Site Characteristics of USGS Global Seismographic Network Stations in the Caribbean Region

Daniel E. McNamara, Jean Weaver*, and Lind Gee USGS Global Seismographic Network *USGS Office of International Programs

The USGS operates 12 permanent, real-time broadband seismic monitoring stations in the Caribbean as a part of the Global Seismographic Network (GSN). Nine stations were recently installed (2005-2007) as the USGS Caribbean network (network code: CU) in response to the MW 9.15 Sumatra-Andaman Islands earthquake of 26 December 2004. Three additional permanent real-time broadband seismic monitoring stations have been operating in the Caribbean for nearly 20 years (network code: IU).
Instrumentation at IU and CU network stations consists of both weak-motion velocity seismometers, and strong-motion accelerometers to enable recording a broad band of periods (0.02 – 1000s, 0.001 - 50Hz) and a wide dynamic range of ground motion.

In general, seismic stations located on islands and near-coasts exhibit very high noise levels across a broad band of periods. The broadband ambient seismic noise spectrum is multi-modal with distinctly different physical mechanisms transferring cultural and water-wave energy to seismic waves in the solid Earth. At short periods (0.01 – 1 s) ambient noise levels are generally dominated by human-generated ("cultural") seismic energy radiated from the electrical grid, cars, trains, and machinery within a few kilometers of the recording station. Intermediate periods (2 – 20 s), especially at island and near-coastal stations, are dominated by microseisms, which can be many orders of magnitude higher in power than other parts of the seismic spectrum. Long-period (50 – 600 s) signals are generally caused by ocean infragravity waves generated by storm-forced shoreward-propagating swells interacting with continental coastlines. These oceanic waves are commonly referred to as the "hum" of the Earth. In addition, we will show several examples of site-specific noise due to local sources.

Overall, we find that these stations provide improved earthquake and tsunami monitoring in the region as well as expanding data available for research. In this presentation we will provide detailed site descriptions for each of the 12 USGS GSN stations that includes: communications, power, site dimensions, geology, access issues, partners and seismic noise characteristics. Some of these sites may be possible locations for co-located GPS equipment as part of COCONet.