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Use of In Situ Calibration for Real Time Infrasound Station Monitoring and Improved Wave Parameter Determination

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Many different uncertainty sources can contribute to errors in the infrasound wave parameter (azimuth, trace velocity, amplitude) estimation. It is important to both understand how these sources can effect infrasound measurements, and how to minimize their effects on the infrasound measurements. One such a source is the detector, which comprises the wind noise reduction system and the microbarometer. A comprehensive uncertainty analysis was performed to better understand how the detector uncertainty affects the wave parameter estimation using the time delay of arrival (TDOA) algorithm, such as that used by the Progressive Multi-Channel Correlation (PMCC) algorithm. An in situ calibration of the detector was performed using a co-located reference sensor and the ambient signals that are observed at the site. This in situ calibration can be used to monitor the status of the detectors, and provide feedback to the station operators. In addition, the calibration results were used to provide corrections to the raw signal data for retrieval of the corrected wave parameters. Experiments were performed at the IS26 site using a temporary WNRS to provide quantitative measurements of the effects of the WNRS and its calibration on the wave parameter estimation. These were compared to the IS26 measurements, demonstrating that accurate measurements can be retrieved using the calibration.

E-mail

samuel.kristoffersen@cea.fr

Promotional text

In situ calibration provides near real time monitoring of the IMS infrasound station performance and provides corrections for degraded detectors allowing for continuous analysis.

Oral preference format

in-person

Primary author: Mr KRISTOFFERSEN, Samuel (Commissariat à l'énergie atomique et aux énergies alternatives (CEA))

Co-authors: Mr LE PICHON, Alexis (Commissariat à l'énergie atomique et aux énergies alternatives (CEA)); Mr LARSONNIER, Franck (Commissariat à l'énergie atomique et aux énergies alternatives (CEA)); Ms SCHWARDT, Michaela (Federal Institute for Geosciences and Natural Resources (BGR)); Mr VINCENT, Paul (Commissariat à l'énergie atomique et aux énergies alternatives (CEA))

Presenter: Mr KRISTOFFERSEN, Samuel (Commissariat à l'énergie atomique et aux énergies alternatives (CEA))

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