

of the Frequency Response of Seismic and Infrasonic International Monitoring System Station Sensors Using an On-Site Calibration Approach

Thursday, 22 June 2023 16:55 (15 minutes)

The development of laboratory calibration methods for seismometers and microbarometers in the low frequency range down to 0.01 Hz provides the possibility of a traceable on-site calibration during operation for field sensors of the International Monitoring System. The laboratory calibrated reference sensors can be installed as transfer standards at the stations co-located to the operational sensor, thereby improving data quality and identification of Treaty-relevant events while not disturbing the regular measurements for Treaty validation purposes. At International Monitoring System stations PS19 and IS26 in Germany we performed on-site calibrations tests with both seismometers and microbarometers calibrated at the laboratories at PTB and CEA, respectively, using signals from different natural and anthropogenic excitation sources. Following the approaches of Gabrielson (2011) and Green et al. (2021), the frequency response function of the station sensors including site specific factors such as the wind noise reduction system or possible effects of pre-amplifiers and data loggers are determined. We present calibration results of the comparison between the station sensors with the laboratory-calibrated instruments along with the nominal responses of the sensors. Furthermore, the possibility of a station-wide calibration of seismometers with a single temporary and stationary reference sensor is assessed using suitable excitation signals and station-wide similarity measures.

Promotional text

Bridging the gap between the laboratory and field: How to bring traceability to the International System of Units to IMS stations through on-site calibrations using transfer standards.

E-mail

michaela.schwardt@bgr.de

Oral preference format

in-person

Primary author: Ms SCHWARDT, Michaela (Federal Institute for Geosciences and Natural Resources (BGR))

Co-authors: Mr PILGER, Christoph (Federal Institute for Geosciences and Natural Resources (BGR)); Mr KRISTOFFERSEN, Samuel (Commissariat à l'énergie atomique et aux énergies alternatives (CEA)); Mr BRUNS, Thomas (Physikalisch-Technische Bundesanstalt (PTB)); Mr LARSONNIER, Franck (Commissariat à l'énergie atomique et aux énergies alternatives (CEA)); KLAUS, Leonard (Physikalisch-Technische Bundesanstalt (PTB)); Dr HUPE, Patrick (Federal Institute for Geosciences and Natural Resources (BGR)); Mr GAEBLER, Peter (Federal Institute for Geosciences and Natural Resources (BGR)); CERANNA, Lars (Federal Institute for Geosciences and Natural Resources (BGR))

Presenter: Ms SCHWARDT, Michaela (Federal Institute for Geosciences and Natural Resources (BGR))

Session Classification: O3.1 Seismic, Hydroacoustic and Infrasound Technologies and Applications

Track Classification: Theme 3. Monitoring and On-Site Inspection Technologies and Techniques: T3.1 Seismic, Hydroacoustic and Infrasound Technologies and Applications