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Climate of the Past Discussions

Interactive comment on "An independently dated 2000-yr volcanic record from Law Dome, East Antarctica, including a new perspective on the dating of the c. 1450s eruption of Kuwae, Vanuatu" *by* C. T. Plummer et al.

Anonymous Referee #2

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This manuscript reported 2000-year volcanic record from Law Dome, East Antarctica. It is an extension of a similar record by Palmer [2001] and mainly investigated the date of the 15th century Kuwae Eruption. The topic is of relevance to Journal of Past Climate. However, there are still quite a few points that need to be addressed and clarified (please refer to the details in the following paragraphs). I would recommend "rejection" of this article in its current condition unless significant revision is provided.

1) In the abstract (Ln. 11-14 in P. 1569) How does the good agreement between Law Dome and NGRIP make the former "the most accurately dated Antarctic volcanic

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dataset"? Is the use of single NH ice core sufficient to make such a statement?

2) In the last paragraph of the Introduction, the authors used "the ice cores" implying multiple cores were used in this reconstruction. If that is the case, general information of the individual cores and how the volcanic time series were combined should be provided.

3) In determination of volcanic signals, the phrase "visual study" needed to be clearly described and better justified by providing the criteria, etc. In addition, in calculating the residual nssSO42-, how does the 31-yr running mean help to remove the seasonality of biogenic sulfate?

4) In line 24 of page 1578 the authors mentioned that "there is a small gap in trace chemistry during this period". Could the authors be more specific about this gap in terms of trace chemistry and duration of the gap? Since it is a critical time frame, does the gap affect the main argument the authors tried to make about the timing of the Kuwae eruption?

5) The proposal of two volcanic eruptions during 1450 and 1460 (in NH) was made by previous studies, so it is not original to this work. In addition, in suggesting there are two individual eruptions during the decade, how would one explain the missing of the second signal in several of the sulfate and the majority ECM ice-core-records, as shown in Fig. 3&4 of the Gao et al [2007] study?

A few minor comments

1) The first paragraph in P. 1576 does not seem to be valuable, since the relationship between volcanic eruption and tree rings (described there) is relatively well known; and more importantly the use of only one tree-ring record does not really justify the argument the authors tend to make, for tree-ring record reflects climate change at a more local scale and it has associated errors as well.

2) Table 1 & 2 could be combined.

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3) Fig. 1, it would be better to use sulfate flux or deposition as the Y-axis so that the signal spikes are in agreement with the ranks.

4) The introduction section could have been improved to describe the importance of the presented work, rather than a repeat of the basic knowledge.

Interactive comment on Clim. Past Discuss., 8, 1567, 2012.