

EARTHQUAKE UNIT



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Acting Head of Unit

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 budgetary allocation to the EQU by the GOJ during this financial year amounted to J\$29,995 million. 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

Dr Lyndon Brown resigned as Head of the Earthquake Unit (EQU) at the end of November, 2013, and Professor Simon F. Mitchell became Acting Head.

January was a very busy month for the EQU with many initiatives and Earthquake Awareness Week taking place. The Seismic Risk Forum, a conference organized by UNDP and ODPEM at the Jamaica Conference Centre, was held from the 8th to 9th of January, 2014, with the aim to raise awareness among decision makers on seismic risk in Jamaica and to seek commitment to develop a seismic roadmap and action plan for Jamaica. The EQU was involved with the launch of Earthquake Awareness Week on the 13th of January, 2014. The theme this year was “Earthquake Safety: Know your vulnerability to improve your capacity”. The EQU presented a report on earthquake activity for 2013 and highlighted the unit’s thrust to expand the Jamaica Strong Motion Network. As part of Earthquake Awareness Week, the EQU was also involved with the Portmore Municipal Council in association with ODPEM in a Safe School Forum relating to earthquake risk for principals and teachers of schools in the Portmore community on the 14th of January, 2014. The main objective was to empower school principals and senior teachers by increasing their awareness of earthquake risk and what can be done to mitigate or prepare for these risks.

February saw the EQU manning its exhibit at the annual UWI Research Days, where posters were displayed and brochures were handed out. As usual, great interest was expressed by visitors to the seismic demonstration.

March saw three major activities. The South-South Cooperation Seminar, run from the 12th to 14th of March sought to develop further cooperation in disaster preparedness and management between Argentina and the Caribbean region. During the seminar experiences were shared and the workshop ended with a brainstorming session to see what areas would be best for developing projects and organizing capacity building training between the region and Argentina. Caribe Wave 2014 saw a tsunami simulation exercise organized for Caribbean states. Participants from

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Jamaica included the ODPEM, the Met Office and the EQU. There were two scenarios this year, a submarine slide in the Gulf of Mexico and a magnitude 8.2 earthquake off the Portuguese coast. On the 27th of March, the EQU was invited to the Tourism Emergency Management Committee's workshop at the Knutsford Court Hotel, where a presentation was made and a display was manned. The objective of the workshop was to sensitize and empower committee members and to develop strategies and plans within the tourism sector in preparation of a major earthquake.

On the 28th of June, 2014, the EQU was involved with the annual disaster preparedness activity at the start of the June-November hurricane season at the Portmore Mall as part of the ODPEM Disaster Preparedness Expo.

During the year the EQU in collaboration with the ODPEM sought funding for seismic risk initiatives and institution strengthening for Jamaica. Meetings were held with the Japan International Cooperation Agency (JICA), a Chile-Spain Cooperative Agreement (for technical support) and the World Bank to develop funding initiatives. These discussions are continuing into the next reporting period.

The EQU currently operates the Jamaica Seismograph Network (JSN) which consists of 12 analog short-period seismograph stations installed across the island (Figure 1) and four broadband seismographs. The fourth digital broadband seismograph station was funded from the 2012–2013 budget and arrived in the island from the manufacturer (GURALP) in March 2014. This station was installed at Castle Mountain in Portland.

The EQU is now using Seiscomp3 software for earthquake data analysis solutions which produces preliminary solutions which can provide real-time bulletins to relevant persons/agencies and the media. The solution can be subsequently rechecked by the seismic analyst and a revised bulletin provided (as is done on large networks elsewhere) if necessary. At present this is operating in a testing phase.

There is an ongoing push by the EQU to expand the Jamaican Strong Motion Accelerograph Network across the island. Accelerographs detect

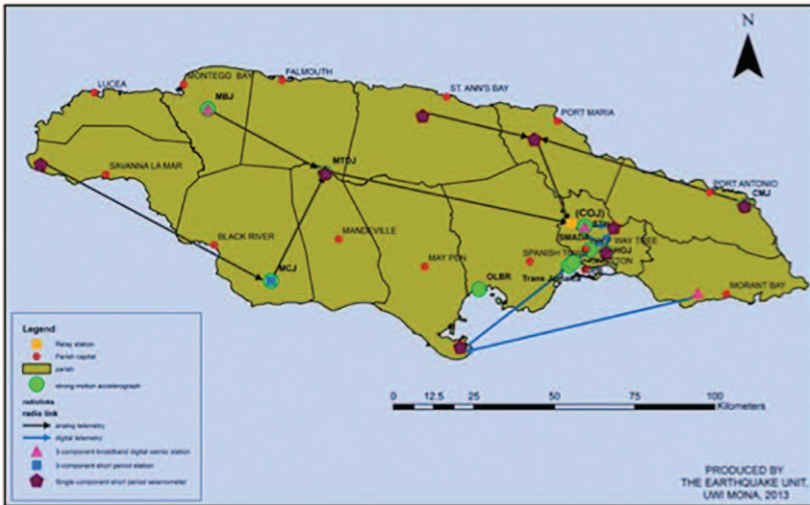


Figure 1: Locations of seismic stations that form the Jamaica Seismograph Network (JSN).

