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The present technology and future challenges of the seismic monitoring used in the International Monitoring System (IMS), CTBT

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INTRODUCTION AND MAIN RESULTS

Since the start of the nuclear era, global efforts have aimed to reduce risks from nuclear weapons and testing. Environmental concerns from atmospheric nuclear tests and the arms race spurred early test limitations. Distinguishing earthquakes from explosions remains vital. For example, a magnitude 6.3 event on Sept 3, 2017, was detected. IMS stations now detect and located nuclear blasts down to mb = 4.0 (~1 kt), as well as earthquake aftershocks.

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8 SEPTEMBER ONLINE DAY
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Introduction

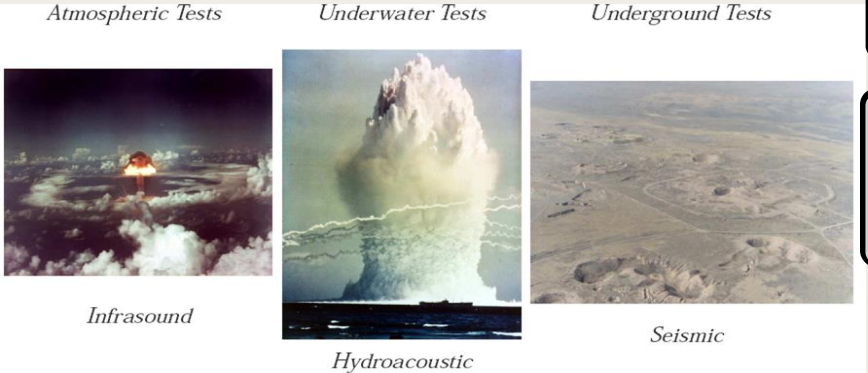
❑ Since the beginning of the nuclear era, the international community has debated proposals to reduce the risks posed by the existence of nuclear weapons and their proliferation. The environmental hazards of nuclear test explosions in the atmosphere, added to the dangers inherent in the nuclear arms competition, led to early initiatives designed to limit nuclear testing research.

❑ The IMS is a global network of 337 facilities conceived to detect signals generated by nuclear explosion with a yield greater than one kiloton anywhere on the planet: underground, underwater and in the atmosphere.

❑Seismic signals and earth structure: Today, seismology continues to provide significant information on crust motion and on Earth deepest

1- Tsunami warning service.

2- The global seismological network and earthquake mitigation

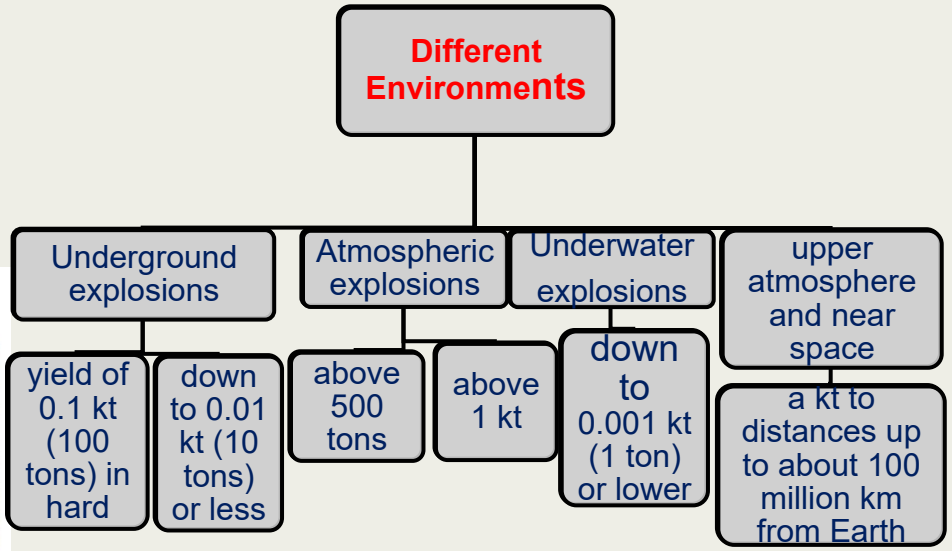


Methods/Data

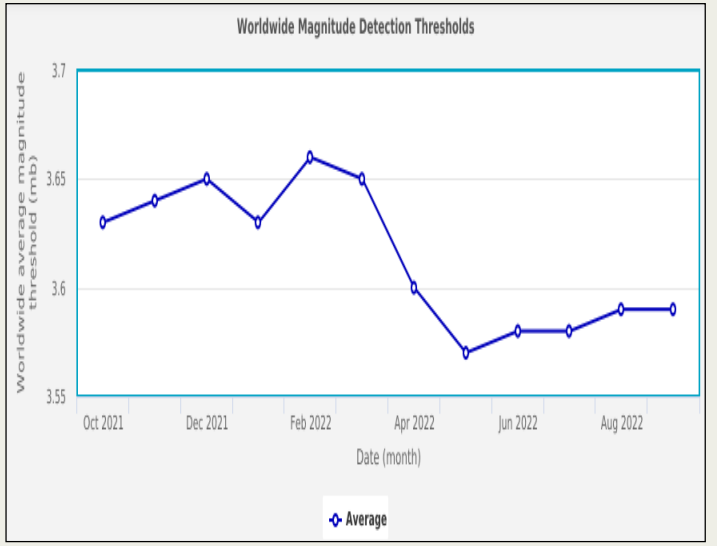
1- The purpose of this article is to assess the present technology and future challenges of the seismic monitoring used in the International Monitoring System (IMS), CTBT.

