The GSN Data Quality Initiative

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The Global Seismographic Network (GSN) is undertaking a renewed effort to assess and assure data quality that builds upon completion of the major installation phase of the GSN and recent funding to recapitalize most of the network's equipment including data acquisition systems, ancillary equipment and secondary sensors. We highlight here work by the network operators, the USGS' Albuquerque Seismological Lab and UCSD's Project IDA, to ensure that both the quality of the waveforms collected is maximized, that the published metadata accurately reflect the instrument response of the data acquisitions systems, and that data users are informed of the status of the GSN data quality.

Procedures to evaluate waveform quality blend tools made available through the IRIS DMC's Quality Analysis Control Kit (http://www.iris.washington.edu/QUACK/), analysis results provided by the Lamont Waveform Quality Center (www.ldeo.columbia.edu/~ekstrom/Projects/WQC.html), and custom software developed by each of the operators to identify and track known hardware failure modes. Each operator's equipment upgrade schedule is updated periodically to address sensors identified as failing or problematic and for which replacements are available. Particular attention is also paid to monitoring the GPS clock signal to guarantee that the data are timed properly.

Devices based on GPS technology unavailable when the GSN began 25 years ago are being integrated into operations to verify sensor orientations. Portable, broadband seismometers whose stable response can be verified in the laboratory are now co-located with GSN sensors during field visits to verify the existing GSN sensors' sensitivity. Additional effort is being made to analyze past calibration signals and to check the system response functions of the secondary broadband sensors at GSN sites. The new generation of data acquisition systems will enable relative calibrations to be performed more frequently than was possible in the past.

Additional details of this effort can be found at the GSN Quality webpage (www.iris.edu/hq/programs/gsn/quality).