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T3.1-P02. A Field Calibration Method for Digitized Electro-Mechanical Seismometers

High quality data from regional and local seismological networks can increase the effectiveness of State Party monitoring and analysis under the CTBT. Currently, many networks still operate older electromechanical seismometers with digitizers which, unfortunately, are poorly calibrated. Calibration of these stations is difficult because of impedance mismatches, coil loading, and amplifier gain differences that vary by station and digitizer model. Therefore, it is necessary to calibrate stations as a complete system. We have developed a field deployable calibration method that utilizes an inexpensive and commercially available laser position sensor. Using a signal generator and a small excitation coil, we force the mass of the instrument to oscillate at frequencies across the pass band. We then measure the station output and compare it to the laser-measured mass motion and determine the instrument response at each frequency. If free-period and damping ratio are measured, an accurate calibration curve can be generated. A grid search algorithm optimizes the curve and determines the instrument response in Seismic Analysis Code (SAC) poles & zeros format. Results are within a few percent of a standard laboratory calibration. This method is an effective and affordable option for networks that employ electro-mechanical seismometers.

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