EARTHQUAKE UNIT

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INTRODUCTION

The Earthquake Unit (EQU) is a research unit in the Department of Geography and Geology that is funded directly by the Government of Jamaica (GOJ) as the sole agency responsible for the monitoring of earthquakes and research in seismic hazards in Jamaica. The EQU budget is supported by the Government of Jamaica with allocations through the Ministry of Science Technology Energy and Mining (MSTEM). The EQU acts as a Data Centre for the Comprehensive Test Ban Treaty Organization (CTBTO) and contributes data to the upcoming Caribbean Tsunami Warning Network in conjunction with the United States Geological Survey (USGS).

WORK OF THE UNIT

The Earthquake Unit (EQU) at the University of the West Indies continues to operate the Jamaica Seismograph Network (JSN), Jamaica

Strong Motion Accelerograph Network (JSMAN) and GPS Network, along with operating the USGS-GSN broadband digital station at Mount Denham in Manchester. The EQU is also Jamaica's National Data Centre (NDC_JM) for the Preparatory Commission for Nuclear Test Ban Treaty Organisation (CTBTO), where we operate equipment to access Seismic data, Hydro-acoustic data, Infrasound data and Radionuclide data from over 337 stations around the world.

For the year August 1, 2017 to July 31, 2018, we continued the process of upgrading the Jamaica Seismograph Network and expanding and upgrading the Accelerograph Network across the island. The Jamaica Social Investment Fund, through funding from the World Bank Seismic Support Program, handled the procurement of equipment and civil works. The Civil work included the construction of five seismometer vaults at Negril Seismograph Station in Westmoreland, Pike Seismograph Station in Manchester, Greenwich Seismograph station in St. Andrew, Castle Mountain Seismograph Station in Portland, and the Montego Bay Seismograph station at Kempshot in St. James. Repair work was carried out on the Bonny Gate vault in St. Mary. the Jamaica Seismograph Network now consists of 13 stations.

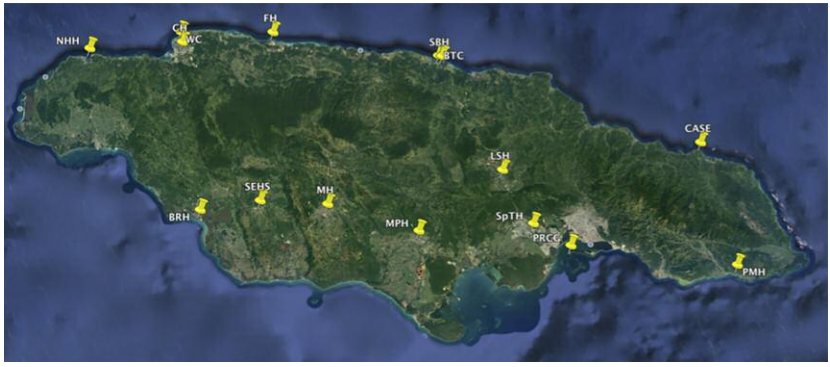

Figure 1. The Jamaica Seismograph Network

Fifteen (15) concrete bases were built across the island, at selected hospitals and schools, to accommodate the fiberglass housing for the new free-field accelerograph stations (Figure 2); fiberglass houses were built

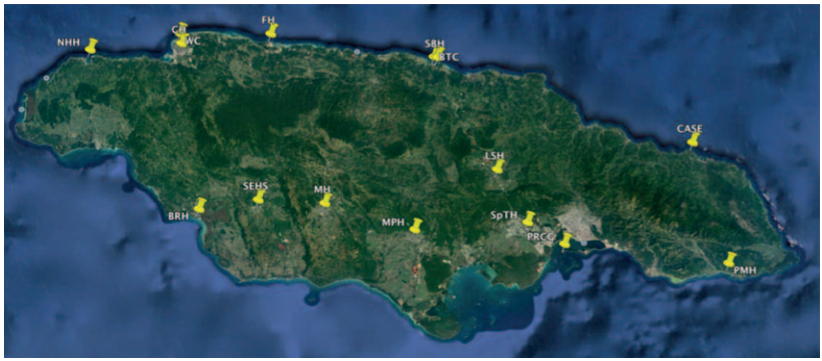

Figure 2. New free-field accelerograph stations

and installed on the bases. Pole mounts were installed at all of these locations, with the exception of the Mandeville hospital, and another six pole mounts installed at six of our seismograph stations; the stations are, Negril, Castle Mountain, Portland Cottage, Bonny Gate, Pike and Kempshot. Most of the free-field accelerograph stations were fenced.

Solar power was installed for the fifteen (15) accelerograph free-field stations, and another fifteen (15) for the accelerograph that were mounted on buildings. The solar panels were mounted on the pole-mount for the free-field stations, and roof mounted for the building installation.

