

Wind Effects on Long-Distance Infrasound Amplitude

We have investigated the effects of stratospheric winds on the amplitudes of atmospheric nuclear explosion infrasound signals for distances up to 17500 kilometers. The raw amplitudes data set were scaled for yield. We extracted the zonal and meridional winds from source to receiver propagation path using the Horizontal Wind Model (HWM14) database. An attenuation propagation constant k is derived from the slope of a least-squares best fit by plotting yield-normalized amplitude A_n and associated wind vector V_d . The k -constant is derived for each infrasound station location and associated testing site location to determine the stratospheric waveguide multiplying factor $10E-kV_d$. We determine an average k -constant as a function of distance at each nuclear test site location for the wind correction, and find the slopes of the k -constants are on the order of $10E-2$ to $10E-3$ seconds/meter and are, on average, slightly smaller values to findings by Mutschlecner et al. (1999). Overall, we find that the distance attenuation of the uncorrected-wind amplitude data with respect to distance is not statistically different than the corrected-wind amplitude data, having a standard error of 1.06 and 1.03 respectively.

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