# UNDERGROUND SOUNDS. AN APPROACH TO EARTHQUAKE PREDICTION BY AUDITORY SEISMOLOGY

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Assuming that earthquakes could be predicted there are possibly two reasons why a reliable prediction theory has not been achieved yet: either we have not collected the right kind of data or we are in the possession of the relevant data but do still not recognize the precursory patterns within the database. In the latter case clearly an alternative way of representing the data is needed, an alternative that reveals and displays precursive patterns so that they are to be recognized. In our talk we want to plead for audification as a technique of displaying data that delivers fine arguments to be of special interest for earthquake prediction research. The acoustic approach which we call "Auditory Seismology" is easy to accomplish: One compresses the time axis of seismological registrations by a factor of about 2.200 and then replays the data on a speaker so that the seismograms can be listened to. First tried in the 1960s several seismologists used this technique already to trace low amplitude signals in noisy records. But in our predecessing investigations we discovered that audification is capable of displaying many more aspects of seismic data with clarity: listening to earthquake sounds our ear recognizes the broadening of the signal due to distance between source and station; different source mechanisms such as those at mid ocean ridges and subduction zones show a clear difference of sound characteristics; the influence of site response phenomena expresses itself in changes of timbre etc. (cf. sound samples at http://www.gmd.de/auditory-seismology).

Introducing Auditory Seismology to earthquake prediction research could be justified even by the uncommon way of representation alone which on the whole allows a new perspective of the data. But there are more arguments to it: The use of waveform data instead of calculated event catalogues preserves a lot of information. E. g. the arrival time and relative amplitude of incoming waves even from distant quakes which often have to be neglected in earthquake location maps or statistics of regional catalogues are always heard and i. e. triggered events can be studied easily. The task of differentiating between source signals and the influence of elastodynamic Green's function is all to familiar for our ear: it always copes with both, the sound signal as well as the space information given by reverbs. Moreover the ear is called powerful in its perceptive faculty for timely developments and the tension between past and future events which is mainly the task of a prediction. And it is especially this ability of the ear that convinces us that listening to audified seismograms is of special use for earthquake prediction research.

During our talk we will present audified seismograms of different kinds to give an impression of how tectonic activity generally sounds.

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