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Influence of Uninterruptible Power Supply on Seismic Data

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A modern stand-alone digital seismic station is equipped with seismometer, acquisition unit, communication devices and uninterruptible power supply. Uninterruptible power supply (UPS) is a device, which maintains a continuous supply of electric power for all equipment, important for real-time seismic data acquisition and data transmit. While usually UPS unit is one of the least considered elements in seismic station design, it is still very important. Incorrect design of UPS unit can produce data loss or unexpected source of artificial noise, which could decrease the quality of seismic data. In general an UPS system has to provide a 12 V DC output for seismic equipment and a 230V AC output for communication equipment. The capacity of the UPS system must be properly dimensioned, so that in case of public power supply failure operation of the seismic station is not influenced for at least a day.

In year 2000 the project Modernization of the Slovenian National Seismic Network has started and was finished in the year 2007. The new network consists of 26 seismic stations. All are equipped with quanterra Q730 data loggers, broadband seismometers (STS2, CMG40T or CMG3ESPC), communication units transmitting data in real-time to the Data Center and UPS unit.

Every year an extensive analysis of several parameters (percentage of lost data, noise level, temperature), which indicate quality of our new seismic network, is performed. One of the main sources of data loss was UPS unit. UPS units were also responsible for unusual glitches , detected on different seismic station at the same time. Analysing seismic data, recorded with CMG3ESPC seismometers, we detected seismic noise in the high frequency band ($f > 10$Hz). From the shape of the seismic noise we con-

cluded that the cause of that noise is artificial. After eliminating seismic equipment (seismometer and data logger) as a source of that noise, we found out that the cause of the high frequency noise was the UPS system.

At this moment 5th generation of UPS unit is in use. With the last generation we eliminated all known problems. In this article source of artificial noise that origin from UPS system will be presented. Moreover all the actions to eliminate that kind of noise are presented.