

Application of Soviet PNE Data to the Assessment of the Transportability of Regional Discriminants

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Abstract

In order to discriminate the regional seismic signals produced by underground nuclear explosions from those produced by earthquakes, rockbursts and conventional mining explosions of comparable magnitude, it is necessary to know the range of nuclear explosion signal variation that can be expected as a function of source and propagation path conditions over the entire ranges of these conditions which may be encountered in global test monitoring. However, most research conducted to date has focused on analyses of regional signals recorded from explosions conducted at the few major nuclear test sites and these sample only limited ranges of the variables of interest. On the other hand, the extensive Soviet PNE testing program provides a source of regional seismic data recorded over much broader ranges of source and propagation path variables. More specifically, over 120 tests were conducted in this series and these explosions were detonated in a wide variety of geologic emplacement media (e.g., salt, clay, sandstone, granite, limestone) and are representative of wide ranges in yield (0.01 to 300 kt) and source depth (130 to 2860 m). Moreover, because of the tremendous geologic and tectonic diversity represented within the territories of the former Soviet Union, regional data recorded from these tests sample propagation path characteristics encompassing a range extending from tectonically active to stable continental interior regimes. S-CUBED plans to work with scientists from the Russian Institute For Dynamics of the Geospheres (IDG) to improve regional seismic discrimination capability by using data recorded from these Soviet PNE tests to derive improved, quantitative bounds on the ranges of seismic signal characteristics which can be expected from underground nuclear explosions which might be conducted under the wide variety of source and propagation path conditions which must be considered in global test monitoring.

Key Words: Seismic, Discrimination, Regional, Soviet, PNE

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