2- the process of data reviewing and screening that takes place at the International Data Centre (IDC) is analyzed.

3- Finally we mentioned the future challenge which facing the seismic technology in IMS.



Results



❑**The regular costs of each auxiliary seismic station**, including the cost of physical security, are the responsibilities of the State hosting it. However, practice has shown that this constitutes a significant challenge for **auxiliary seismic stations in developing countries** that do not belong to a parent network with an established maintenance programme.

❑**Large earthquakes** are often followed by **aftershock sequences**, which may contain hundreds or even thousands of additional events capable of being detected by the IMS and located.

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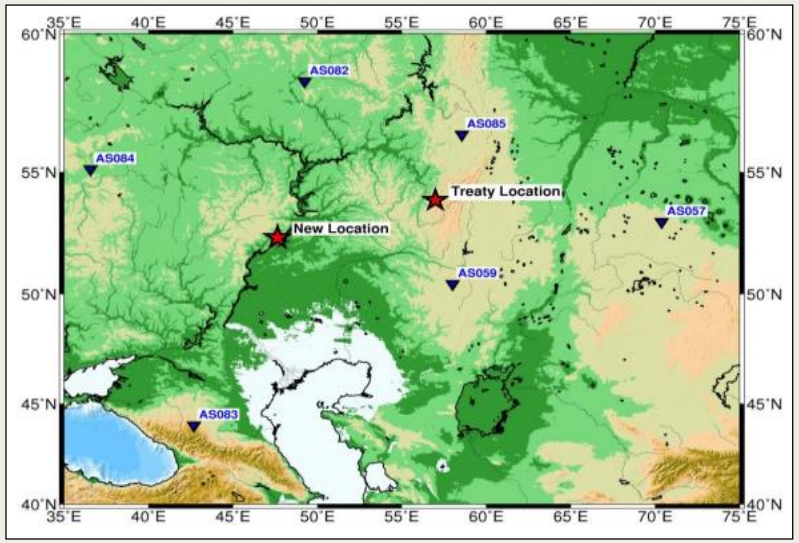
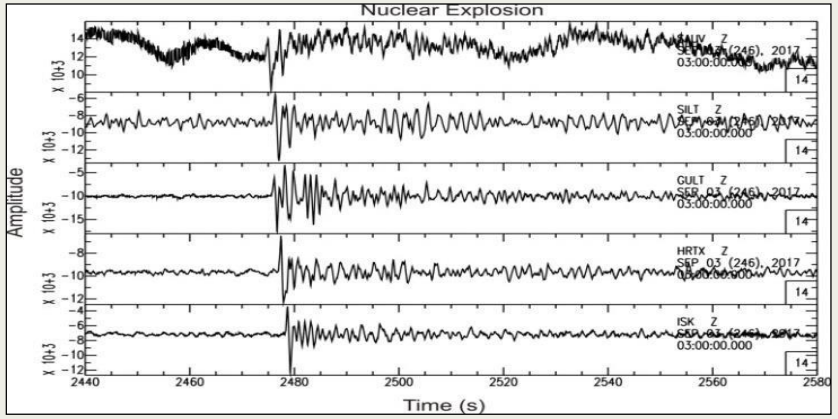
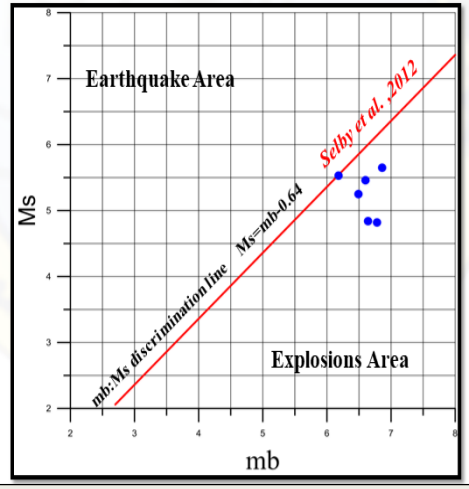
Refinements to IMS station coordinates for auxiliary seismic station. For example (AS94)





❑**Recent developments of seismology** kept challenging some of the conventional ideas well-accepted in the CTBT monitoring practice. At present, there are several complementary **methods for the identification of an explosion from an earthquake.**

Station	mb	Ms
HKPS	6.18	5.53
KMI	6.49	5.25
DAV	6.78	4.82
CHTO	6.60	5.46
YAK	6.86	5.65
GUMO	6.64	4.84



Conclusion

- State parties that have not yet established an NDC or those have not yet sign up for a SSA should do so.
- The preparatory commission should create a portal that allows access to its archived data and bulletins. Access should be granted to those scientific institutions, research centers and other organizations that could benefit from it.
- Seismic technologies for **nuclear explosion monitoring** have improved significantly over the past decade. Much of the improvement is due to the use of **regional-distance (< 1,600 km, or 1,000 mi)** seismic recordings of broader bandwidth signals.
- Continued development of **high-frequency regional and local seismic methodologies** will lower thresholds for the detection, location, identification and characterization of small events.
- The **preparatory commission and ICAO** should establish an **early warning system for explosive volcanic** eruptions. IDC should send the above warning directly to VAACs in a process similar to that conceived for the early tsunami warning.
- **Detection capability** can be improved by any **augmentation of the IMS primary seismic network,** to the extent that the additional data streams are continuously examined for detections, along with IMS data streams. **Augmentation can be done to improve the monitoring of areas of particular interest** e.g. **(thick salt, and mining regions.**