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Acoustical Impulse Conservation for Estimating a Ground-Level Impulse Source Energy by a Distant Acoustical Method

New methods for estimation the energy of explosions by registration data of infrasound waves are proposed. The one method is based on using acoustical impulse I conservation law - $E(I)[kt] = 1.38 \times 10^{(-10)}(I[kg/sec])^{1.482}$. Where I is the result of a multiplication wave profile area S/2 of analyzing infrasound signal by a distance to the source. The second method uses correlation between an explosion energy and a duration of N-wave positive phase t on the height of ray tracing turning to the ground - $E(t)[kt] = 27.67 \times (t[sec]^2/\sigma)^{(3/2)}$, where σ – some non-dimensional distance characterizes a non-linear effects under sound propagation along ray trajectory. The advantage of the relation E(I) compared to Whitaker's relation E(W) is the possibility of using this relation for pulsating sources with any arbitrary profile form of an initial impulse and with any arbitrary type of infrasound arrivals. The peculiarity of E(⊠) is obviously taking account of earth atmosphere influence on the characteristics of registration infrasound signals. Both methods are tested by infrasound data, registered in the distance of 322 km from the sources (30 explosions). Empirical relationship between energy values of one and the same explosion is obtained with the different methods: $E(I) = 1.107 \times E(W)$; $E(t) = 2.201 \times E(I)$.

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