Clim. Past Discuss., 7, C1148–C1151, 2011
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Climate of the Past Discussions

Interactive comment on "Synchronicity of the East Asian Summer Monsoon variability and Northern Hemisphere climate change since the last deglaciation" *by* T. Shinozaki et al.

Anonymous Referee #1

Received and published: 2 August 2011

General comments: The authors established a high resolution peat cellulose δ13C series and compared their curve with those in northeast China and others worldwide. They found a wet-cold/warm-dry climate pattern over the mid-high latitude of East Asia, which is inversely related to that over mid-low latitude. They ascribed such a climate pattern to the intensity and south/north movement of ITCZ and western Pacific sub-tropical high. In general, the paleao- climatic changes of East Asia and the dynamics behind have been widely concerned and have aroused warm discussions, especially for the most recent years. The location of this study should be an ideal choice to study climatic dynamics of the East Asia, and the high resolution samples with large number of dating measurements are valuable. However, the writing, discussion, and some fundamental questions make me to suggest a major revision before publication.

Specific comments (1) The variation of δ13C in atmospheric CO2 is about 0.5‰ (Fig.3 e), which is too small compared with those in peat cellulose (about 8‰ in this study; Fig.3 d). The variability of δ13Catm is also incomparable with that of peat cellulose δ13C. Therefore, it is not necessary to calibrate the peat cellulose δ13C data with δ13Catm. In addition, how is the calibration done? From Fig.2, I note the δ13C' (after calibration) is ranged between -24$\sim$-32‰ does this imply that the original data may vary between -30$\sim$-40‰İf so, it seems to be quite negative for peat cellulose? Then it is important and necessary to provide the modern plants δ13C data around the study site. I note a work of Akagi et al. (Geochemical Journal, Vol. 38, pp. 299 to 306, 2004), in which the peat δ13C data seem to be more moderate (about -23‰$$\sim$-27‰. I therefore suggest the authors to check the experiments (e.g. the cellulose extraction, and δ13C measurements) and/or calibration method.

(2) The lithology is helpful to constrain the climate pattern, it is better to describe the lithology in detail. Does the profile possibly contain some sections of lacustrine sediments? The authors mentioned two sand layers, this may be useful to understand the climates and to constrain the "peat δ13C$\sim$climate" response pattern at the study region. Are these two layers correctly marked in the lithology figure? The two layers are about 10cm and 20cm in depth, how to date there? By the way, the TOC data varied within a large range (0$\sim$50%; Fig.2 b). This possibly suggests notable changes in lithology. A high resolution TOC measurements or weight loss on ignition may be helpful to catch both the climatic trend and events.

(3) About 6000-9000 is a traditionally generally warm/wet period. However, sedimentation rate during this period is slow (as shown in Fig.2), and the δ13C during this period is very negative. These two features are very similar with those in the Younger Dryas interval. What does this imply?

(4) The Hani peat δ13C curve has been extended to about 14000 aBP (see Hong et

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al., 3P, 2010ïijŇ297: 214-222), I suggest the authors to compare their Tashiro curve with the whole Hani peat δ13C curve. I note although these two curves show high synchronicity for millennial climatic events in the Holocene, they also show general antiphase trends during about 15000∼10000 aBP. Does this imply different climatic dynamics or different "peat δ13C∼climate" response pattern? Comparisons with more climatic records, especially those of nearby sites, like Lake Biwa, Lake Suigetsu, Maboroshi Cave, would therefore be helpful to constrain the "peat δ13C∼climate" response pattern and the climatic dynamics.

(5) Continue from (4) : Climatic significance of peat cellulose δ13C P 2162, Line 7∼15, It is no need to cite so many peat-related but not directly relevant literatures here. Instead, more sentences about the climatic response pattern of grasses should largely improve the reliability of the proxy. How does the modern grass δ13C response to climate around the study region?

(6) Paleaoclimatic records covering the last deglaciation of East Asia are important to understand the nature of East Asian summer monsoon. However, the present literatures show very complex paleaoclimatic changes in Japan, e.g. the debates on YD-like and ACR-like (Antarctic Cold Reversal) patterns of Japanese paleaoclimatic records. Different proxy index may respond to different aspect of the climatic changes. Therefore, it is necessary to develop more indices with high resolution and robust dates. From this point of view, the Tashiro mire can provide ideal sediment to extract high resolution and well-dated paleaoclimatic information. The present work showed interesting result; however, much more work, both on the development of more proxy indices and on the interpretation of climatic significance, is necessary before deep discussion.

Some minor points (1) P 2184, Caption of table 1: ". . ...121114cm depth"? (2) P 2167, accumulation flux calculation, the units need to be checked. (3) P 2166, line 5, reference Shinozaki et al., 2011, is not appeared in the reference section. (4) P 2163, the geological location coordinates; change 144° to 140°? (5) P 2187, Figure 2, dencity to density? (6) I suggest marking the tephra dates in the AMS 14C dating curve. (7) P

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2169, line 5-10, the present sentence is hard to read through, need to be reorganized. (8) P 2190, Fig.5, the present caption is quite confused with some English writing error, needs to be rewritten.

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