



The MUTENAGE Project (MUSical Tools for ENhancing the Awareness of Global Emergencies)

Antonio Menghini (1), Stefano Pontani (2), Vincenzo Sapia (3), and Tiziana Lanza (3)

(1) Aarhus Geofisica s.r.l., Cascina (PI), Italy (am@aarhusgeo.com), (2) Freelance musician, Rome, Italy (stefanopontani@hotmail.com), (3) INGV, Rome, Italy (tiziana.lanza@ingv.it)

Music can be a powerful device for raising awareness about environmental issues. Following the trend, we are organizing a project to specifically address climatic and environmental emergencies.

To this aim, we use the transformation of geophysical data into musical notes, according to the procedure (EMusic) defined by Menghini and Pontani (2016). We claim that it is possible to compose musical tracks describing faithfully the geological and environmental setting of various sites, which we choose by considering five main topics:

- 1) Pollution of aquifers;
- 2) Seawater intrusion along the coastlines;
- 3) Seismic risk;
- 4) Drought;
- 5) Permafrost melting;

The TDEM method (Time Domain Electromagnetics) shows an excellent diagnostic feature for each of these environmental emergencies. It is not surprising that the technical-scientific community widely acquire TDEM data since many years as the variations of the recorded signal (voltage) duly reflect the modifications induced on the Earth system.

Through the sonification process, we can associate well-defined musical “footprints” to these geophysical variations. Then, we have an extraordinary didactic-popular tool that we can use to communicate and sensitize people and students of every age and grade about the impact of climatic-environmental changes. In this occasion, we present, among others, the example of the musical effect of seawater intrusion that is well marked by the progressive increase of the pitches when approaching the coastline. In many cases, the relationship between geophysical response and high environmental risk is straight: for instance, pollutants, like leachate or polluted groundwater, can produce high voltage responses and/or similar high voltage signals can be produced by soils affected by permafrost melting. Nevertheless, there are situations in which the diagnostic feature of TDEM is fair, however, even if the data interpretation is less immediate, so that it requires an accurate processing and inversion of the data. In these cases, the sonification significantly contribute to make comprehensible less intense geophysical variations. As such, the seismic risk assessment is a valid example. It is possible to let “hear” the differences among the existing geological units, which may contribute to different seismic amplification and thus leading to diverse level of risk. The same is valid for the study of the hydrogeological critical issues, where the sound of an aquifer can be very different from that of an impermeable zone. Besides being a new source of inspiration for musicians, the MUTENAGE Project is intended for delivering original didactic tools for scientific museums and schools. As such, we are also planning a series of EM concerts that will be located in different countries, for each of the above-mentioned environmental issues.

References

Menghini, A., and Pontani, S., (2016): What is the Sound of the Earth? *First Break*, 34, 41-46.