

A Differential Highly Sensitivity Sensor for Accounting of Seismic Devices Instrumental Thermal Noise

One of the main factors causing noise in the records of precision long-period seismometers is the temperature fluctuations of the mechanical elements of the seismometers and their sensitive sensors caused by temperature fluctuations in their internal space due to the presence of local heat sources. Electronic components, for example, operational amplifiers, resistors and inductances that are part of the electronics of such devices, can be act as local heat sources. Heat is generated during the operation of mechanical elements too. A very complex dynamic temperature pattern is created in the internal volume of the device. To reduce the effect of this type of noise, we suggest using adaptive and optimal filtering of seismic signals based on high-precision temperature recording of key elements of seismic instruments. To date, there were not so small systems capable of recording temperature changes inside seismic instruments with sufficiently high accuracy. The highly sensitive thermometer developed by us is capable of simultaneously monitoring the temperature at several of the most important points of any seismic device with an accuracy of up to 0.005 degrees Celsius

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