The auxiliary seismic station Muntele Rosu (AS01, MLR) is part of International Monitoring System (IMS), being operated by the National Institute for Earth Physics (NIEP, Bucharest) in support of the verification regime of Comprehensive Nuclear-Test-Ban Treaty.

The MLR station (45.490° N, 25.945° E, 1,360 m altitude) (figure 1) has been running since 1970; in (IMS), being operated by the National Institute for Earth Physics (NIEP, Bucharest) in support of the environmental one) are characteristic for the MLR station (figure 2 and 3). Seismic data are recorded locally and forwarded directly to the IDC upon request at any time through on-line connections and VSAT transmission.

Relatively quiet background noise conditions, with very few noises sources (except of the natural environmental one) are characteristic for the MLR station (figure 2 and 3). Site geology consists of limestone and conglomerates. Crystalline flysch.

Conclusions

- The analysis of the background noise at MLR station for one year showed that in terms of overall characteristics, noise level lays 20 dB above Peterson’s NLNM for f > 1 Hz, whilst for below 1 Hz, this difference varies between 10 and 30 dB.
- The noise diurnal variation of the MLR noise is represented by an increasing of the daytime noise level with 30dB above nighttime level for a frequency band between 0.5 and 30 Hz.
- The noise seasonal variation at MLR implies frequency dependence, i.e. the noise level increases during the winter for f = 1 - 10 sec., whilst from April to July, this level is lower.
- For f > 1 sec, the noise power levels are lower during summer and highest during winter, while during spring and fall, the noise level is very similar and in-between the two.
- All lower periods (T < 1 sec), the noise level is slightly higher during summer.
- Noise analysis results are consistent with the MLR automatic detection performance reported by IDC for regional, teleseismic and noise phases.
- The MLR detection capability for regional and seismic phases is lower during the summer; this behavior could be associated with the specific seasonal human activity and atmospheric conditions (thunderstorms).
- Noise analysis results are consistent with the MLR automatic detection performance reported by IDC for regional, teleseismic and noise phases (figure 7):
  - the number of noise phases detected at MLR is visibly higher in the winter season
  - the MLR detection capability for regional and seismic phases is lower during the summer, this behavior could be associated with the specific seasonal human activity and atmospheric conditions (thunderstorms).

Data Analysis

- The analysis of the background noise at MLR station was carried out for one year: between December 2006 and November 2007.
- The characteristic of the seismic noise recorded at MLR is analyzed using Power Spectral Density (PSD) estimates and their corresponding Probability Density Functions (PDFs) (McNamara and Buland, 2004).
- Probability Density Function (PDF) for EVK, NS and Z components of 3C station MLR were constructed using more than 14000 PSDs to show the overall characteristics (figure 4); the color bar represents the probability of occurrence, the dashed line represents the PDF median and the two gray lines represents the Peterson’s (1993) NHNM and NLNM models.
- For frequencies $f > 1$ Hz, noise level lays 20 dB above NLNM; for $f > 1$ Hz; this difference varies between 10 and 30 dB.
- Diurnal and seasonal variations are observed in the MLR background noise.

References


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- This paper exploited some of the data reported in the International Data Centre (IDC) Monthly Performance Reports for the period analyzed.
- Maps were created using GMT software (Wessel & Smith 1995).