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CTBTO seismic processing and the announced DPRK nuclear test of October 9, 2006

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The Provisional Technical Secretariat (PTS) of the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) has been ramping-up the installation of the International Monitoring System (IMS) consisting of a network of seismic, hydroacoustic, infrasound, and radionuclide stations, since its inception in March 1997. Data from these networks are automatically processed at the International Data Centre (IDC) to produce, within a few hours, a series of automatic bulletins called the Standard Event Lists (SEL1, SEL2, SEL3). After analyst review and correction as necessary the Reviewed Event Bulletin (REB) is produced. Additional information about characterization of an event as an earthquake or otherwise is also available in the Standard Event Bulletin (SEB) shortly after production of the REB. The overall process was successfully tested on October 9, 2006 when the Democratic People's Republic of Korea announced and conducted a nuclear test.

The standard SEL1 bulletin was routinely produced on the day of the event with good results. The event was available in the IDC database 1 hour and 46 minutes after its occurrence and consisted of 13 associated stations, all part of the primary seismic network and ranging in distance from 17 degrees to 151 degrees. The origin time of the event was 1:35:28 UT, the location at 41.28 North, 129.01 East, and depth 0 km. Subsequent SEL2 and SEL3 processing did not modify the composition or the location of the event. An additional 9 stations contributed to the event in the REB bulletin. The location of the event was moved slightly to 41.31 North and 129.02 East, the origin time being moved earlier by 0.7 seconds. The surface area of the error ellipse was reduced from 2391 km^2 to 880 km^2 after interactive analysis, and the event was not screened out as an earthquake (IDC does not perform discrimination *per se* but does screen out events with a high probability of being earthquakes.)

At the time of the event, and in addition to standard processing, the IDC was also experimenting with SEL0, a modified version of its processing sequence designed to produce an automatic global bulletin to the shortest possible time schedule. The purpose of this fast bulletin in a potential future operational context could be to supply additional information to tsunami warning organizations. The project was initiated following the disastrous Indian Ocean Tsunami of December 26, 2004. The experimental SEL0 bulletin detected the DPRK event with an epicentre at 41.13 North, 128.33 East, and included 12 primary stations. The event was in the database 19 minutes after its occurrence. Although the quality of the solution was not as good as the SEL1 solution - in particular the event was erroneously placed at depth - the SEL0 epicentre was close enough to the suspected test site to allow staff at the IDC to be alerted and start diligent work on the analysis before major news media publicly announced the event.