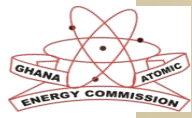


Earthquake Safety: An Important Contribution of CTBT Seismic Monitoring Data

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Abstract

The CTBT provides a robust monitoring and verification regime for the ban on nuclear test explosions established by the United Nations Member States. The Treaty employs four global monitoring technologies namely seismic, hydroacoustic, infrasound and radionuclide to monitor and detect any signs of nuclear explosions anywhere on the planet. Provisional Technical Secretariat (PTS) data and products generated from the monitoring system have additional non-verification-related applications in civil, scientific and industrial uses. Seismic monitoring data is one of such beneficial service the CTBT offers to its State Signatories for public good application in the area of earthquake hazard assessment for Ghana. NDC-Ghana regularly accesses and compiles seismic events data registered on the seismo-acoustic networks of IMS for the country, since earthquakes are one of the natural seismic signals regularly detected. This data in addition to the national earthquake monitoring means will be used to update and identify seismically prone areas of the country. Creating public knowledge about earthquake prone areas and the level of vulnerability to lives and properties in an earthquake event is key in earthquake safety planning.

Introduction

The Comprehensive Nuclear-Test-Ban (CTBT) provides a robust monitoring and verification regime for the ban on nuclear test explosions *adopted* by the United Nations member states. It is aimed at monitoring the compliance to the *nuclear test ban* anywhere around the world for military or peaceful purposes. Thus, the CTBT is intended to serve as a nuclear arms controlling measure to prevent proliferation. The Treaty applies its four global monitoring technologies namely seismic, hydroacoustic, infrasound and radionuclide to monitor and detect any signs of nuclear explosions anywhere on the planet. Provisional Technical Secretariat (PTS) data and products generated from the monitoring system have additional non-verification-related applications in solving the civil, scientific and industrial needs of society [1].

Earthquake activities in Ghana

Ghana is seismically located in a relatively stable tectonic plate and further from any major continental plate boundary. However, the country's seismicity has been described as moderately active with few intra-plate faults predominantly located along the southern part of the country [2, 3, 4]. The country has historically recorded some major destructive earthquake events leading to casualties and loss of properties during the pre-colonial era. Whereas the post independent seismic activities have recorded generally earth tremors of magnitudes 3.8 – 4.8 [5]. From the above seismic background of the country that the NDC-Ghana deems it important to access and monitor the seismic events recorded in the country from the CTBT monitoring system. This is for the purpose of compilation of seismic catalogue.

CTBT and the Seismic Monitoring Network

The CTBT uses a globally distributed network of monitoring system comprising of seismic, hydroacoustic, infrasound and radionuclide, primarily for nuclear test monitoring in all environments (underground, underwater, atmosphere, and space). The seismic monitoring network (both primary and auxiliary) is deployed strategically to monitor and detect shock waves underground. This network detects seismic signals generated from natural or human-induced explosion sources. Earthquakes are one of the natural seismic signals regularly detected and registered on the seismo-acoustic network of the IMS. The Africa region host a number of the CTBT monitoring facilities. Of the 21 planned total seismic monitoring facilities to be located on the African territory, 17 of them are certified and sending data. The CTBTO makes the monitoring data available to all State Signatories including Ghana, and is accessible through the authorized technical body such as NDC-Ghana.

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Contribution to Earthquake Safety: CTBT Seismic Monitoring Data Availability

The seismic monitoring data in addition to existing data will be used to update and identify seismically prone areas of the country. The Centre uses its public sensitization programmes to create public knowledge about the dangers posed by earthquakes and the need for effective earthquake safety measures to be observed to save lives and properties. This can be achieved through creating public understanding of the need and benefit of engineering and reinforcing their building structures in earthquake prone areas. It is in fulfilling the United Nations Sustainable Development Goal # nine (9), aimed at building a resilient infrastructure.

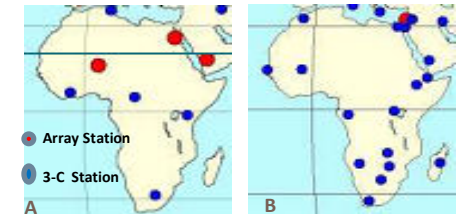


Fig. 1 IMS Primary (A) and Auxiliary (B) Seismic network in Africa

Conclusion

NDC-Ghana accesses and compiles seismic events data registered on the seismo-acoustic network of the IMS for the country, since earthquake signals are part of the events regularly detected. This data together with that from national earthquake monitoring means will be used to update and identify seismically prone areas of the country. Creating public knowledge about earthquake prone areas and the level of vulnerability to lives and properties in an earthquake event is key in earthquake safety planning. Hence, seismic monitoring data is one of the beneficial services the CTBT offers to its State Signatory, Ghana for public good application.