

Interactive comment on “Significant recent warming over the northern Tibetan Plateau from ice core $\delta^{18}\text{O}$ records” by W. An et al.

Anonymous Referee #1

Received and published: 23 July 2015

This paper titled “Significant recent warming over the northern Tibetan Plateau from ice core $\delta^{18}\text{O}$ records” presents the isotope variations from the top part of a new ice core drilled in the central Tibetan Plateau. The authors also compared with other available ice core $\delta^{18}\text{O}$ record relating the last past decades, and made a composite isotope record time series to compared with the temperature change in different spatial scale. The main finds in the paper are the rapid warming trend reflected from ice core isotope records and the diverged trend from the ice core from the observation temperature change in the past decade. The authors specifically discussed possible reason caused the diverged trends in the past decade. The sensitivity high elevation climate change is still a debated questions and ice core isotope records from high elevation probably bring some hints on the answer of the question. This paper provided new proof about a much higher warming trend from ice core record on the middle of the Tibetan Plateau,

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and comparison found this is not the unique phenomenon. The consistence between ice cores from different sites exclude the local temperature pattern. Therefore, the work from this paper is important, and the finding about the continuous warming trend from higher elevation ice core records is also an interesting phenomenon and need further research work from e.g. more ice core records. Although there are some uncertainties needing further discussion, the research from this paper should be considered for publication in the journal of *Climate of the Past*. Because the factors influencing precipitation isotopes in that region is not fully understood, the reasonable explanation of the Tibetan Plateau ice core record, especially for clear annual record, is still a tough work, and I think the authors should think over the following questions carefully.

1.The difficulty in explaining the annual ice core $\delta^{18}\text{O}$ is that there is a very weak correlation with local meteorological temperature record, and there is a relative higher correlation in Spring (March–May), while the local precipitation is in summer. 2.Routinely, the annual signal from ice core in the central Tibetan Plateau might be not clear enough for dating the annual layer due to either the lack of winter precipitation or strong wind erosion on the glacier surface. This make the attempt of the accurate date in annul scale ice core difficult, at least from the isotope variation. From figure 2, if you account the seasonal cycle of isotope, there will be about only 20 years to the beta maximum. Therefore, please discuss in detail how the annual layer is determined in more clear way. In this case, I think the authors should more focus on the discussion of the ice core record in, for example, 5 years interval average. 3.The discussion about the reason of different warming trend in recent decade from both ice core and meteorological data is, somehow, not convincing. For instance, the addressing of “The increased vegetation density may also have contributed to the continuous warming by reducing albedo and heat loss.” may not reasonable.

Interactive comment on *Clim. Past Discuss.*, 11, 2701, 2015.

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