

Interactive comment on “Climate changes recorded by Hani Peat in Northeast China over the past 13.8 cal ka BP” by Ge Shi et al.

Anonymous Referee #1

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Two records were collected in Hani peat-land. The LOI_{550°C} (organic matter content) and Rb/Sr ratios (chemical weathering) over the past 13.8 ka were analysed to discuss the climate change in Northeast China and the evolution of East Asian Summer Monsoon (EASM). The organic matter content and chemical weathering were compared with previous lake and peat-land temperature and precipitation proxy records from northeast China. The manuscript is well presented and provides results of two new proxies research for northeast China that will contribute to the knowledge of the evolution of East Asian Summer Monsoon (EASM) and adds relevant information to improve our understanding of the past climate based on multi-proxy climatic records in this region. The text mentions a long-term "positive correlations" trend between LOI_{550°C} and Rb/Sr ratio over the past 13.8 ka (decrease Rb/Sr ratio value while increase

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LOI_{550°C} value) (Figure 6f,g). Also, three specific events marked by an abrupt decline in organic matter content at c. 8.2ka, 5.5 ka and 0.22 ka are identified. These events are "negatively correlated" with Rb/Sr ratio value (increase Rb/Sr ratio value while LOI_{550°C} value decrease) (Figure 7c,d). However, I am concerned about the choice of time periods, when the authors used the terms "positive correlations" and negatively correlated" (see below) and, about the figure 6t does not show Rb/Sr ratio value for the last 1.0 ka, thus it is not possible to see any correlation between LOI_{550°C} and Rb/Sr ratio by 0.22ka (as the authors present). The figure 6f and g do not show clear decreases in Rb/Sr ratios from early to mid Holocene in the Hani peat record (c.12-7.0 ka.). The strength of the interpretations depend on where and when the starting point of the indicator arrow is chosen. For instance, if the horizontal line is drawn at 0.5, when the values for each element are the same (Figure 6f), the general trend of Rb/Sr ratio between (c.10-7.0 ka.) is stable, with values remaining around 0.5 (slightly strong EASM intensity during the mid-Holocene). Then, the lowest Rb/Sr ratio value between c.7.0-6.0 ka suggests a strong EASM intensity, followed by general trend to increase in Rb/Sr ratio value (less strong/weak EASM intensity) towards present. The same comments for LOI_{550°C}, if the horizontal line is drawn in Figure 6g at 80% of LOI_{550°C} (water content versus organic content is linear up to loss ignition =80%), the figure show a general warmer climatic conditions between c.9.0-5.0 ka suggests a strong EASM intensity (suc. mag) during the mid-Holocene, followed by general trend to increase in Rb/Sr ratio value (less strong/weak EASM intensity) towards present. In addition, this work highlights the decrease in LOI_{550°C} and the correlation with the Rb/Sr ratio value, thus it is key to show any tephra layers in the stratigraphy to exclude them for the interpretation. The authors do not discuss two major periods of abrupt change shown in their work, these events show the lowest organic matter content due to the sandy layer deposition and the lowest Rb/Sr ratio by c. 11.3-10.3 cal ka BP and c. 2.0-1.4 cal ka BP, respectively. The authors suggest that there insufficient evidence to discuss "the dynamic mechanisms of the two depositions events". However, there are previous works about tephra deposition in Hani peat-land coeval to both deposition

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events (Huang et al., 2015; Zhao et al., 2016 among others). The drastic decrease in LOI 550°C by c. 8.2ka and the increasing of Rb/Sr ratio suggests a cold-dry climatic event (reduction of weathering intensity), consistent with falling in temperature is slight decrease in precipitation (Figure 6acd) in other published Hani peat proxy records. The evidence suggests a weak East Asian monsoon (hot/wet summer) during the 8.2 ka. event highlighting the sensitivity of the peat for EASM reconstruction. The comparison between Rb/Sr ratio and CaCO₂ (previous works) would have allowed stronger interpretations of specific time intervals Hani peat, because the Rb/Sr ratio appear to be a response to moisture conditions or effective moisture conditions (figure 7f). An increase of Rb/Sr ratio is consistent with increase in percentage tree cover at Daihal Lake, except during the short-time c.8.2ka event, perhaps because of the low resolution pollen intervals around 8.2ka.

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