Geophysical Research Abstracts,
Vol. 10, EGU2008-A-07761, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-07761
EGU General Assembly 2008

Moment Tensor of Seismic Events from Rayleigh and Love Waves Using the IMS/CTBTO Network.

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The Provisional Technical Secretariat (PTS) of the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) continues to develop the International Monitoring System (IMS) consisting of a network of seismic, hydro-acoustic, infrasound, and radionuclide stations. The International Data Centre (IDC) automatically processes these data to produce, within a few hours, a series of automatic bulletins called the Standard Event Lists (SEL1, SEL2, SEL3). Subsequently, analysts review and correct the results as necessary to produce the Reviewed Event Bulletin (REB). Shortly after the production of the REB, a Standard Event Bulletin (SEB) is produced containing additional information about characterization of an event as an earthquake or otherwise. The Comprehensive Nuclear-Test-Ban Treaty (CTBT) mandates that the IDC apply standard event screening criteria to each detected event to filter out events clearly consistent with natural or non-nuclear man-made phenomena. A specific event screening criterion is the seismic source mechanism.

Over the past two years, the IDC implemented two methods for moment-tensor inversion to quantify the seismic source mechanism: one based on P body waves and the other on surface waves. We report here on the results from the surface-wave moment-tensor inversion, using both Rayleigh waves and Love waves. Surface waves are often well observed from small events; however, a reliable inversion method must account for the path-dependent variation of the dispersion and attenuation. The regional variation of earth structure and its effect on surface-wave propagation continues to be an active area of research. To incorporate the best available knowledge about regional

surface-wave propagation properties, the inversion method uses gridded maps of the surface-wave dispersion and attenuation properties sampled at 1-degree intervals. Although the global coverage at this resolution remains incomplete, in some regions observed surface waves down to 25s period produce good results.