

Authors' Response to the Comments on gc-2020-18

Authors' Response to RC1 by Anonymous Referee #1

Thank you very much for your careful reading of our manuscript and very helpful comments and suggestions. We apologize for our not so quick response due to the unusual situation in our university affected by the Coronavirus epidemic and its prevention.

In the following authors' response to the reviewers' comments, we will italicize the comments, and add our answers below. In the answers, page and line numbers and figure numbers are based on the previous manuscript uploaded as the discussion paper.

<Overall comments> This paper is a unique interdisciplinary attempt to integrate the knowledge on regional climate and music in order to educate some of the fundamental ESD literacies, such as thinking of various complex relations, diversity, understanding of heterogeneous others to university level students by the authors several educational activities conducted in Okayama prefecture, Japan. While climate, or more precisely in this article, climatic seasonal changes in different regions can be more easily treated as objective methodologies, how to treat its counterpart "music" or cultural matters in objective scientific ways will be a hard task. The authors set three targeting issues in Japan and Europe. 1. Asymmetric seasonal feeling between early winter and early spring in Japan. 2. Seasonal feeling in Germany focusing on mid-winter "Fasnacht" for driving winter away. 3. Seasonal feeling in North Europe focusing on summer solstice festival. The selections of these specific seasonal events in each region are uniqueness of the authors' perspective, and still there remain some ambiguity on how to express such feelings in scientific ways, their educational examples show at least partly the effectiveness of their approaches in university education. The reviewer is not familiar with the overseas situations, but this will be a quite unique educational attempt to understand the global diversity through climate and music. Therefore, it will be worth describing their educational results on this matter. There are, however, some of the issues from a view point of climatological seasonal cycles in this paper as pointed out below. Therefore, the paper needs minor/major revisions.

Thank you very much for your showing an interest in our manuscript. We will revise our manuscript after the following manner by the consideration your comments and suggestions as below.

<Major comments>

1. Since this paper deals with regional climate, it will be better to add some references on the general regional climate features, for example, Arakawa and Taga (1969) for Japan, Schüpp and Schirmer (1977) for Germany, and Johannessen (1970) for Scandinavia.

Thank you very much for your suggestions. We will add these references on the general regional climate for three regions.

2. Climatological six seasons in Japan, Maejima (1967) will be the first to identify these natural seasons, different from the traditional "four seasons" in mid-latitude regions. Arakawa and Taga (1969) also stated Japanese 6 seasons. Better to refer this paper on the Japanese climatological seasonal cycle.

Thank you very much for your information. We will refer to Maejima (1967), Arakawa and Yaga (1969), on the Japanese climatological seasonal cycle with the "6 seasons".

3. The weather phenomena “Shi-gu-re” and the early spring snow “Awayuki” will be typically occurred in the semi-Japan Sea side climate situation (Suzuki, 1962), such as in Kyoto, but may rarely occur in the Pacific side climate such as in Okayama. This will be a big issue in regional climate recognition in Japan when educating this in Okayama. In addition, need to add the location of Okayama and Kyoto where most of “Waka” in Table 1 will be read in Fig. 5, and such information should also be elaborated on related with Table 1.

After your suggestion, we will add the locations of Kyoto and Okayama with the light modification in the right panel of Fig. 5, together with adding the figure’s caption as below. And in the text, it will be also mentioned that Kyoto is identified as the semi-Japan Sea side climate situation (Suzuki, 1962) and the “Shi-gure” may rarely occur in the Pacific side climate such as in Okayama where our lesson practices were performed. We will also add the statement in the caption of Table 1 to refer to the location of Kyoto in Fig. 5.

In addition, we would also like to note that, although there may be many students in Okayama University who have not experience either the Japan Sea side climate or the semi-Japan Sea side climate, they have learned them at least in junior high school. Thus we think that such phenomena would be not so inadequate for our lesson practice.

