

Exploiting Bayesian inference priors to form synthetic waveform events or to validate events formed by automatic processing

The Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) has been developing and testing NET-VISA, Bayesian automatic event detection and localization software package. In our preliminary testing at the CTBTO, NET-VISA shows better performance than its currently operating automatic association program. This implies that the priors of Bayesian inference built within the NET-VISA framework have a good ability to depict the relationship between sources of waveform events and detections on CTBTO's stations. At the same time, synthesizing a good event, or evaluating and validating events quantitatively are important topics to improve the performance of detecting waveform events, and therefore, detecting a nuclear explosion. In this context, we have been building methodologies to apply the NET-VISA priors onto the synthetic event generation and the event evaluation. In the presentation, the quality of synthetic events and the feasibility of validating events formed by the currently operating association program will be discussed.

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