

Award Number 07HQAG0016

MID-AMERICA INTEGRATED SEISMIC NETWORK - VA TECH

**Final Report
November 4, 2008**

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ABSTRACT

The Virginia Tech seismic network collects high-quality seismic data in Virginia and adjacent parts of the Appalachian region. Research objectives include earthquake monitoring to maintain continuity of earthquake catalogs for seismic hazard assessment, studies of the seismotectonics of the region, earthquake source studies, wave propagation, and the temporal/spatial behavior of seismicity. Outreach objectives include development and maintenance of regional earthquake catalogs; and dissemination of information to federal/state/local governments, the engineering community and the general public via publication of seismicity bulletins and an internet website:

(<http://www.geol.vt.edu/outreach/vtso/>).

Five high-dynamic range, short-period stations and one extended-response broadband station were operated in Virginia during a six month period under support by this award. July 31, 2007 marked the end of many years of assistance for the Virginia Tech Seismic Network by the U.S. Geological Survey. The Virginia Tech Seismic Network continues to provide real-time data to NEIC and collaborates with ANSS.

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INTRODUCTION

The Virginia Tech seismic network collects high-quality seismic data in Virginia. Research objectives include earthquake monitoring to maintain continuity of earthquake catalogs for seismic hazard assessment, studies of the seismotectonics of the region, earthquake source studies, wave propagation, and the temporal/spatial behavior of seismicity. Outreach objectives include development and maintenance of regional earthquake catalogs; and dissemination of information to federal/state/local governments, the engineering community and the general public.

This report covers the final six month period (February 1, 2007 to July 31, 2007) of long-term support of the Virginia Tech Seismic Network by the U.S. Geological Survey.

NETWORK OPERATION

Network station configuration prior to February 1, 2007 is shown in Figure 1. Stations WMV, PWV, FWV, ELN, BLA and VWCC were 3 component, short-period with 24-bit digitization. Station WMV was decommissioned during 2004 and reinstalled as station VWCC in 2005. Stations PWV and FWV were decommissioned during 2006 and were re-installed in central Virginia in 2007. Broadband station URVA became operational in February, 2006. That station is a collaboration between Virginia Tech, the University of Richmond and the City of Richmond. The City of Richmond purchased the equipment (Geotech Instruments SMART-24D digitizer and KS-2000 broadband sensor). University of Richmond provides the site, and internet connection, and Va Tech provides maintenance, technical support and analysis of the data. Telemetry for station ELN is by digital duplex radio. Telemetry of URVA and VWCC is by a combination of local UHF digital radio and Internet.

Figure 2 shows the current (November 4, 2008) configuration of the Virginia Tech Seismic network. It continues to operate in this configuration independently of ANSS. Stations RCRC and JSRW were installed in central Virginia during the final project period

(February through July, 2007) of this award. Telemetry of data from those two stations is identical to that described above for URVA and VWCC. We have plans to add additional stations in western Virginia and in central Virginia, pending support.

The digital network data are ported to an EARTHWORM system and are exported to USGS NEIC in Golden, Co, and CERI (University of Memphis). Virginia Tech continues to provide real-time data to the U.S. Geological Survey NEIC and remains an active collaborator with ANSS.

The Virginia Tech worldwide web site <http://www.geol.vt.edu/outreach/vtso/> contains products of this project, which include a regional seismicity bulletin and historical earthquake catalog for the southeastern U.S. region. In addition, the website includes twelve hour digital Helicorder trace data from all components of the network.

