

The Jamaica Seismograph Network (JSN)

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The Jamaica Seismograph Network (JSN) has twelve short-period stations that are linked by UHF telemetry to a Central Recording Station (Figure 1, Table 1). Four stations have three-component sensors and eight have just single vertical-component sensors. In addition there is one low-gain station that brings the number of real-time data channels to twenty-one. Throughout the network Mark Products L4 1-Hertz seismometers and Geotech standard analogue VCO, amplifier-modulator and discriminator electronic assemblages are used. Station outputs are transmitted continuously to the Central Recording Station where they are digitized using 16-bit analogue-to-digital converters, then recorded and time-stamped by GPS synchronised timing. This basic configuration has existed since 1997 when the JSN consisted of just eight vertical single-component stations.

Currently, two different computer-based systems are used to sample, record and analyse the data. Both operate on the basis of the STA/LTA trigger. One is the Seismic Data Acquisition (PC-SDA) and Processing (PC-SDP) system (1997 versions) that was developed by the then Geophysical Institute of Israel (GII). The other is the SEISLOG and SEISAN system that was developed by the University of Bergen (UiB). The PC-SDA and SDP systems have been in use since 1997 and are now being phased out to be replaced by SEISLOG and SEISAN that offer more flexibility both in data acquisition and analysis. The PC-SDA uses a National Instruments AMUX-64T digitizer operating at 50 samples-per-second which is now out-of-date whereas SEISLOG uses a SARA 32-channel digitizer set at 100 samples-per-second. SEISLOG can be used with a variety of other digitizers and sample rates. The PC-SDP only accepts data from the PC-SDA which must be copied and demultiplexed before any analysis can be done, whereas SEISLOG writes declared events directly into the SEISAN database for immediate analysis. SEISAN can utilize most types of data. The JSN also have deployed eight digital strong motion instruments – seven Kinometrics Etna and one K-2 (Figure 1) and own a number of portable instruments including one Guralp 3-component broad-band sensor with 24-bit digitizer, one Nanometrics ORION 3-component 24-bit recorder and six Geosig GBV-x16 3-component seismographs.

A number of developments to the JSN are envisaged in the near future with the aim of increasing the dynamic range of the stations and reducing cultural noise contamination. Among them will be improving the housing of the stations, and replacing the analogue telemetry and central digitization of signals with digitization at the stations and some form of digital data transfer, to preserve in part the real-time availability of data at the data centre. To date, five stations have isolated piers - the goal is to have isolated piers or vaults for all permanent stations and strong motion recorders. The details of the digital telemetry system are being planned as a number of options are available. One Global Seismograph Network (GSN) Very Broad Band six-component station is also being planned for Jamaica courtesy of the United States Geological Survey. This station MTDJ is intended for Mount Denham near the centre of the island and will be one of nine such stations installed in Caribbean territories for the purpose of establishing a tsunami early warning system, CTWS.

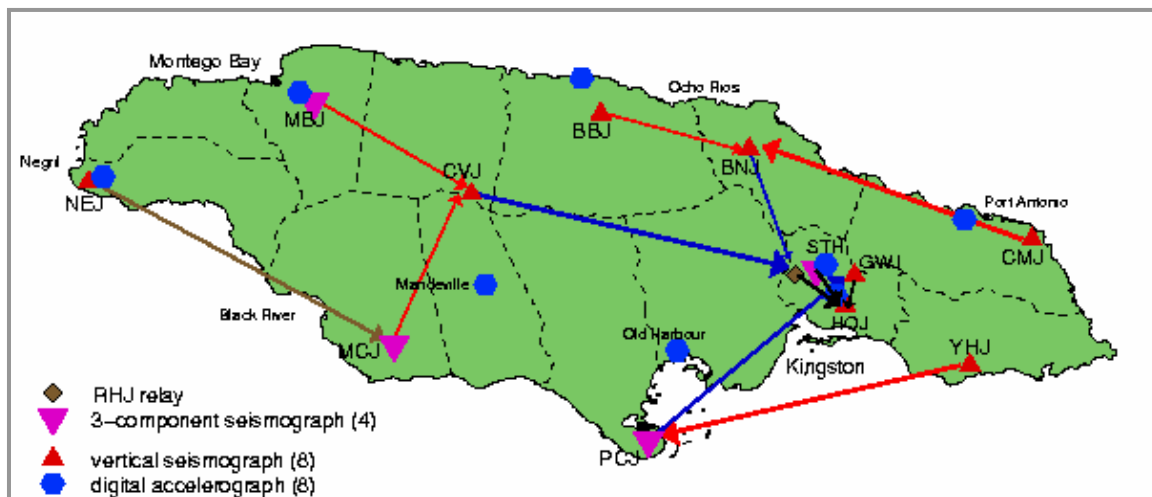


Figure 1. Jamaica Seismograph Network

Code	Station Name	Latitude (degrees)	Longitude (degrees)	Elevation (metres)	Remarks
BBJ	Bamboo, St. Ann	18.387	- 77.262	766	Z
BNJ	Bonny Gate, St. Mary	18.321	- 76.951	485	Z est. 1998/01
CMJ	Castle Mountain, Portland	18.135	-76.361	391	Z est 1998/02
CVJ	Coleyville, Manchester	18.226	-77.535	986	Z est. 2001/04
GWJ	Greenwich, St. Andrew	18.074	-76.728	1170	Z
HOJ	Hope (Mona) St. Andrew	18.005	-76.749	228	Z
MBJ	Montego Bay, St. James	18.405	-77.863	513	Z, N, E
MCJ	Munroe College, St. Elizabeth	17.925	-77.686	661	Z, N, E
NEJ	Negril, Westmorland	18.251	-78.330	200	Z est. 2002/04
PCJ	Portland Cottage, Clarendon	17.741	-77.157	198	Z, N, E
STH	Stony Hill, St. Andrew	18.077	-76.810	504	Z, N, E + Low Gain
YHJ	Yallahs Hill, St. Thomas	17.892	-76.493	600	Z

Table 1. Jamaica Seismograph Stations

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