The inclusion of RT-GNSS PGD data can therefore greatly enhance the accuracy of early warning systems by providing improved magnitude estimates of large earthquakes.

We can combine the ambient noise levels for the GNSS PPP solutions with the GNSS-derived PGD scaling relationship to assess the ability of NOTA RT-GNSS stations to unambiguously detect the long-period surface waves generated by large earthquake events. This enables implementation of tools for evaluating and continuously monitoring the capability of magnitude-threshold detection level for RT-GNSS networks. I will discuss results related to some recent earthquakes captured by the NOTA RT-GNSS network.



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