Ongoing Modernization of Global Seismographic Network (GSN) Stations

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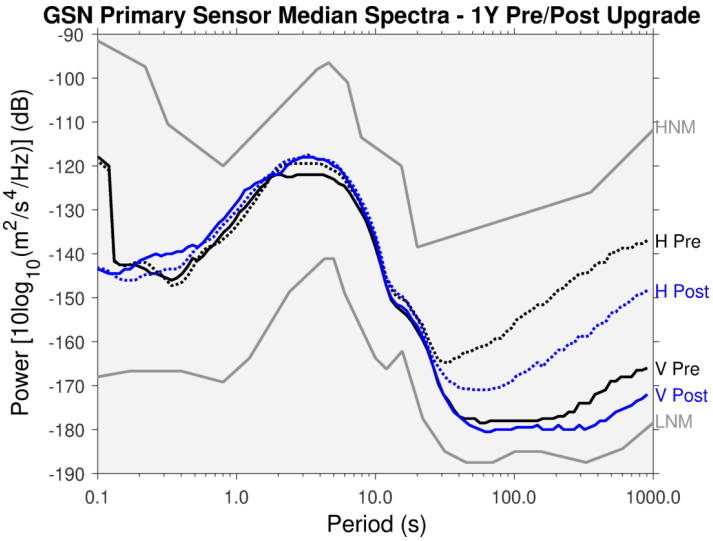
With renewed NSF and USGS funding and new primary VBB borehole seismometers available to replace aging sensors, the Global Seismographic Network is poised to enter a period of improved reliability and data quality. The GSN has begun deploying the next generation VBB borehole seismometers to replace the aging KS54000 and some poorly performing STS-1 sensors over the last two years. Considerable effort has also been made to address problems with deteriorating infrastructure that suppressed data return and increased background noise. This includes adopting new borehole sensor installation techniques that maximize the performance of seismic instruments deployed at GSN sites. The new seismometers have improved self-noise characteristics and broader bandwidth than the generation of sensor they are replacing. We will show the performance at the newly upgraded stations.



Comparison of the median spectral power for the vertical and horizontal components at upgraded GSN stations extracted from the probability density function of power spectral density calculated by MUSTANG (http://services.iris.edu/mustang/noise-psd/1/). For periods >14 sec., PSDs were derived from the LH channel and calculated from a 3 hour window; for periods <14 sec., derived from the BH/HH channel using a 1 hour window. The median of these was then computed for comparisons.

The GSN is also diversifying the instruments sited at the stations to expand the variety of geophysical data collected and make GSN seismic stations platforms for geophysical observatories. These instruments include meteorological stations and infrasound sensors intended to augment the infrasound network already deployed as part of the CTBTO's International Monitoring System and the IRIS Transportable Array. A variety of pressure sensors have also been deployed for a number of years.