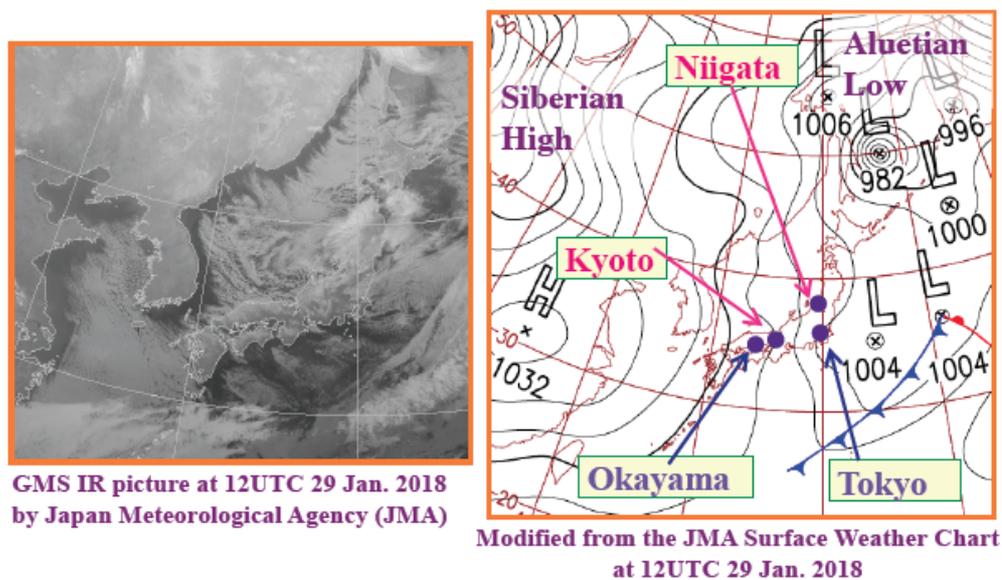


Figure 5: A typical example of the surface weather chart (right) and that of the infrared picture of the Geostationary Meteorological Satellite (GMS) (left) in the “winter pressure pattern” situations around East Asia in midwinter. These figures are cut out from the original figures provided by the Japan Meteorological Agency (JMA). Locations of the surface meteorological stations Niigata (the Japan Sea side), Tokyo (the Pacific side), Kyoto (semi-Japan Sea side) and Okayama (where the lesson practices by the present authors were made) are also added on the weather chart by the authors.

4. A number of regional different characteristics in seasonal cycles in Japan and Europe have been pointed out, but isn't it based on the different nature of the so-called “west coast” and “east coast” climate? Why winter temperature variations are larger in Europe compared in Japan?

Thank you very much for your comments. As for the mean values of the climatological variables, the different nature of the so-called “west coast” and “east coast” climate would be the important basis, including the role of the winter mean Icelandic low in the “west coast” climatic situation. It should be also noted that intraseasonal variation of the Icelandic low is very large. While the rather warmer days persists as the intraseasonal variation when the Icelandic low shifts near

the European side, due to the larger warm air advection, the temperature sometimes shows extremely low when it is located rather westward from the Europe, according to the case study of our group as briefly introduced in 3.3 (L232-235 in P8) (Hamaki et al. 2018, although written in Japanese). However, their analysis is limited to the case for 2000/2001 winter and the mechanism for the appearance of the extremely low temperature periods other than the absence of the warming effect of the eastward shift of the Icelandic low. Thus we only stated as the original manuscript.

However, the larger day-to-day variation of the air temperature around Germany and Northern Europe than in Japan seems to be very interesting also at the viewpoint of the relation to the “seasonal feeling”. As for the emotional sense, various subjective acceptance of the natural environment would be possible, depending on the inner situation of a person. For example, they might feel the seasonal coldness not only by the mean temperature but also by the intermittent appearing the rather low temperature situations in some regions. Although the objective relationship between such day-to-day variation and the “seasonal feeling” seems to be hard to be clarified by the authors’ special fields, it would be very helpful to understand/imagine the natural environmental around Germany and Northern Europe as an important factors relating to the “seasonal feeling” of the “severe winter” there, at the first step for the lesson practice on the interdisciplinary cultural understanding education.

5. The authors seem to show the severity of winter in Germany or North Europe only by temperature. Is it enough to show the severe winter feeling in Europe?

The authors also do not think it enough to show that and it is needed to examine the effects of the other factors. However, we thought that only paying attention to the day-to-day variability of the temperature as well as its climatological mean would give an unexpected fresh finding to the students and we showed only the temperature for understanding the severe winter situation in our lesson practice.

6. Non-English words are better to be written in Italic.

Thank you very much. We will do so.