

## ***Interactive comment on “Climate and music (Toward development of the interdisciplinary climate and cultural understanding education of ESD with special attention to the seasonal cycle and “seasonal feeling” around Japan and Europe)” by Kuranoshin Kato et al.***

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### General comments

The paper presents an interdisciplinary study relating climate, music and education, and contrasting these aspects in two different countries and cultures Japan vs Germany and Northern Europe. The paper is structured on a series of educational activities which include the explanation of climate concepts and cycles and some exercises

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where students relate climate to colors and generate music imitating certain climate-related processes, e.g. rain. The important climate concepts which are addressed are: (1) the asymmetric seasonal progression around Japan (autumn to midwinter and midwinter to spring); (2) the large day-to-day variation in mean surface temperature in winter in Germany, which is related to the Fasnacht; and (3) The traditional mid-upper event in Northern Europe, corresponding to the Summer Solstice, compared to summer climate in Japan. After including these climate concepts, the paper is structured around a set of educational activities carried out at the Faculty of Education where students were asked to compose a set of songs representative of these concepts.

The paper is very interesting and contributes to current state of the art, in particular given its interdisciplinarity, novelty and cross-cultural elements of comparison. However, I think the paper needs to be improved in terms of the description of the involved musical concepts, the methodology of the experiments and the presentation of the results in a rigorous way. I provide some comments for improvement from my expertise on music and computing.

### Specific comments

I add here some comments for improving the paper:

- I think the structure of the paper could be better balanced. My advice would be to structure the paper in three main sections for each of the analyzed climate concepts: (1) description of the climate concept and characteristics; (2) description of associated music / colors with these events, including a list of musical pieces and art works; (3) presentation of the activity including the followed methodology; and (4) analysis of students results: study on the use of colors, instruments and temporal patterns, agreement between students, and conclusions on how climate concepts are related to musical ones.

- In general I think the paper focuses a lot on the climate concepts but it does not describe the relevant musical concepts, e.g. which songs are linked to the climate

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events in each culture, which are the properties of these songs (emotion, instruments, tempo). We miss also a description of the musical instruments used in the study, and a description of other musical concepts considered (e.g. tempo and timbre). It is very important to describe this in order to fully understand the links and results of the experiments.

- 2.2.1: please describe better the expression of the four seasons (Itten 1961) and relate it to the results in Figure 9 commented in 2.2.2.

- I miss a more rigorous analysis of the results of the three experiments, as Figures 11-19 and 20 only present and comments few examples. We would need to understand the results for all students following the same methodology, and see if we can get some conclusions on the general findings and individual differences in the way they related music, climate and emotions. It would then be interesting to analyze the agreement between the students, and if they select the same instruments and temporal patterns in the same way. I advise the authors to consider and relate to the large corpus of literature relating music to emotions that one would need to cite here, such as: [1] Juslin, P. (2019). *Musical emotions explained*. Oxford University Press. [2] Meyer, L. (1956). *Emotion and the Meaning of Music*. Oxford University Press. [3] Eerola, T., and Vuoskoski, J.K. (2013). A review of Music and Emotion studies: approaches, emotion models, and stimuli. *Music Perception: An Interdisciplinary Journal*, 30, 307-340. [4] Balkwill, L.L. and Thompson, W.F. (1999). A cross-cultural investigation of the perception of emotion in music: psychophysical and cultural cues. *Music Perception*, 17, 43-64.

#### Technical corrections

- I suggest the authors to add some complementary material to the paper which that can be useful for future educational and research activities on the area. I suggest to include a list of representative songs from Japan and Germany representative of each climate season

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- Figures 19 and 20 are difficult to read. I would suggest to add a description in the text.

As a conclusion, I think the paper topic is very interesting and there is a lot of work behind it, but I think it would benefit a lot from a change in the structure and a more detailed description of the results, so that the paper is self-contained for publication.

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