

Interactive comment on “Postglacial fire history and interactions with vegetation and climate in southwestern Yunnan Province of China based on charcoal and pollen records” by Xiayun Xiao et al.

Anonymous Referee #2

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General comments:

This paper reports a high resolution of macroscopic charcoal record from Qinhai in the monsoon region of China for the last 18500 yrs cal BP. A lower resolution charcoal record is already published in Xiao et al. 2015 JQS as well as the pollen analyses. In addition to the high resolution charcoal record, the novelty concerns fire and vegetation interaction using fire episodes and frequency indexes compared to vegetation diversity indexes obtained from pollen assemblages from the same core. The authors reach the conclusion that fire occurs during cold and dry climate periods characterized by evergreen oaks and *Alnus*, and that fire lead to decrease in abundance of *Lithocarpus/Castanopsis* and tropical arbors. The material and methods section (and related

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figures) should be reduced as this is already published in details in Xiao et al. 2015 JQS. The discussion section needs to be restructured with a clear description of fire adapted and fire-sensitive taxa found in the region today in order to discuss fire impact on vegetation through time, and a discussion about how climate/monsoon drives the vegetation in the region should be presented before discussing the possible role of fire on the vegetation. Specific comments below should help to improve the manuscript in this way.

Specific comments:

- Title: it seems from the reading of the title that the charcoal and pollen records are new – remove “based on charcoal and pollen records”
- Line 12 page 1: compared with the pollen record – already published in Xiao et al 2015 JQS. Please modify to read “compared with major taxa and diversity indexes” or something similar.
- Line 10 page 2: the reference of Power et al. 2008 is wrong here
- Line 21 page 2: “resulting in forest fire occurring frequently” please add some words here or in regional setting about the kind of vegetation that is burning today and the different fire adapted taxa and fire-sensitive taxa found in the region. This would help to follow the discussion.
- Line 25 page 2: would be good also to discuss macrocharcoal results and Black Carbon of the same core published in *Palaeogeography, Palaeoclimatology, Palaeoecology*, Volume 435, 1 October 2015, Pages 86-94 by Zhang et al.
- Material and Methods - section 3.1: the Table 1 and age model (Figure 3) are already published in details in Xiao et al. 2015 and in Zhang et al. 2015. Table 1 and Figures (3a and 3b) should be removed and references should be clearly indicated in the Material section 3.1. If the authors want to republish the age model, they should update their record from IntCal09 to IntCal13. For macroscopic charcoal analysis: please indicate

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that a low resolution record is already published in Xiao et al. 2015. Please explain in what the high resolution charcoal record will help to understand fire, vegetation and climate in this region.

- Line 20 page 4: why standardizing pollen percentages? Please justify your approach.

- Line 7 page 5: fire episode magnitude –discrepancy between units (particles/cm²) and the total charcoal influx?

- Results – Chronology: remove this paragraph because this is already published in details in Xiao et al. 2015 – or shortened it and put this in the Material and Methods section – but clearly it is not new results. Keep the description of the temporal sampling of charcoal however.

- Section 4.2 Charcoal record, fire events and palynological diversity indices: this section is difficult to follow because the numbers reported in the text is not readable on Figure 4. Change the scale of the units reported in Figure 4. In addition, the authors describe the charcoal variations following pollen subzones determined in Xiao et al. 2015 but for pollen subzone TCQH-2 they changed this approach and determined subzone based on fire activity? As this paper is a focus on fire activity would be better to describe what is happening using fire activity zones and not following pollen subzones. Zone TCQH-4: only one fire event was detected – did the authors try several smoothing window and check whether this event remains in case of changing the smoothing background?

- Line 22 page 7: “In the last 50 years, the charcoal concentration was still very low, and the relatively high CHAR may be at least partly due to the high sedimentation rate.” Using the charcoal accumulation rate (CHAR) or in other word the charcoal influx instead of concentration is supposed to avoid “wrong” signal of fire in terms of concentration due to dilution. This sentence is unclear.

Discussion section: - Line 23 page 7: same comment as above about the sedimenta-

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tion rate.

- Line 16 page 8: While frequent fires appear to occur during the YD, it is unclear during the H1 giving the dates used by the authors (see Sanchez Goni and Harrison 2010, QSR – HS1 is between 18 to 15.6 kyr cal BP) and the choice of using pollen zone to describe charcoal trend. In this case, low fire frequency is recorded during HS1.

- From line 29 page 8: Artemisia pollen percentages are also high in TCQH-1b. Why Poaceae and Artemisia would be indicative of human activities from 4.3 ka? “Superimposed influence of human activities and climatic cooling and drying” what are the proxies that indicate a cooling and drying then?

- Line 9 page 9: again unclear about dilution and charcoal influx. Add the sedimentation rate curve to one of the figures.

- Line 13 page 9: “Paleofire studies at global scales reveal that high fire activity occurred during warm interstadials or interglacials, and low fire activity occurred during cold stadials or glacials (Power et al., 2008; Mooney et al., 2011; Marlon et al., 2013)”. The reference of Mooney et al. 2011 is for the Australasia, regional scale. Add for interstadials and stadials Daniau et al. 2010 QSR. Marlon et al 2013 is for the Holocene only.

- Line 7-8 page 10: same comment about references

- section fire activity and vegetation: this section would benefit of a clear description of what are the fire adapted and fire-sensitive taxa found in the region today. In addition, it would be good to discuss how climate/monsoon drives the vegetation in the region before discussing the possible role of fire on the vegetation composition.

- Figure 2 is already published in Xiao et al. 2015.

Technical details: - Line 3 page 9 and others: “Editorial Board” modify to read “Editorial”

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