ground shaking for larger earthquakes and monitor structures with the aim of improving building design, so as to locate critical facilities in safer areas, and to provide parameters to be used in constructing and retrofitting important structures. Two accelerographs were acquired through a collaborative proposal with the Seismic Research Centre (SRC), St Augustine, Trinidad, to the Caribbean Catastrophe Risk Insurance Facility (CCRIF) and one unit has been installed at the Kingston Container Terminal and one unit on Long Mountain. Six accelerographs were purchased with funds received from the ODPEM and local government in the 2013–2014 reporting period and these are expected to arrive on the island shortly. Two of these units will be placed in the ODPEM headquarters building, two at the Kingston Public Hospital, and two at the Portmore HEART Academy. This will bring the network up to 16 stations. During the upcoming year the EQU hopes to extend this network with equipment being installed in at least five more towns.

The Jamaican GPS network to monitor plate and fault movements has received attention in the reporting period. The United States funded University Consortium (UNAVCO) worked with the EQU with help

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from the JDF Coast Guard and the Port Authority of Jamaica in September 2013 for maintenance of the GPS sites on Morant Cay and San Pedro Cay. At Morant Cay, a faulty communication system was repaired and at San Pedro Cay, the station was made more hurricane and corrosion resistant.

OUTREACH ACTIVITIES

A total of 22 schools visited the EQU during the 2013–2014 reporting period, with totals of 911 students and 55 teachers. The Seismic Analyst and Education Officer provided presentations to the visitors detailing the operation of the Earthquake Unit and also information on Jamaica’s seismic activity and earthquake awareness.

EARTHQUAKES RECORDED

The JSN recorded a lower number of events (68) for the period from August 2013 to July 2014 than in the previous year (101), which is a drop of 32.7%. There was also a drop in the number of felt events from 13 in 2012–2013 to 8 in 2013–2014 (Table 1).

Year	Month	Located Events		Total located	Recorded Events					Total recorded	Felt Events
		Local	Near		Local	Near	Regional	Distant	Blasts		
2013	Aug	4	2	6	4	2	8	0	0	14	1
2013	Sep	7	4	11	7	4	6	0	0	17	3
2013	Oct	6	3	9	6	3	6	0	0	15	2
2013	Nov	4	7	11	4	7	5	0	0	16	0
2013	Dec	4	2	6	4	2	5	0	1	12	0
2013	Jan	4	4	8	4	4	4	0	2	14	0
2013	Feb	4	4	8	4	4	3	0	1	12	0
2013	Mar	8	7	15	8	7	14	0	0	29	1
2013	April	8	3	11	8	3	10	0	0	21	0
2013	May	4	1	5	4	1	9	0	2	16	1
2013	Jun	8	5	13	8	5	7	0	2	22	0
2013	Jul	7	2	9	7	2	4	0	2	15	0
ALL	Totals	68	44	112	68	44	81	0	10	203	8

Table 1: Events recorded by the Central Recording Station at the EQU from August 2013 to July 2014; of the 68 local events recorded, eight were felt.

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. Earthquakes also occurred along the course of the Cavaliers and Rio Mino fault zones as well as along the Newmarket-Monteplier Belt (Figures 2 & 3). A single felt event was also recorded offshore of the parish of Hanover in western Jamaica (Figure 3).

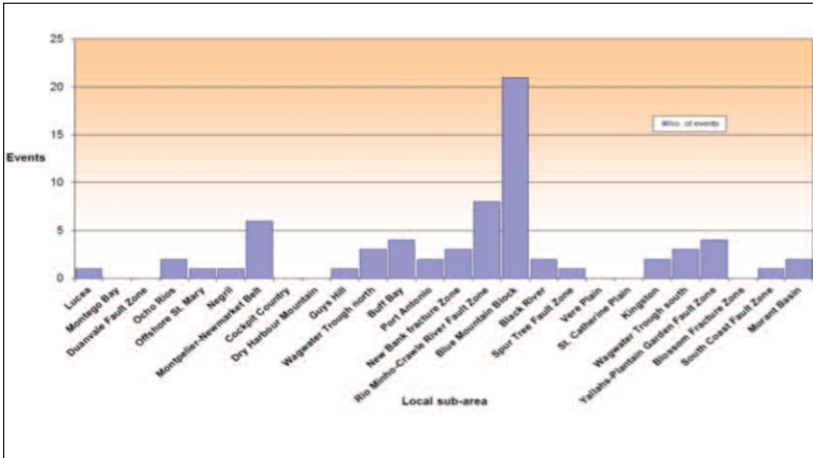


Figure 2. Breakdown of earthquakes by subregion for the period from August 2013–July 2014.

