



New Portable Mechanical Sensor System for Rotational Seismic Motion Measurements

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A new mechanical sensor system for recording the rotational components of ground velocity in a horizontal plane has been constructed. It was tested both in a laboratory and in a field experiment. The sensor system is based on measurements of differential motions between paired sensors mounted along the perimeter of a rigid (undeformable) disc. The elementary sensors creating the pairs are sensitive low-frequency geophones with equal frequency response. The main features of the new rotational seismic sensor system is a flat frequency characteristic in the wide range from 1 Hz to 200 Hz and sensitivity limit of the order of 10^{-8} rad/s. Notable advantages are small dimensions, portability, easy installation and operation in the field. An important feature of the instrument is that it provides records of translational seismic motions together with rotations, which allows many important seismological applications. We have used the new sensor system to record the rotation velocity in a horizontal plane due to a small earthquake of $M_L=2.2$, which occurred within the earthquake swarm in Western Bohemia in autumn 2008. We found good agreement of the rotation record with the transverse acceleration, as predicted by theory. This measurement demonstrates that this device has a much wider application than just prospecting measurements, for which it was originally designed.