A new building was constructed for the new seismograph station at Mount Edgecombe in Westmoreland: this was a 10 feet by 10 feet building, with a slab roof to accommodate the installation of two solar panels. A seismometer pier was also constructed in the building for the sensors.

The decision was made to purchase Guralp seismic equipment, and as such, ten (10) Guralp CMG-3ESPC seismometers, thirty (30) Fortis 5TC accelerograph and forty (40) 6 channel DM24-DAMU digitizers were purchased from Guralp Instruments in the United Kingdom. Digital communication equipment with fifty (50) Ubiquiti radios and twenty-two (22) Freewave 900MHz radios with antennas and coaxial cables, were also purchased.

The following upgrades were made at the Central Recording Station: (1) The upgrading of the Solar Power System at the Earthquake Unit's CRS was completed, with the installation of twelve (12) 315 watt solar panels, twenty four (24) S605 Rolls 468Ah 6 volts Deep Cycle Batteries, one (1) 6800 watts Xantrex inverter and a Schneider 60Amps Charge Controller; (2) The data acquisition and processing room was vastly improved, with the addition of eight (8) 40 inch Samsung monitors received; (3) A new 30 foot communication tower with grounding and lightning protection was installed on the roof of the Earthquake Unit; (4) A new server and NAS was acquired and installed.

CTBTO (Jamaica National Data Centre)

Throughout the year, the communication equipment for the Preparatory Commission for Nuclear Test-Ban Treaty Organisation's (CTBTO) Global Communication Infrastructure (GCI) at the Earthquake Unit, was upgraded; this also houses the Jamaica National Data Centre for the CTBTO. Two Engineers from the CTBTO visited the Earthquake Unit, to complete installation of new software, and to train staff at the Earthquake Unit. The work completed during their visits included: Maintenance of the Capacity Building (CBS) System; Installation of the last release of NDC in a Box; Repair of the CBS Servers; Installation of CENTOS; Installation of SEISCOMP3; Training of Staff at the Earthquake Unit and ensured that NDC staff can access IMS data and IDC products.

EARTHQUAKES RECORDED

The JSN recorded 74 local events (Table 1) for the period from August 2017 to July 2018, slightly less than in the previous year when 89 were recorded.

The largest 'cluster' of earthquakes was located to the north-east of Kingston in the south-western Blue Mountains Block/Wagwater Belt, which is the main subarea for earthquakes in Jamaica. Scattered earthquakes also occurred elsewhere but there were no other clusters (Figures 3).

Table 1: Events recorded by the Central Recording Station at the EQU from August 2017 to July 2018; of the 74 local events recorded, seven were felt.

EARTHQUAKE EVENT SUMMARY AUGUST 2017 to JULY 2018

Year	Month	Located Events		Total	Recorded Events					Total	Felt
		Local	Near	located	Local	Near	Regional	Distant	Blasts	recorded	Events
2017	Aug	2	9	11	2	9	4	0	1	*16*	0
2017	Sep	7	6	13	7	6	13	0	2	*28*	1
2017	Oct	3	6	9	3	6	3	0	0	*12*	0
2017	Nov	7	5	12	7	5	2	0	1	*15*	0
2017	Dec	5	6	11	5	6	1	0	0	*12*	0
2018	Jan	11	7	18	11	7	13	0	3	*34*	0
2018	Feb	5	4	9	5	4	4	0	0	*13*	2
2018	Mar	6	3	9	6	3	0	0	1	*10*	3
2018	April	7	3	10	7	3	7	0	1	*18*	0
2018	May	6	5	11	6	5	2	0	3	*16*	0
2018	Jun	10	0	10	10	0	3	0	0	*13*	1
2018	Jul	5	4	9	5	4	2	0	2	*13*	0
ALL	Totals	74	58	132	74	58	54	0	14	*200*	7

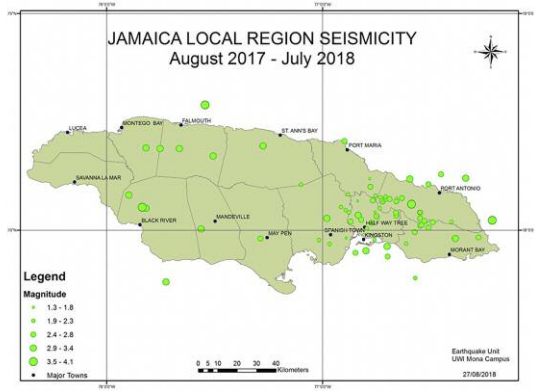

Figure 3. Earthquakes in Jamaica from August 2017 to July 2018.

The total number of events processed by the Jamaica Seismic Network was 200, which included: 74 local events, 58 near events, 54 regional events, and 14 blasts (Table 1).

COMMUNITY SERVICE

The Earthquake Unit works in close collaboration with ODPEM and the Jamaica Institution of Engineers in disseminating the findings of research. The EQU also provides information/advice that is of national significance to both institutions.