Climate of the Past Discussions

Clim. Past Discuss., author comment AC2
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Reply on RC2

Junpei Hirano et al.

Author comment on "Analysis of early Japanese meteorological data and historical weather documents to reconstruct the winter climate between the 1840s and the early 1850s" by Junpei Hirano et al., Clim. Past Discuss., https://doi.org/10.5194/cp-2021-33-AC2, 2021

Response to reviewer2

We greatly appreciate valuable comments and suggestions provided by reviewer #2. Below is a list of individual comments and questions followed by our responses:

Reviewer2: comment1

In Fig.1, nine locations were selected to find out the synoptic weather patterns in Japan. Are they the only locations that have available historical weather records□ If not, how are they selected.

Author: response to comment1

Many thanks for this valuable comment. Although historical weather documents are available for other locations, they often contain missing records or gaps. In particular, regarding the East Asian winter monsoon, very few continuous weather records are available for the area on the windward (Sea of Japan) side of Japan. Sparce coverage of complete weather records in this area could cause uncertainty in results, such as missed winter monsoon outbreaks.

In the revised manuscript, we will analyze interannual and intra-seasonal variations of the East Asian winter monsoon for the period from 1839/40 to 1853/54, following the reviewer's comments. For this analysis, it would be inappropriate to use sporadic weather records. Therefore, we will select two diary data sets (Hirosaki and Kawanishi, the first and second locations from north to south, Fig. 1 of original manuscript) for the windward (Sea of Japan) side of Japan. Both diaries have almost complete daily weather records for the entire study period. With the exception of these two records, there are very few continuous diary data sets available for the Sea of Japan area. Furthermore, we will use daily temperature series as observed in Tokyo to detect the outbreak of the East Asian winter monsoon. We will add these explanations in the revised version of manuscript.

Reviewer2: comment2

Also in Fig.1, the second location (counted from the north to the south) is considered as location in the Sea of Japan side. However, we can see from the elevation map that it locates in the northeast side of a mountain (or a high-altitude area), which is the leeward side relative to the East Asian winter monsoon. Also, according to Fig.5(d)-(e), it seems that there is limited precipitation in this location during WMDs. So, is it appropriate to classify it as the Sea of Japan side□

Author: response to comment2

Thank you for this comment. According to the climatic divisions by Suzuki (1962), this location (Kawanishi, counted from the north to the south) falls within the Sea of Japan (windward) side climate zone. The climatic divisions by Suzuki (1962) are classified based on daily precipitation patterns in a typical "winter monsoon type pressure pattern day." Therefore, after careful consideration, we decide to retain the classification of this location as falling within the Sea of Japan side climate zone. In the revised manuscript, we will refer to Suzuki (1962) concerning climatic divisions.

Reviewer2: comment3

According to line 182-183, the format of weather description in JMA data changed significantly after the mid-1980s, which makes it not appropriate for identification of synoptic weather patterns. Could you give an example in the text?

Author: response to comment3

Thank you for this suggestion. In the revised manuscript, we will present an example of weather descriptions before and after the mid-1980s.

Reviewer2: comment4

In line220, the continuous WMD days are not selected in the composited analysis (except the first WMD). But it's not quite clear to me that are there WMDs in the "preceding four days" □ For example, suppose the WMD series from day 1 to day 5 is "WMD1-normal-WMD2-normal-WMD3", are WMD2 and WMD3 adopted in the composite analysis, or only series like "normal-normal-normal-normal-WMD" adopted?

Author: response to comment4

Apologies for the insufficient explanation in the original manuscript. We decide to use "normal-normal-normal-normal-WMD" and we will add this explanation in the revised manuscript.

Reviewer2: comment5

In section 4.2, a case study is conducted for the winter of 1973/74. Why is this year selected? This seems a bit abrupt.

Author: response to comment5

Thank you for this comment. In the revised manuscript, we will select the coldest and warmest years based on seasonal (DJF) mean temperatures in Japan. From this, we will conduct a case study for the selected winters.

Reviewer2: comment6

Similar to the last question, the historical case is for the winter of 1851/52. I think that the argument would be much more reliable if the study period is longer than one year. If the digitization of the surface pressure observation requires large amount of work, it is feasible to use the data of just Tokyo and Nagasaki, since this study already shows that SLP N-T is as effective as SLP B-T capturing the activity of the East Asian winter monsoon.

Author: response to comment6

Thank you for pointing out this. In the revised manuscript, we will expand the study period to extend from 1839/40 to 1853/54. Unfortunately, we found some quality problems in SLP data for Tokyo in the 1840s. Therefore, we decide not to use SLP data for the analysis of inter-annual variations during this period. However, daily temperature observations in Tokyo from 1839/40 to 1853/54 did not have any quality-related problems. Therefore, we will detect "winter monsoon outbreak days (WMD)" by using daily temperature data for Tokyo and two diary data sets for the Sea of Japan side. In addition, we will used SLP data for a case study.

Although we plan to use a limited amount of data (daily temperature data for Tokyo and two diary data sets for the Sea of Japan side,) results from preliminary composite analysis indicate that the outbreak of the East Asian winter monsoon can be detected from these data.

Reviewer2: comment7

In Fig.7(b) and (c), the bold purple line did not appear in the legend (also in Fig.8).

Author: response to comment7

Thank you very much. Bold purple line indicates 5-day moving average. In the revised manuscript, we will add it in the legend.