Clim. Past Discuss., 8, C459–C461, 2012
www.clim-past-discuss.net/8/C459/2012/

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 #1

Received and published: 26 May 2012

I recommend that this paper be rejected. The paper suffers from sloppy presentation and reasoning, and it is not clear what the new science is. These are the main issues I found:

1. The abstract and the paper say that multiple ice cores were used, but the only new analysis is of a Law Dome core. Were there multiple cores there that were averaged? The paper is very unclear about this. Other cores that were analyzed previously are compared to the new Law Dome core, but really we are only presented with one new core, I think.

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2. The authors are very unclear about how they determined volcanic peaks in their core. They say it is by "visual study." But how? Did they look visually at the cores themselves? If they analyzed a time series, what were the criteria to identify volcanic peaks?

3. Volcanic deposition is inherently noisy. That is why previous studies gathered all the evidence from as many cores as they could, so as to filter out the noise. This paper uses only one core and implies that it is better than previous ones, and so deserves more attention. But the core has a dating error of possibly 4 years in one direction to 7 in another direction. Furthermore, no matter how good it is, it cannot get around the stochastic nature of snowfall or surface winds. In addition, they just happen to mention that there is a gap in their chemistry around 1453 CE, by their counting. So I see no reason to consider this core better than any others.

4. To compare to their new volcanic record and three older ones, the authors use tree rings. But tree rings only record local climate, and there are many influences in addition to volcanic eruptions. They need to use all the tree ring records that exist in both hemispheres to filter out local weather variations. That certain ice cores or tree rings miss volcanic events is certainly not evidence that the eruptions did not occur or cause climate change.

5. In Table 1 they give "event dates." Are these dates of the eruptions or dates of the volcanic sulfur layer in the ice cores? They have to specify this. If the latter, how can you compare this to tree rings? What are the differences in the lag between and eruption and the tree ring response or the time for ice deposition?

6. I don't buy the main claim of the paper, that Kuwae was in 1458. Gao et al. (2006) used 33 ice core records, 13 from the Northern Hemisphere and 20 from the Southern Hemisphere. Most of the SH cores had the date in 1453. Why should one new core prove that this consensus is wrong, especially with its potential dating errors?

7. In Fig. 1, the numbers in brackets signify event size rank. But is 1 or 5 the highest?

CPD

8, C459–C461, 2012

Why is 2 larger than either of these and 4 larger than 3?

I attach an annotated manuscript with some additional issues to deal with.

Please also note the supplement to this comment:
http://www.clim-past-discuss.net/8/C459/2012/cpd-8-C459-2012-supplement.pdf

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