

## **What should be done with millions of analog seismograms, containing information acquired prior to the era of digital recording?**

Paul Richards

Columbia University, New York, Lamont-Doherty Earth Observatory, Palisades, United States (richards@ldeo.columbia.edu)

Seismology is an observational science, continually surprising us with features in seismograms that are not fully explained by current theories of wave propagation applied to current models of earthquake and explosion source processes, and Earth structure.

Today, seismic ground motion is documented via digital recordings that for many stations are commonly made easily available to the research community. There are questions about access to digital data from stations not easily available in this way, but this presentation asks “what to do, with the information acquired earlier, during decades of analog recording?”

There is more than 25 years of experience in Europe addressing the question, and a somewhat different history of data rescue efforts in the United States, where on the order of ten institutions, holding millions of analog seismograms, are beginning to ask how long to maintain such archives.

Data products derived from seismograms have a remarkably diverse community of users, including scientists and engineers who study ground shaking in particular regions (to quantify earthquake hazard and risk), scientists studying tectonics and Earth structure (of the shallow crust, and on down into the deep interior) and the physics of earthquake and explosion sources, and those engaged in monitoring for nuclear test explosions (in order to verify compliance with nuclear testing treaties, and/or to document violations).

The experience of more than 2000 nuclear test explosions has consequences in many forums. Archives of recorded ground motion from past nuclear explosions, both in the atmosphere and underground, may assist with the prompt evaluation of future nuclear explosions, should they occur (what yield, what height-of-burst?). Most nuclear test explosions took place prior to the era of digital recording of seismic ground motion. Old analog seismograms of nuclear explosions may be sufficiently important that their rescue and conversion to modern formats may help with the rescue of old earthquake seismograms.

The main purpose of this presentation is to develop an exchange between US and European seismologists, on experiences acquired during efforts to rescue the information contained in analog seismic recordings. Questions of interest include: what guidance has been useful, in selecting subsets of analog data to save (assuming there is consensus that not all such data can be kept indefinitely); and how to get the next generation of seismologists interested in issues that are potentially addressed by the information content contained in analog seismogram archives.