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Discussions

Interactive comment on "ElectroMagnetic Music: a new tool for attracting people interest in Geosciences, while sensitizing them to planet sustainability" *by* Antonio Menghini et al.

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Thanks for the detailed review Bernardo Feldman. Your contribute as musician was really appreciated and gave us the chance to greatly improve the paper. Following your suggestions we have extensively reorganized the manuscript.

You wrote: No explanation YET as to how exactly the sonification took place. Did the musicians translate the data by providing their own personal interpretation? Were voltages used to assign amplitudes (loudness/dynamics), frequencies (pitch values), lengths of individual sounds to create rhythmic patterns? There is no clarification given to the reader who might not know what sonification exactly is.

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Discussion paper

We added a detailed paragraph in which we explain in detail the rules of sonification, based on rigorous scientific criteria, so that any musicians who would follow our methodology would achieve the same pitches collected in the same site. Once the pitches are drawn the musicians can work on them in different ways, as explained in the text.

You wrote: If the intention of the project is to bring awareness to our planet, it really doesn't matter how literal the translation of the data provided by the voltages is. Evidently, as the title of the article clearly states, it is intention to attract people's interest to geoscience while, in the process sensitizing us to planet sustainability. If, in the other hand, the sonification can to be used as a tool to "prevent risks" and assist in the reading of a particular phenomenon occurring at a certain part of our planet, there has to be a consistent array of sounds or textures that could quickly and easily be understood by people, scientists in particular. I would equate these as type of "sonic fingerprints" mentioned in line 145 of the article. I presume that there already many other tools are in place to measure potential earthquakes, eruptions, pollution of aquifers, seawater intrusion along the coastlines, seismic risk, drought and permafrost melting, etc.

We added a paragraph named "Objectives" where we have explained better what we aimed at: we are not interested in any device for preventing risk, but simply to use Music to sensitize people regarding global emergencies. Rather than a single frequency/pitch, we are sure that a cluster of pitches, that can be assigned to a scale and hence to a mood, can arise emotions and curiosity for the listener.

You wrote: What exactly are they looking to find through these experiments in schools? Are they looking to measure how students respond and get sensitized in regards to planet sustainability? Is it by simply bringing attention to the subject?

We focus more this in "Objectives" paragraph

You wrote: Although it is stated that fixed values are used to assign to the various transient's particular pitches in an objective manner, it is not quite clear how these pitches

are arrived at. The analogy comparing it with edges of a color scale does help to assume that gradations have been arrived with a certain logic, most likely translating numerical values into audible frequencies that retain precise intervallic relationships. The explanations right below help in confirm that amplitudes (louder sounds) will come from the stronger responses and vice versa, and that higher frequencies (pitches) will correspond to stronger responses. Inasmuch as I tried to find a clear correspondence between the pitches given in Figure 3, arrived at as transformations of the voltage's responses, and the so-called "score" utilized by the saxophonist to interplay with these collected sonified transients. Although there is no explanation as to how the player choose these particular chords as the basis for his improvisation, while listening to the two elements interacting with each other, I found that the performer did utilize pitches that beautifully harmonized and complemented the clusters created within the sonified textures. While crossfading, alternating pitches within the sonification produced a sense of chromatic movement extending beyond the traditional harmonizations found in "traditional" Western music, and closer to the textures of musicians experimenting with pure intonation and microtonalism.

In "Data sonification" we have reported more details about the sonification rules. Regarding "Selinunte" we corrected a mistake about the grouping of the pitches (it's not by 4). Here is the corrected text:

As the saxophonist Marco Guidolotti played during this reversed part of Selinunte piece, the relative score has the form shown in Figure 4 (notice that the pitches are translated into an Eb instrument, while the sonification produced notes in the C-key). The musician chose to fix some chords that can be assigned by grouping the pitches so to get some chords.

Hence, the saxophonist plays the exact pitches derived from the sonification, but starting from the end of the transient in Fig. 3, so that to reproduce the travel from the greatest depths to the surface. It is important to emphasize that we don't want to keep the musicians in a cage: they can handle the pitches as they wish, in any order: the

most important thing is to remain into the scale and the different moods provided by the local geology.

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