

Are Measurements of Infrasonic Signal Duration Useful in the Context of Nuclear Explosion Monitoring?

Robust infrasound signal detection and association remains a challenge. False automatically generated infrasound bulletin events impact upon analyst workload at the International Data Centre, and therefore there is interest in improving association algorithms. One signal characteristic that is currently not utilized in the association process is signal duration. Results from a suite of over 40 ground truth signals, recorded on International Monitoring System infrasound arrays, show that signals that propagate along longer paths tend to have longer durations. Although the range-duration relationship is weak, the duration measurements can help identify signal associations that are non-physical given the hypothesis of a single transient source; long signals cannot have been generated at short ranges. We identify propagation conditions that result in longer, or shorter, signal durations due to the fraction of energy ducted in particular waveguides. We also examine the effects of signal-to-noise ratio on signal duration determination, a factor that is likely to limit the usefulness of a duration measurement in high noise conditions.

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