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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.

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We would like to make a few comments concerning the discussion manuscript submitted by Plummer et al. (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).

The discussion paper describes the high dating accuracy and precision regarding the Law Dome core by independent annual layer counting (ALC), eliminating the use of

time stratigraphic markers. The ages or dates of these markers are usually established by other methods which carry inherent uncertainties or may even be incorrect dates. The ALC dating of the Law Dome core results in a volcanic record independent of the chronologies of other records. This will contribute to the overall accuracy of chronological volcanic records derived from ice cores.

We would first like to ask for clarification on the core(s) used for this record. There have been several ice cores from Law Dome. The record presented by Palmer et al. (2001, 2002) was from DSS cores drilled in the 1990s. This discussion paper mentions a core drilled in 2005. An explicit statement on which core(s) are used to construct this volcanic record would eliminate any possibility for confusion among the cores.

An important contribution of this paper is the dating of a large volcanic signal in the 1450s in the Law Dome record. A similarly large signal has also been found in other Antarctica cores and has been attributed to the Kuwae eruption, although the eruption has been assigned the date of 1452-1454. This large event is dated in the Law Dome record at 1458$\pm$1. The authors point out that, when dating uncertainties are taken into account, the common period for this event in Antarctic ice core records is from 1457-1459. Greenland ice core records and tree ring records indicate that probably two volcanic eruptions occurred in the 1450s. The signal of the earlier eruption is dated at 1453 in the NGRIP records. We would like to point out that two volcanic events (SP04C5-14 & 15), separated by five years dated as 1448 & 1453, were reported in the South Pole core (the SP04C5 record) by Ferris et al. (2011). The larger and later (1453) event was attributed to the Kuwae eruption. We believe it is important to recognize that there is strong evidence of two volcanic eruptions in the 1450s in both Greenland and Antarctica ice core records supporting the author's argument of two low latitude eruptions in that decade with climatic implications.

The last comment relates to vagueness in the statement beginning in line 2 and continuing to line 13 on Page 1573 concerning nssSO42- residual calculations. It is unclear to us whether the running mean being subtracted is a 31 year running mean of an-

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nual averages or 31 year running means of 8 individual bins per year. It would seem that subtracting a near constant (31-yr nssSO42- moving annual average) from the raw data would have no effect on the annual cycles and that the start of a volcanic event could still be masked if occurring during a winter.

Thank you for your consideration on these comments.

David Ferris and Jihong Cole-Dai

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