Helping to Mitigate Disasters

The early 21st century witnessed a series of devastating, and unpredictable, natural disasters. The December 2004 Indian Ocean earthquake and tsunami, the January 2010 earthquake in Haiti, and the March 2011 earthquake and tsunami in Japan were examples of the devastating force of nature. These events, fearsome in their scope, also reminded us of our limitations in understanding how our natural environment works.

When the CTBTO’s International Monitoring System (IMS) was planned, it had one purpose in mind – monitoring for nuclear tests. However, after the Indian Ocean earthquake of 2004, scientists realized that the IMS had detected and gathered data from the event.

Scientists discovered that the IMS’s four complementary methods of gathering data (seismic, hydroacoustic, infrasonic, and radionuclide) not only detect nuclear tests, but also allow for an unprecedented level of environmental surveillance. The CTBTO’s IMS is therefore able to hear volcanoes roar, detect earthquakes, and provide advance warning of tsunamis. By utilising the data gathered by the IMS, scientists around the world have been able to devise new studies to analyse natural disasters.

The CTBTO’s IDC shares information in real-time with tsunami warning centres in 14 countries to help them issue more timely and precise warnings. The CTBTO has also established strong collaborations with international organisations, such as the Intergovernmental Oceanographic Commission (IOC), the International Atomic Energy Agency (IAEA), the International Civil Aviation Organisation (ICAO), the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations Office for Disaster Risk Reduction (UNISDR), and the World Meteorological Organization (WMO). As Patricio A. Bernal, former Executive Secretary of the IOC and Assistant Director-General of UNESCO commented, “There is no question that the access to IMS data for tsunami warning systems is a major contribution by the CTBTO Member States, which may reduce the loss of lives and property due to natural disasters, a common goal of all the nations of the world”.

On 11 March 2011, an earthquake under the Pacific Ocean triggered a 10-metre high tsunami that devastated the north-eastern seaboard of Japan. When the tsunami struck the Fukushima Daiichi nuclear power station, cooling systems failed for three of the reactors. It was the worst nuclear accident since the Chernobyl accident of 1986, and given the most severe classification on the International Nuclear Event Scale.

Within 24 hours of the accident, more than 35 IMS radionuclide stations were providing information on the spread of radioactive particles and noble gases. The Taka-saki station, RSN8, located around 250km from Fukushima, was the first to pick up radionuclides such as iodine-131 and caesium-137. The radioactive cloud was tracked as travelling first to Russia and then the United States, before dispersing across the northern hemisphere and around the entire globe. After a month, radioactivity had spread to the southern hemisphere of the Asia-Pacific region, and had been detected at stations located in Australia, Fiji, Malaysia, and Papua New Guinea.

With Fukushima, the IMS demonstrated its ability to track radiation and predict dispersion using Atmospheric Transport Modelling. This enabled CTBTO Member States to provide valuable information to their publics and implement disaster mitigation plans accordingly. “The importance of inter-organizational and inter-sectoral collaboration is one of the most critical lessons learned from the Fukushima disaster”, remarked Maria Neira, Director of the Department of Health and Environment at the WHO, speaking on the first anniversary of the disaster. “CTBTO data proved crucial in enabling the WHO to provide accurate information to the public on health issues after the nuclear accident.”

»Even before entering into force, the CTBT is saving lives.«
BAN KI-MOON
United Nations Secretary-General (2011)

»Japan appreciates the contribution of the CTBTO and sincerely thanks its staff for their dedicated work during those difficult times.«
TOSHIRO OZAWA
Permanent Representative of Japan to the UN in Vienna (2012)

»I look forward to further collaboration with the CTBTO, in this and other key areas, in particular for the protection of life, livelihoods and property; health and well-being; safety on land, at sea and in the air; sustainable economic growth; the protection of natural resources and environmental quality; and especially for natural disaster risk reduction activities and climate change adaptation.«
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Left: The Fukushima Dai-ichi nuclear power plant. © NUCLEAR REGULATION AUTHORITY, JAPAN

Experts examine the Fukushima Daiichi nuclear power plant, following the accident. © GREG WEBB / IAEA

Right: IAEA staff examines Reactor Unit 3 at the Fukushima Daiichi nuclear power plant. The CTBTO aided the disaster mitigation efforts by providing information on the spread of radiation following the accident. © JASDF / Morita / IAEA

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