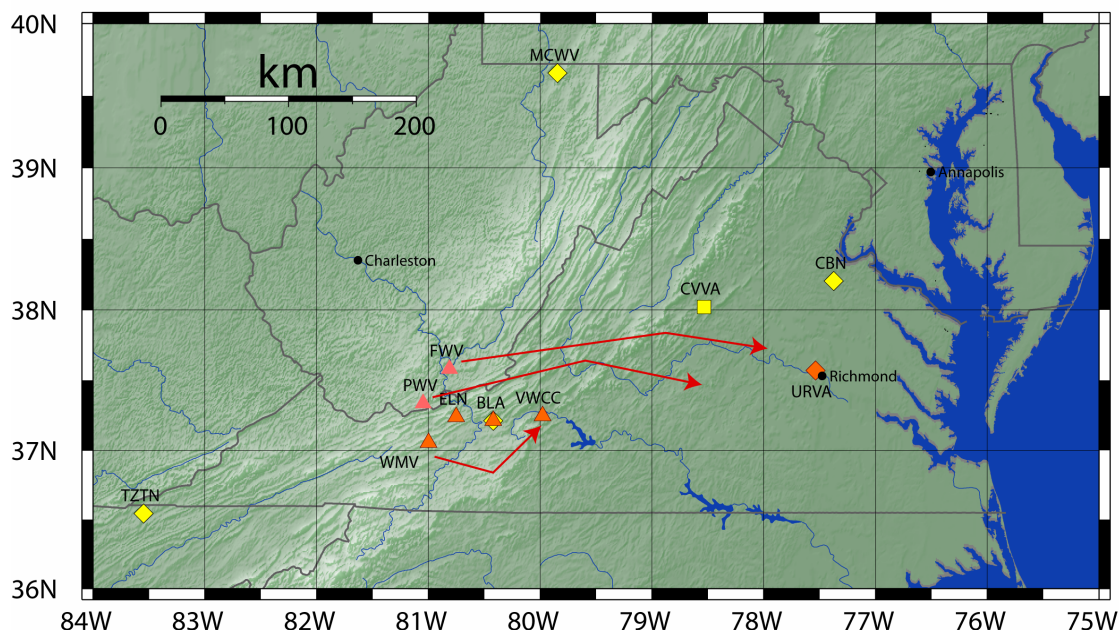


Figure 1. Stations operated by Virginia Tech during 2004-2006 are shown by the orange triangles and the orange diamond. Yellow diamonds are ANSS broadband backbone stations. The yellow square is an ANSS strong motion station. Station URVA is a broadband station operated jointly by Va Tech, the University of Richmond and the City of Richmond. Station WMV was decommissioned during 2004 and re-installed as station VWCC during 2005. Stations PWV and FWV were decommissioned during 2006 and were re-located in central Virginia in 2007.

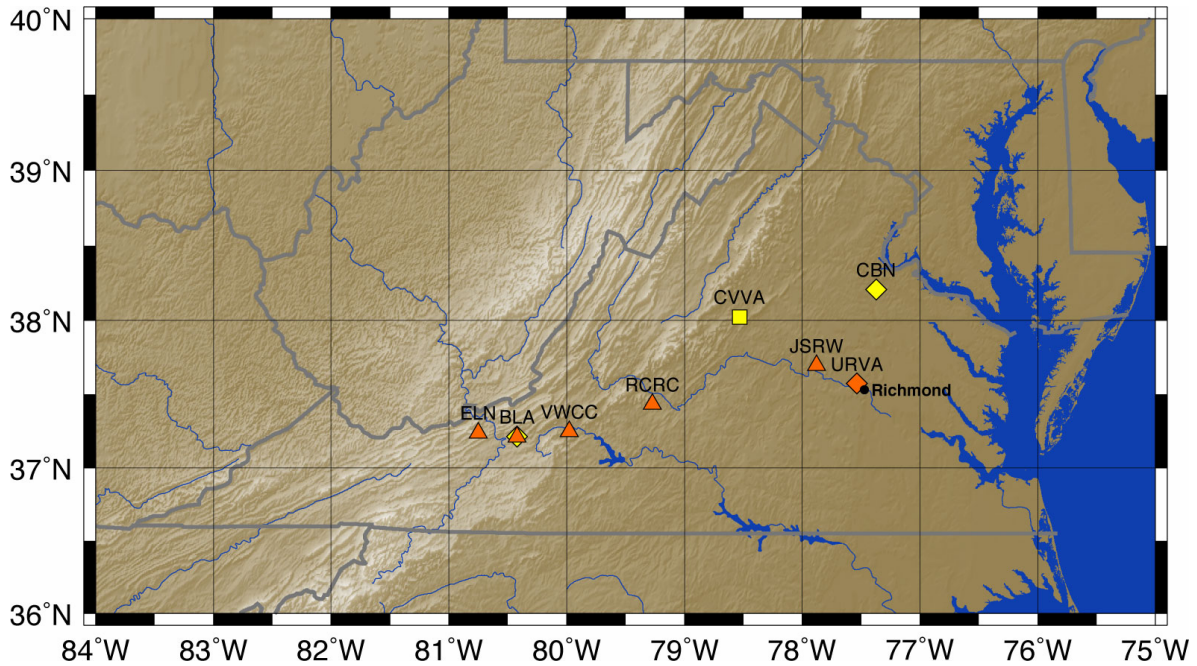


Figure 2. Seismic stations currently (November, 2008) operating in Virginia. Stations operated by Virginia Tech are shown by the orange triangles and the orange diamond. Yellow diamonds are ANSS broadband backbone stations. The yellow square is an ANSS strong motion station. Station URVA is a broadband station operated jointly by Va Tech, the University of Richmond and the City of Richmond. Calibrated data from all Va Tech stations are exported in real-time to NEIC via Earthworm.

SUMMARY

The objective of the Virginia Tech Seismic Network has always been to record quality data for scientific investigation of the earthquake activity in the region and to compile and distribute information directly useful for earthquake hazard assessment and mitigation. For years, funding for the program at Virginia Tech has resulted in our ability to provide products like the Bulletin of the Southeastern United States Seismic Network. This bulletin contains hypocenter location and phase arrival data contributed since 1977 by all seismic network operators in the region. Virginia Tech has maintained a comprehensive catalog of both historical and instrumental earthquakes in the region. This catalog is a primary data set for probabilistic hazard assessment in the region, and is currently being used by many of the utilities in the region for updating their hazard assessments of critical facilities. These products are available electronically at our website.

The principle investigator of this project will continue to operate seismic stations in Virginia that will provide real-time data to NEIC, and will remain an active collaborator with ANSS.