

***Interactive comment on “Temperature variability at Dürres Maar, Germany during the migration period and at high medieval times, inferred from stable carbon isotopes of *Sphagnum* cellulose” by R. Moschen et al.***

**Anonymous Referee #2**

Received and published: 15 April 2011

1) The topic of the paper is very relevant to past climate research, because the authors apply a method ( $\delta^{13}\text{C}$  of sphagnum) as a temperature proxy for the medieval age for which reliable historical data and tree-ring based paleotemperature reconstruction are available. The pattern of the  $\delta^{13}\text{C}$  sphagnum record matches the tree-ring based proxy within an acceptable error from the  $^{14}\text{C}$  analysis. This match is of high importance for other peat sites from the pre Holocene past, or from high latitudes, where no trees existed or can survive. According, establishing the  $\delta^{13}\text{C}$  sphagnum would be a big step forward for Pleistocene climate research.

2) The method of  $\delta^{13}\text{C}$  sphagnum is not new, but not yet established, accordingly, every well dated record is an important piece of work.

3) The authors reach substantial conclusions on the applicability of the record. On the other hand, the  $\delta^{13}\text{C}$  record of the last 100 years does not match the modern measured temperature variations in the larger Eifel area. The authors state this very frankly, but it indicates that the  $\delta^{13}\text{C}$  of sphagnum is not fully understood. This must be reached before this method can indeed be faithfully applied to older records where tree ring based data are not at hand.

4) I see one point where I disagree with the authors. The age model for depth below 5 m appears arbitrary to me. There is one  $^{14}\text{C}$  age which appears too young and is excluded from the age model, but the one used is too old. Whatever happened at that time (Roman peat cutting, thus a hiatus) extreme  $^{14}\text{C}$  production, coring problems cannot be judged from the present record. The authors should add more  $^{14}\text{C}$  dates or exclude the section below 5 m from their interpretation, in particular because the find of a cold Roman period is in sharp contrast to the current understanding of the climate of that time.

5) The title is misleading, because the convincing results are about the medieval times, not the migration period, for which the age model is partly weak.

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Interactive comment on Clim. Past Discuss., 7, 535, 2011.

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