

1.1-P04. Application of infrasound technology in detection of volcanic explosions

Infrasound technology has been used by various institutions around the world for various applications well before the major undertaking by CTBTO in 1999 for establishment of the International Monitoring System (IMS) network. The IMS network consists of four main types of technology and includes infrasound technology. The main purpose for the IMS network is to enforce the Comprehensive Nuclear-Test-Ban Treaty (CTBT) by detecting nuclear explosions conducted anywhere around the world and bring to notice countries responsible for conducting the explosion(s). Infrasound technology detects airwaves or pressure waves generated by nuclear explosions. The airwave or pressure wave is dominated by low frequency signal and can travel very long distances from the explosion source. Volcanic explosions are synonymous to nuclear explosions and they too generate airwaves or pressure waves as well.

Rabaul Volcanological Observatory (RVO) in Papua New Guinea operates a network of 14 short period seismic stations to monitor volcanic activity at Rabaul Caldera. Between 1995 and present Tavurvur volcano produced several short duration very explosive strombolian eruptions full of discrete explosions. Effects of airwaves or pressure waves from some of the very strong explosions have featured very distinctly in rattling windows and doors and even shattered glass windows within several kilometres from the source. Similarly airwaves have featured very prominently on seismograms for stations within one to several kilometres and barely just seen on one of the farthest stations 16 km away. The installation of IMS infrasound station IS40, located 23 km southwest from the volcano, in 2013 has clearly increased the detection capability of the explosions at distances where normal short seismometers are unable to detect them. This observation and/or outcome is very useful for underdeveloped and some developing countries who are hosts to an infrasound station and also who are volcanic-prone but are unable to monitor many of their active and potentially active volcanoes due to lack of resources or are in isolated and remote locations. If they have access to the data and have the capability to process the data in-country, then the infrasound station may assist such host countries in detection of early phases of an eminent eruption and alert appropriate authorities to take appropriate measures in anticipation for a possible larger eruption.

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