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There is more to do, in building key datasets on nuclear explosions

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More than 2000 nuclear test explosions have been conducted in and above the atmosphere, underwater, and underground, from 1945 to 2013. They constitute an extraordinary human activity from several perspectives.

The physical and radiochemical signals from such testing provide the basis for training sophisticated modern monitoring systems, both national and international, that are designed to detect future nuclear explosions in the context of international efforts at nuclear arms control. These same signals also have many uses in the study of Earth processes and Earth structures.

Of principal interest for monitoring purposes, are regional signals from explosions—conducted in a wide variety of environments—that were too small to be reliably identified via teleseismic recordings. The great majority of stations operated today, even those in networks established for nuclear explosion monitoring, have never recorded explosion signals at regional distances, because most stations were installed long after the period when most underground nuclear explosions were conducted; and the few nuclear explosions that have been conducted since the early 1990s were mostly recorded only at teleseismic distances. Of principal interest for studies of Earth structure and processes, are the larger explosions whose signals were clearly recorded on global scales, with accurate knowledge of source depth, epicenter, and origin time.

This presentation will review accomplishments of two substantial projects, each of them conducted over about twenty years, that have emphasized the rescue of regional seismic waveform data from nuclear test explosions conducted in Eurasia. These data are now available in modern digital formats. Because of these two projects, openly available seismogram archives for Eurasian explosions are in several respects now better than those for explosions conducted by the United States, France, and the UK, especially for the era from 1960 to about 1985.

The opportunity to build and improve such archives will not last indefinitely. The main purpose of this presentation is to advocate for larger efforts to collect waveform data and associated metadata for *ALL* nuclear test explosions, and to make such data openly available for present and future generations of Earth scientists.