Geophysical Research Abstracts
Vol. 12, EGU2010-7366, 2010
EGU General Assembly 2010

Operational Aspects of the NSF EarthScope USArray Transportable Array

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The USArray Transportable Array (TA) is comprised of ∼400 deployed stations in a rolling layout across the 48 contiguous United States. Using BRTT's Antelope software, the Array Network Facility (ANF) is responsible for the delivery of all TA data (seismic, state of health and metadata) to the IRIS Data Management Center (DMC). In addition, the ANF provides station command and control, verification and distribution of metadata, with remotely accessible world wide web interfaces for Array Operations Facility (AOF) personnel to access network and station state of health information; and quality control for all seismic data. To date, 850+ stations have been deployed with Quanterra Q330 dataloggers and Streckeisen STS-2, Guralp CMG3T, or Nanometrics Trillium 240 broadband sensors. Data return rates average above 98% through the Antelope Real Time System.

As part of the TA operational procedures, a white noise calibration of at least 2 hours is performed at each after each site is certified and before each site is removed using the standard 40 sps data streams. Calibrations are also performed immediately before and after sensor or datalogger swaps. Results from these calibrations are remarkably consistent within each sensor type and match the expected response curves in normalized amplitude and phase quite well for the frequency range of 1 mHz to 16 Hz. Encouraged by these results, a special calibration of the TA was conducted by collecting an additional 200 sps 3 channel data stream for a week in August 2009. The TA network data return for the 200 sps calibration run was 98.7%. Using these new data, calibration response results for all sensors for the frequency range of 0.2 mHz to 80 Hz. gave remarkably good results.

Since the initiation of the TA in 2004, analysts have reviewed over 2.75 million automatically generated arrivals for >45,000 local, regional, and teleseismic events. As part of the TA operations, a Richter Ml is calculated for each event observed inside the footprint of the TA. Taking advantage of the consistent and well calibrated TA equipment, we present comparisons of local magnitudes published by each regional network to the standard Ml estimates provided by the TA. The results show in some cases that the TA Ml results are biased when compared to the authoritative regional networks published magnitudes. The observed biases can be caused by the regional networks using different magnitude estimators, different stations, station corrections, path corrections, and/or regional geological settings.