

## **Cooperative Central and Southeastern US Integrated Seismic Network-VPI&SU**

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

**Annual Project Summary  
November 1, 2001**

### **INVESTIGATIONS UNDERTAKEN**

The Virginia Tech seismic network operates in conjunction with other regional networks in mid-America region to collect high-quality seismic data in the 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.

### **RESULTS**

Stations in operation during the report period are shown in Figure 1. The stations are 3 component, short-period with 24-bit digitization. Telemetry to the central recording facility on-campus is by duplex digital VHF radio.

The digital network data are ported to an EARTHWORM system and are being exported to USGS NEIC in Golden, Co, CERI (University of Memphis), JIEE-TVA in Knoxville, TN and to the University of South Carolina in Columbia. Along with Virginia Tech, these institutions as well as others in the central and southeastern U.S. are presently developing improved data analysis and archiving procedures to take advantage of the greatly increased efficiency provided by the EARTHWORM systems now operational at the various institutions. Virginia Tech and other collaborative institutions are committed to efficient data acquisition, analysis and dissemination under the auspices of the mid-America region of the Advanced National Seismic System (see the ANSS-MA website at <http://www.anss-ma.org> ).

In addition to the data dissemination via EARTHWORM, Va Tech maintains an

anonymous ftp site containing waveform data from selected regional events. This is accessible via web browsers at <ftp://vtso.geol.vt.edu/events>. The worldwide web site <http://www.geol.vt.edu/outreach/vtso/> contains information on how to access the waveform data, as well as the other products of this project, which include a regional seismicity bulletin and historical earthquake catalog for the southeastern U.S. region. An new addition to the website includes twelve hour digital Helicorder trace data from vertical components of the network.

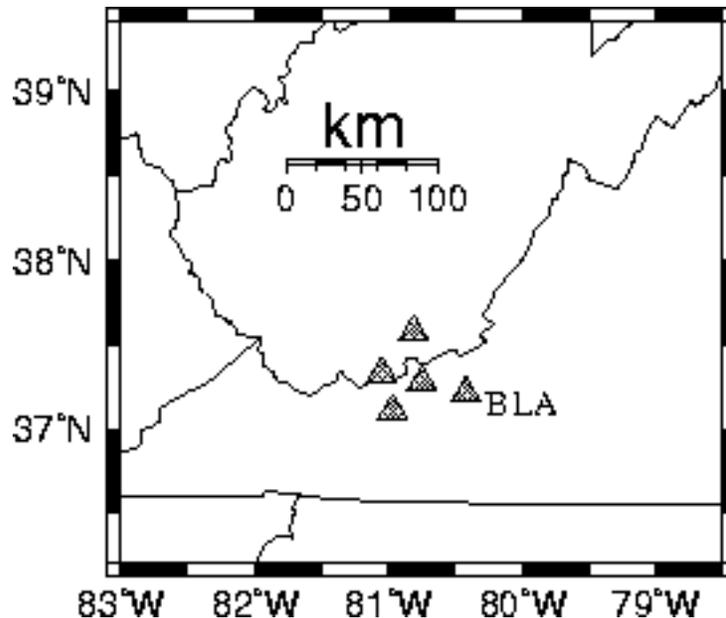


Figure 1. Triangles show seismic stations operated by Virginia Tech.

### Recent Seismicity in Virginia and the Southeast US

Figure 2 shows the epicenters of earthquakes in the Southeastern U.S. region reported in the 35th volume of the Southeastern United States Seismic Network Bulletin, for 2000, and earthquakes in the state of Virginia during the report period.

Virginia earthquakes during the report period include a magnitude 2.5 shock on March 28, 2001 near the town of Narrows, in Giles County, western Virginia, a magnitude 2.5 shock near Culpeper, Virginia on June 25, 2001 that was felt locally, two small shocks (the largest, M 2.8) near Cumberland, Virginia on September 2, 2001 (neither were felt), a magnitude 3.0 shock IN Charlottesville, Va on September 22, 2001 (maximum intensity IV MM) that caused considerable consternation, confusion and disbelief on the eastern side of town, and finally, a magnitude 1.8 event on October 1, 2001 near Roanoke, Va that was not reported felt.

The September 22, 2001 Charlottesville earthquake was notable for its shallow focal depth and location: it probably occurred within the eastern city limits. Most residents on the eastern side of town both felt and heard the shock, and many called the local officials. Initially, the sheriff's department reported that the cause of the event was unknown, but

possibly a sonic boom. The author was able to confirm the fact that the event was an earthquake, and distributed that information to the local authorities, press and public.

