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Climate of the Past Discussions



# *Interactive comment on* "Precipitation variations of Longxi, northeast margin of Tibetan plateau since AD 960 and its relationship with solar activity" *by* L. Tan et al.

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The paper is well written and has a good structure and logicality. The topic is very interesting and promising to the readership of CP. I read the paper with great interest.

China is strongly influenced by monsoon precipitation. The study area of this paper, Longxi Area, is located in the north margin of the Asian summer monsoon, and the precipitation is sensitive to Asian summer monsoon. However, as stated by the authors, high-resolution geological/biological climatic proxies of past 1000 years are very few, and the meteorological data here cover just several decades. Searching high-resolution climate records over the last millennium is therefore of special importance.

The authors exacted climate information from various Chinese historical literatures and reconstructed the precipitation variations of Longxi since AD 960. Then, they compared it with the precipitation variation in Lanzhou (Gansu Province) and Dulan (Qinghai Province). The authors further compared the reconstructed precipitation variation with the variations of the solar activity and the temperature of the northern hemisphere. They supposed that solar activity may be the main driving force of precipitation variations of east part of northwest China on multi-decadal to centennial scales in the last millennium.

However, I remain somewhat unsatisfied after a thorough and careful reading. I would like to relate a few shortcomings and limitations of the manuscript and give a few suggestions.

1) A large number of historical literatures are utilized, and they are of great importance to the subsequent analysis. However, the original literatures and the references are not shown in the paper, thus hampers an evaluation the reliability of the literatures or that of the curve. It would be much better to give a few examples in the text and/or list the full texts as supplementary materials.

2) As far as I know, most of the records in the chronicles are about floods and droughts. Are flood/drought variations equal to precipitation variations?

3) There are too many gaps in the historical data, particularly in the first half of the time series (circa. AD 960-1400). The reliability of the curve might be graded into two epochs: relatively good from AD 1400-present, and relatively poor from AD 960-1400.

4) The reliability of the historical literatures is assessed to be good (Section 4.1). However, the assessment process is not persuasive. The authors argue that many of the local chronicles cited in this paper were written in early time. Several ancient chronicles are selected as examples, but the authors do not state objectively that most of local chronicles were compiled no earlier than the 17th century.



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5) The authors suggest that the solar forcing is the main driving force of the precipitation variations of Longxi during the last millennium (Sections 5.2 and 5.3). Do the curves of precipitation variation (if it is reliable) and solar irradiance really correlate well (Fig. 6)? The driving force of precipitation variations of the past millennium should be complicated. What about volcanic eruptions, greenhouse effects, ENSO and other potential forces?

6) The schematic map (Fig. 1) shows the location of the study area, but it does not identify the area clearly, and it would be much better to produce a map with a bigger scale and clearly illustrates the area.

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