Clim. Past Discuss.,
doi:10.5194/cp-2016-38-RC2, 2016

Climate of the Past Discussions
Open Access
EGU

Interactive comment on "A 413-year tree-ring based April-July minimum temperature reconstruction and its implications on the extreme climate events, northeast China" *by* S. Lyu et al.

Anonymous Referee #2

Received and published: 26 May 2016

Long tree-ring chronology is always exciting. I'm happy to see this manuscript developed a 413-year-long tree-ring chronology in northeast China, the longest one so far in this region. Following the basic procedure of dendroclimatology, this manuscript reconstructed the April-July minimum temperature. However, this manuscript failed to detect the driving mechanism of April-July minimum temperature variation. The periodicity analysis revealed cycles similar to sunspot activity cycles. It only means solar forcing likely play a crucial role in past climate change in the Laobai Mountain region. To support such ideal, more evidences are needed (such as comparison with the sunspot series or so). The periodicity analysis along is far from enough. Under the comprehensive consideration, I don't think this work is good enough to meet the high quality of the

Printer-friendly version

Discussion paper

journal (Climate of the Past) at current situation. I provide my personal concerns in the following part, hoping it will be helpful to the further progress of it.

Major concerns 1. It's impressive that the authors collected 54 cores from 31 trees in the studied area, and all the cores are used and successfully cross dated. The standard tree-ring chronology extended from 1600 to 2013, and lucky enough, EPS>0.85 also starts from 1600 (5 cores). However, the fact is that the core number during 1600-1650 is less than 5 (Fig. 2a). Please check this inconformity. Moreover, the quality of the chronology during around 1670-1710 is low because both EPS and Rbar decrease sharply. For the above reasons, I have to doubt the starting year of the reliable chronology. 2. Why do you deal Xt with ln (Y=2.728ln(Xt)+7.812)? What's the philosophy behind it? I never see such kind of transfer function in dendroclimatology. 3. In Fig. 4a, the year to year (high-frequency) variations of the reconstruction and actual April-July MMT didn't match well. The high correlation (0.757) may be caused by similar trends. This is the biggest problem of this manuscript. What's the direct correlation coefficient between tree rings and April-July minimum temperature? Did you calculate the 1st-difference correlation coefficient between them? Therefore, the following discussions (especially the extreme cold years in Fig. 4b) are meaningless and unconvincing. 4. Table 1 indicates that "the autocorrelation order 1" is 0.75, thus except for the current year climatic records, the previous year climatic records should also be included in the climate-radial growth relationship. 5. When you do the climate-radial growth relationship analysis, current November and December shouldn't be considered. Because the annual frost-free period in the studied area is approximately 90-110 days (page 3, line 17), which means the growth season is very short. So the tree-ring width almost stops expansion in November and December. If you consider these months, please give convincing reasons. The explanation in line 5-7 in page 5 is not suitable. 6. Theoretically, it's unreasonable to compare this temperature reconstruction (April-July) with the October temperature by Yin et al. (2009), and the February-April temperature in Changbai Mountains (Zhu et al., 2009) (Fig. 5), which was influenced by the East Asian Winter Monsoon. 7. What's your definition of Little Ice Age (LIA)? According to the general

definition of LIA, the period before 1850 of this reconstruction belongs to LIA. Except for the temperature during 1605-1681 was very low, the other periods before 1850 was not so cold. Furthermore, the comparison with Northern Hemisphere temperature (NHT) (Fig. 5) is not so good. NHT (Wilson et al., 2007) showed evident increasing trend since around 1810, while this temperature reconstruction doesn't show such direct warming trend. The temperatures during most time of 19th even had opposite phase to NHT. 8. CE is a more rigorous parameter than RE in split-period calibration and verification analyses, please offer this parameter in table 2. Minor concerns 1. A map showing the general location of sample site and meteorological station is useful in helping the readers get an intuitive understanding of this work. 2. The general information of the sampled species in this manuscript should be given. It will be helpful for the understanding the following climate-growth relationships. 3. Detailed information of sampling site (e.g. longitude, latitude, main vegetation types) is needed. 4. I don't agree that 1684-1690 is a cold period and 1787-1793, 1795-1801 and 1803-1808 are warm periods (Table 3, Fig. 4b). 5. The time span in Table 1 is 1600-2014. Should it be 1600-2013? 6. 1600-2013 is 414 year, not 413 year. 7. The percentage of references during recent 5 years, especially during recent 3 years is too low.

Interactive comment on Clim. Past Discuss., doi:10.5194/cp-2016-38, 2016.

Printer-friendly version

Discussion paper