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Regional moments, energy levels, and a new discriminant

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Abstract

Teleseismic observations of explosions tend to be richer in short-period energy than are earthquakes, thus the effectiveness of them_b:M_s discriminant. At regional distances the same basic separation occurs for smaller events in terms ofM_L:M_o (Woods*et al.*, 1993) andm_b:M_o (Patton andWalter, 1993). While these studies demonstrate the basic differences in excitation, they suffer in practical application because of the detailed information required in the retrieval ofM_o. In this paper, we introduce a new method of discrimination, based on the energy strength (M_E) from broadband regional records that appears to be effective and efficient. In this method all events are processed as earthquakes, and explosions are distinguished by their stronger energy levels relative to their long-period amplitudes. Results from 29 events recorded by TERRAscope, sampling 15 explosions from NTS and 14 earthquakes from the southwestern United States, are represented, indicating complete separation (45 data points).M_L=3.6 is the smallest event examined to date but the method can probably be extended to even smaller levels in calibrated regions.

Key words

Energy discriminant magnitude amplitude earthquake explosion

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