Clim. Past Discuss., 7, C1188–C1190, 2011
www.clim-past-discuss.net/7/C1188/2011/

Climate of the Past Discussions

Interactive comment on "Reconstruction of southeast Tibetan Plateau summer cloud cover over the past two centuries using tree ring $delta^{18}$O" *by* C. Shi et al.

Anonymous Referee #2

Received and published: 9 August 2011

General Comments

I think that this paper should be published eventually in this journal because there have been very little data sets on tree-ring d18O in this region and this paper is based on the reasonable sample selections and analytical methods and the reliable statistical treatments. However, I have a suspicion on the most important point of this paper that is whether the authors have successfully reconstructed cloud cover or not.

Obviously, there is no direct linkage between cloud cover and tree-ring d18O although there are some papers discussing about the apparent linkage between them. As the authors discuss in detail in section 4.1, there are some clear meteorological parameters

governing the tree-ring d18O, such as the globally and/or locally controlled precipitation and water vapor d18O and the in-situ relative humidity. The apparent correlation between cloud cover and tree-ring d18O, therefore, must be owing to an indirect linkage through local moisture condition which directly relates to both of the cloud cover and the relative humidity and/or water d18O.

As authors explain very clearly in the Introduction, cloud cover is very important parameters in Earth climate system, and it is very influential in the study of climate system if you present past records in the cloud cover using some proxy records. Therefore, the reconstruction of past change in cloud cover based on an apparent correlation between a proxy record and cloud cover owing to an indirect linkage may result in serious misunderstandings of Earth climate system. For example, as the authors point out in page 1826 (line 20), cloud cover is sensitive not only to atmospheric moisture condition but also to aerosol load by both volcanic eruption and human activities. When the cloud cover changes by the aerosol load without changes in moisture condition, does the tree-ring d18O actually follow the change in cloud cover? I do not think that the tree-ring d18O directly reflects the changes in cloud cover in case of the constant moisture condition. This simple consideration inevitably makes us as careful as possible when we discuss the past changes in cloud cover using the tree-ring d18O.

According to the above-mentioned viewpoint, I think that this paper is too biased to be understood fairly by ordinary readers outside tree-ring isotope experts as follows.

1) Authors calculate the past change in cloud cover in Figures 2 and 3 directly from tree-ring d18O before the serious consideration of possible changes in other parameters. This may cause a serious misunderstanding and limitless use of the "cloud cover" record by non-expert readers of this paper. As authors discuss at the end of this paper (Page 1834, line 24-26), the process-based understanding of the link between cloud cover and tree-ring cellulose d18O must be investigated before its direct application.

2) There are no clear discussions in this paper why the cloud cover has changed his-

torically as shown in Fig.3 except the discussions of hydro-meteorological dynamics which does not necessarily relate to the cloud cover. This inevitably suggests that the authors need not reconstruct the cloud cover and it is enough for the authors to reconstruct past changes in moisture conditions from the tree-ring d18O.

Therefore, I strongly recommend authors to change the main target of reconstruction in this paper from “cloud cover” to “moisture condition”, which is different from the cloud cover itself and directly controlling the tree-ring d18O.

Specific Comments

(p.1829 line 21-22) What does the “very heterogeneous cellulose” mean? Even in the very heterogeneous sample, the average d18O value of the “six measurements” must nearly represent the real averaged d18O.

(p.1829-1830 Section 3.2) It seems strange that authors only shows the apparent linear calibration equation (1) without any explanations of background mechanisms linking the tree-ring d18O to the cloud cover.

(p.1832 Line 29) I cannot find the referred paper (Shi et al., 2010) in the list of References.

(p.1833 Line 8-9) If there are only very slight correlations in the precipitation d18O between the tree ring site and the ice core site, it is meaningless to compare the d18O time series between them in Fig. 4.

Technical Comments

(Fig.1) The white circle at Bomi site is not clear.

(Fig.1) Longitude and latitude numbers should be indicated around the inserted small subplot (top-left corner), too.

Interactive comment on Clim. Past Discuss., 7, 1825, 2011.