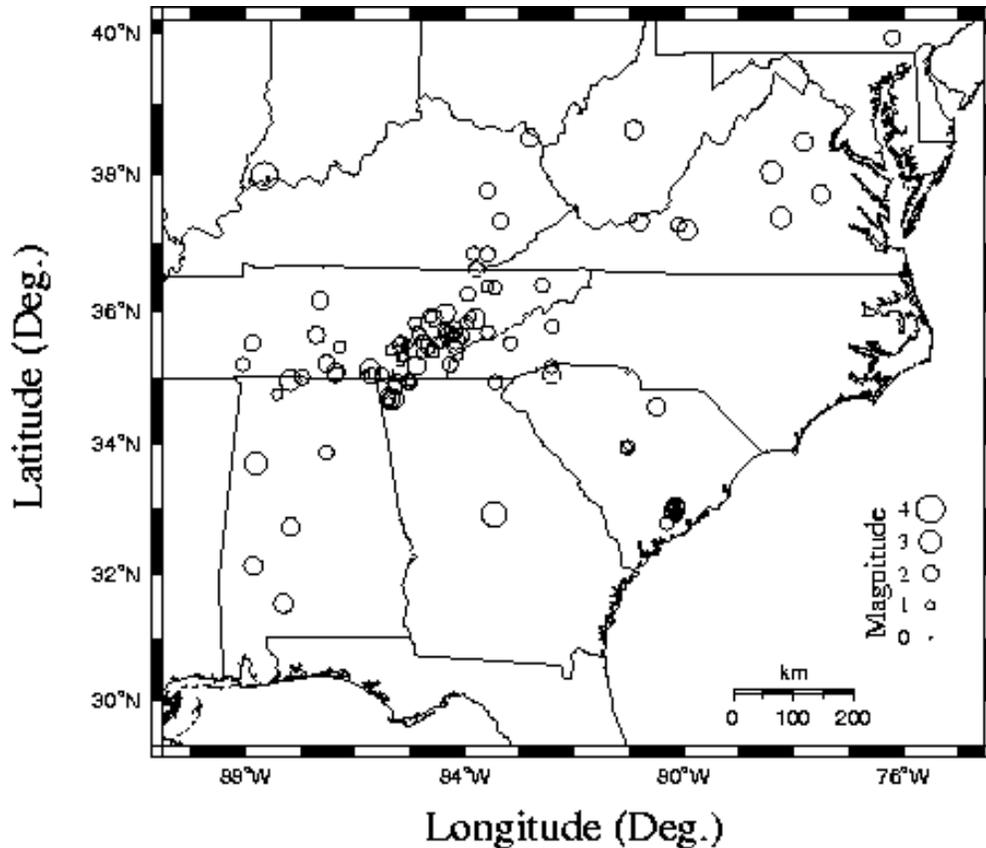


Figure 2. Epicenters of earthquakes occurring during 2000 and contained in the Southeastern U.S. Seismic Network Bulletin No. 35.

### NONTECHNICAL SUMMARY

The Virginia Tech seismic network contributes to the earthquake monitoring of the southern Appalachian region of the southeastern United States. Data exchange with collaborating institutions is real-time, continuous. Data products generated by the project during the report period are available on-line, including waveform data for Virginia earthquakes, instrumental earthquake catalogs and a historical catalog of events in the southeastern region. On-line helicorder displays for the vertical component stations are also accessible at web site [www.geol.vt.edu/outreach/vtso](http://www.geol.vt.edu/outreach/vtso).

### REPORTS PUBLISHED

The 34th volume of the Southeastern United States Seismic Network Bulletin for events occurring during the 1999 calendar year was finalized and distributed to over 200 institutions and individuals in December, 2000 of this report period. The bulletin contains complete phase arrival time data from all stations recording each tectonic earthquake, as well as much

additional information on southeastern U.S. seismicity and network operation. Text versions of the Southeastern U.S. Seismicity Bulletins can be obtained electronically at the Va Tech website, or by anonymous ftp, at the address/URL cited above.

Volume 35 of the Southeastern United States Seismic Network Bulletin for calendar year 2000 has been finalized and will be mailed during November, 2001. Electronic versions of volume 35 in ASCII text and PDF format will be available soon (November, 2000) at our website and anonymous ftp address.

The CNSS Composite Catalog (<http://quake.geo.berkeley.edu/cnss/>) currently contains the listing of instrumentally located tectonic earthquake hypocenters and magnitude estimates for the southeastern US region, complete through 2000. Phase arrival time data for events are available on-line in the electronic versions of the SEUSSN bulletins, at the Virginia Tech anonymous ftp address ([vtso.geol.vt.edu](http://vtso.geol.vt.edu)) or via the website <http://www.geol.vt.edu/outreach/vtso/>.

#### **Bibliography of Published Reports during Report Period:**

Southeastern U.S. Seismic Network Operators, (2000). *Southeastern U. S. Seismic Network Bulletin No. 34*, (compiled by M. C. Chapman, E. C. Mathena and J. A. Snoke), Virginia Tech Seismological Observatory, Dept. Geological Sciences, Blacksburg, Va, 69 p.