

## ***Interactive comment on “Atmospheric circulation controls on the inter-annual variability in precipitation isotope ratio in Japan” by N. Kurita et al.***

**N. Kurita et al.**

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Dear Reviewer #2

I'm grateful for through evaluation of my work provided by the two reviewers of the original submission. I have accepted all of your comments, and following your suggestions, manuscript has been extensively revised.

Among the most significant changes made to conclude that the intensity of the East Asian Monsoon (EAM) is the primary driver of variations of Japanese precipitation. East Asian Monsoon is a one of great concern for paleoclimatologists, and our findings lead to that the isotope proxy records in Japan can be used to reconstruct the past

C2146

EAM. This is an improvement in isotope proxy interpretation in Japan. So that we think the subject of this study is within scope of the CP. Please see attached revised manuscript in detail.

Here I describe my reply to your comments.

# List of major revisions:

1. This revised manuscript has been largely reorganized and rewritten to show that the isotope variations in Japanese precipitation reflect the intensity of East Asian summer and winter monsoon. Unlike China, the seasonal isotopic variation in Japanese precipitation is less sensitive to the monsoon precipitation. Thus, we cannot apply the interpretation for Chinese speleothem  $\delta^{18}O$  to Japanese stalagmite. To reconstruct the past EAM from isotope proxy records in Japan, first we have to clarify the relationship between the isotopic content in Japanese precipitation and the EAM. Through this study, we demonstrate that the intensity of the EAM is the primary driver of variations of Japanese precipitation, and this finding would lead to improve the proxy interpretation in Japan. Thus, we think the subject of this study is within scope of the CP.

2. To explain how useful our study to paleoclimate study, we added a new “motivation” subsection in Introduction and added new Figure 1.

3. Section 5 and several Figures were removed, and then the new discussion to show how the EAM variability influences the isotopic composition in Japanese precipitation and Figure 10 were added.

# Reply to your line by line comments

3991 5 “develop”, please consider using present tense throughout manuscript

Response: Done

3991 7 “re- constructions”

Response: Done

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3991 9 “correlations”

Response: Done

3992 5 “from tropical regions”

Response: Done

3991 11 missing reference (?)

Response: Fixed

3993 1 “contrast with the tropics”

Response: This phrase was removed

3993 6 “in the mid-latitudes over”

Response: Done

3993 14 “occurs in response”

Response: Done

3993 24 “using a new”

Response: Done

3993 27 “ composition”

Response: Done

3994 1 Unclear what is meant by “moisture-formed precipitation”

Response: A words of “moisture-formed” was removed. 3994 19 “much greater than”

Response: Done

3995 11 “In comparison, during the summer, low- level. . .”

Response: Done

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3996 8 abbreviation “LT” was not introduced.

Response: Done

3997 1-4: I do not think it is valid to use the comparison between laser and cold trap to correct for both humidity dependence and drift. For example, is the difference between a given cold trap and laser measurement a product of the humidity or the drift? It would be better to correct for drift using only isotopic measurements taken from a narrow humidity window and then apply the humidity correction following the drift correction.

Response: The comparison between laser and cold trap was only used for H<sub>2</sub>O-concentration-delta D response. We do not care drift correction. The difference with cold trap of 88 percent (265/298) of laser measurement is less than 3 permil. This value is quite smaller than the range of natural variability shown in Figure 3. Thus, we ignore drift correction. This is mentioned in the Section 2.2.

3997 20 “consists”

Response: Done

3999 2-5 I do not follow the meaning of the sentence beginning “We can therefore. . .”

Response: In order to make clear meaning, we modified this sentence.

4000 17 Specify that the d excess is only from the cold trap samples

Response: Done

4001 2 “sensitive to pre- cipitation amount”

Response: Isotopic variation in surface vapor is not related to precipitation amount. Here I mentioned that the isotopic changes in surface vapor occurred when precipitation was observed. In order to avoid misunderstanding, we modified this sentence.

4001 3-5 What is meant by this: “amplitude of the depletion was closely related with the dD of the precipitation.”

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Response: This means that isotopic minima observed during the rainfall correspond to the calculated values of vapor in equilibrium with precipitation. In this revised manuscript, we modified this sentence.

4001 6-9 It is not appropriate to say that the vapor is “identical” to the variation in the precipitation. Perhaps, you could say the vapor can be derived knowing the temperature and the dD of the precip.

Response: We change the words “be identical to” to “reflect”.

4001 20 “relatively higher. . .by low. . .rainfall amounts.”

Response: This sentence was removed from the revised manuscript.

4002 8 “connected”

Response: Done

4002 11 “similar to”

Response: Done

4002 15 Again, “identical” is not really an appropriate term. If the two are similar, how similar? Please specify.

Response: I cannot find a word “identical” in this sentence. In this revised manuscript, the word “identical” was replaced to the other words.

4002 17 “We conclude. . .”

Response: Done

4002 25 “trajectories (Pcumul) over 9h. . .”

Response: Done

4003 8 “Also, since. . .”

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Response: Done

4004 11 “Therefore, precipitation”

Response: Done

4005 4 “variations for central Japan. . .”

Response: This sentence was removed from the revised manuscript.

4005 12 “rainfall events”

Response: Done

4005 16 “while the air mass travels through”

Response: Done

4007 24 “multiple scales”

Response: Done

4008 Much of the discussion on ENSO, AO, Pacific Japan pattern should all be introduced in the Introduction when discussion on controls of synoptic meteorology are discussed. In general, all of the discussion on the met should be condensed.

Response: These sentences were removed from the revised manuscript.

4009 5-13 The discussion on the ENSO regime shift comes across as very speculative.

Response: This discussion was removed from the revised manuscript.

4009 15 “well-known climate”

Response: These words were removed from the revised manuscript.

4010 19 “enhanced storm”

Response: These words were removed from the revised manuscript.

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Figures Figures 1 and 2 should be condensed into single figure.

Response: Figure 1 and Figure 2 was condensed, but we added new Figure 1 to explain our motivations.

Perhaps even Figure 13 could also be condensed into that same

Response: In this revised manuscript, we reduced the number of Figures. Now Figure 10 is the last.

Figure Figure 8 should be removed

Response: Done

Figures 11 and 12 could also be represented in a single figure.

Response: We removed both Figure 11 and Figure 12.

Please also note the supplement to this comment:

<http://www.clim-past-discuss.net/10/C2146/2014/cpd-10-C2146-2014-supplement.pdf>

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Interactive comment on Clim. Past Discuss., 10, 3989, 2014.