



Background Noise Characteristics in the Western Part of Romania

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The seismological database of the western part of Romania increased significantly during the last years, when 33 broadband seismic stations provided by SEIS-UK (10 CMG 40 T's – 30 s, 9 CMG 3T's – 120 s, 14 CMG 6T's – 30 s) were deployed in the western part of the country in July 2009 to operate autonomously for two years. These stations were installed within a joint project (South Carpathian Project – SCP) between University of Leeds, UK and National Institute for Earth Physics (NIEP), Romania that aimed at determining the lithospheric structure and geodynamical evolution of the South Carpathian Orogen. The characteristics of the background seismic noise recorded at the SCP broadband seismic network have been studied in order to identify the variations in background seismic noise as a function of time of day, season, and particular conditions at the stations. Power spectral densities (PSDs) and their corresponding probability density functions (PDFs) are used to characterize the background seismic noise. At high frequencies (> 1 Hz), seismic noise seems to have cultural origin, since notable variations between daytime and nighttime noise levels are observed at most of the stations. The seasonal variations are seen in the microseisms band. The noise levels increase during the winter and autumn months and decrease in summer and spring seasons, while the double-frequency peak shifts from lower periods in summer to longer periods in winter. The analysis of the probability density functions for stations located in different geologic conditions points out that the noise level is higher for stations sited on softer formations than those sited on hard rocks. Finally, the polarization analysis indicates that the main sources of secondary microseisms are found in the Mediterranean Sea and Atlantic Ocean.