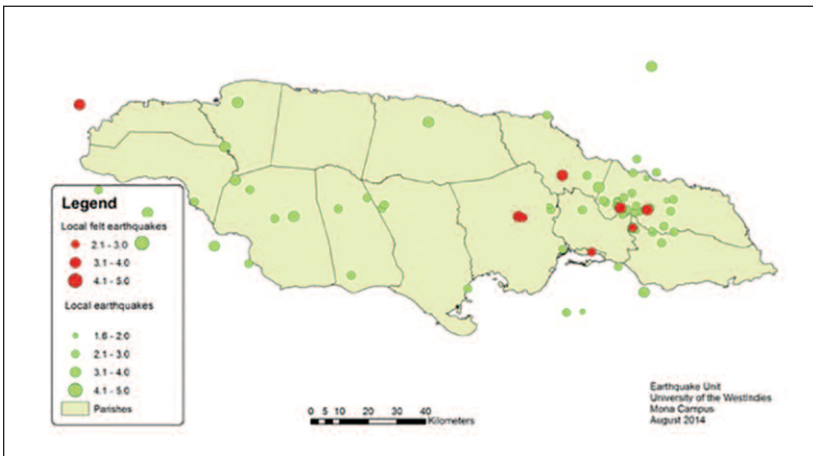


Figure 3. Earthquakes in Jamaica from August 2013 to July 2014; felt earthquakes shown in red.

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The total number of event processed by the Jamaica Seismic Network was 203, which included: 68 local events, 44 near events, 81 regional events, and 10 blasts (Table 1).

PRESENTATIONS

Simon Mitchell (Professor/Head)

- (with L. Brown) “Jamaica: the northern Caribbean plate boundary and earthquake risk” Seismic risk forum, a conference organized by UNDP and ODPEM, Jamaica Conference Centre, 8th–9th January 2014, Kingston, Jamaica.
- (with L. Brown) “Research into earthquakes and tsunamis, UWI, Jamaica” Seismic risk workshop, ODPEM, 10th January 2014, New Kingston, Jamaica.
- (with L. Brown) “Research and teaching earthquakes and tsunamis, UWI Mona, Jamaica” Project Development workshop, CDEMA, January 15, 2014, CDEMA, Bridgetown, Barbados.
- “Jamaica: vulnerability to earthquakes” Earthquake Awareness Workshop, ODPEM and Ministry of Tourism and Entertainment, Thursday, March 27, 2014, Knutsford Court Hotel, Kingston, Jamaica.

Karlene Black (Education Officer)

- “Annual Summary of Operations at the Earthquake Unit, University of the West Indies” Earthquake Awareness Week, ODPEM Press Conference/Launch, ODPEM Head Office, Haining Road, Kingston, January 13, 2014.
- “Earthquake Risk: Implications for Portmore School Community” Portmore Municipal Council: Safe Schools Forum, Cumberland Community Centre, Portmore, January 14, 2014.
- “Jamaica’s Vulnerability to Seismic Activity” Disaster Management Regional Seminar, South-South Cooperation Seminar, ODPEM Head Office, Haining Road, Kingston, March, 14, 2014.

TRAINING AND PERSONAL DEVELOPMENT

Ms. Karleen Black

- “Training in the Development of Tsunami Flood Charts”SHOA (Servico Hydrographico y Oceanographico de la Armada de Chile), Chilean Navy, 28th July to 1st August 2014, Valparaiso, Chile.

Mr. Paul Williams

- “Management of metadata and time series data for seismological networks” Incorporated Research Institution for Seismology (IRIS), July 2014, Bogota, Colombia.

Mr. Paul Coleman

- “Access and Analysis of IMS Data and IDC Products under EU JA V” Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty (CTBTO) Regional Training Course on NDC Capacity Building, June 23–27, 2014, Bucharest, Romania.
- “Access and Application of IMS Waveform Data and IDC Products” The Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty (CTBTO) E-Learning Training Course on NDC Capacity Building – Online.
- “Earthworm for seismic processing” Instrumental Software Technologies Inc. (ISTI), June 1–7, 2014, Saratoga Springs, New York.
- “Management of metadata and time series data for seismological networks” Incorporated Research Institution for Seismology (IRIS), July 2014, Bogota, Colombia.

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.