

# Rule Based Expert System for Seismic Stations Data Quality Analysis

Wednesday, 21 June 2023 16:20 (15 minutes)

Analysis of the seismic data quality provides a vital tool to identify seismic station problems. Timing accuracy, completeness, and ambient noise levels are considered as key data quality parameters. Variation in seismic station noise level and their deviation from a global noise model affects the capability of seismic event detection. Microseismic noise at a station is expressed by the power density spectra (PSD) and the ambient noise probability density function (PDF). Seismic network operators review data quality by visual inspection of the PSDs periodically, since the data quality might change over time. This process is subjective and demands a significant amount of time and considerable experience. A reliable automatic evaluation task makes quality control faster and more objective. This study aims to develop a fuzzy rule based expert interpretation system that can imitate human reasoning and incorporate the operator's knowledge of seismic data quality. Using features extracted from PSDs and PDFs, the categorization system was built based on fuzzy interpretability rules. Results on real seismic station data showed the robustness of the interpretation and its capability to be a part of the routine seismic network operation.

## Promotional text

Building an automated intelligent seismic data quality analysis system based on fuzzy logic to identify seismic station problems and status.

## E-mail

mahmoud.salam@nriag.sci.eg

## Oral preference format

in-person

**Primary author:** Dr SALAM, Mahmoud (National Research Institute of Astronomy and Geophysics (NRIAG))

**Presenter:** Dr SALAM, Mahmoud (National Research Institute of Astronomy and Geophysics (NRIAG))

**Session Classification:** O4.1 Performance Evaluation of the International Monitoring System and On-Site Inspection and their Components

**Track Classification:** Theme 4. Sustainment of Networks, Performance Evaluation, and Optimization: T4.1 Performance Evaluation of the International Monitoring System and On-Site Inspection and their Components