We thank the anonymous referee for their comments, and address their comments below.

The introduction needs some reworking. It is not clear to me what are the major goals of this study in particular what besides the length of the record are the main differences to Palmer et al. (2001). I think the author should already emphasize in the introduction that the Kuwae eruption represents at present one of the largest uncertainties in the volcanic forcing reconstruction for the last Millennium. A compilation of forcing reconstructions for the third phase of the Paleoclimate Modelling Intercomparison Project (PMIP3) (Schmidt et al., 2011; 2012) presents two annual volcanic forcing reconstruction Gao et al. (2008) and Crowley et al. (2008). Largest differences between both data sets in magnitude and timing exist for the Kuwae eruption in the mid 15th century (Fig4. Schmidt et al., 2011, supplementary material Schmidt et al., 2012)), which requires highly precise dating of this special volcanic event.

We agree that the timing of this volcanic event is of importance, and thank the reviewer for their input on this. Our primary focus has been on the dating of volcanic events, but agree that we could do more to highlight the importance of this particular eruption, and the present uncertainty in the two major volcanic forcing reconstructions, therefore we have revised our introduction in order to better illustrate the importance of this work, including a discussion on the differences in the timing of volcanic events between the two datasets during the 1450s.

In the abstract and in the introduction multiple ice cores are mentioned. How many and which ice cores are used from Law Dome. This should be clearly elaborated in the paper.

The Dome Summit South (DSS) site (66°43’11’’ S 112°48’25’’ E) is located 4.6km southeast of the Law Dome summit, and was drilled for the 1196 metre-long DSS main ice core in 1987 CE, with drilling completed in 1993 CE. Two additional mid-length cores (DSS97 and DSS99) were drilled in subsequent years at the site to correct for inconsistencies in the data from the top 117m of the original DSS main core. In recent years (since 1999 CE) the DSS site has been revisited and series of short overlapping firn cores were drilled in 2001, 2008 and 2009 CE (cores DSS0102, DSS0809 and DSS0910 respectively) to bring the record up to 2009 CE. Palmer at al., 2001 produced a single chemistry time series from DSS99, DSS97 and DSS down to 400m (1300 CE), and we have applied their methods to extend the Law Dome chemistry record from 1995 CE to 2009 CE. All cores used were dated via annual layer counting. Dating is registered across core boundaries by matching seasonal features in oxygen isotopes and other chemistry species through the periods of overlap between cores. Dating across core boundaries is unambiguous and locked without error. In the event of misalignment of overlapping records, natural variability in accumulation from year to year would result in rapid loss of coherence between annual cycles. A supplementary table outlining more detail about the cores used has been added.

In the discussion about the dating of the Kuwae eruption the authors tend to generalize their findings for Law Dome for the whole SH. The authors claim for *example that the SH ice cores show only one signal. However, one can see in Fig 3 of Gao et al. (2006) that some SH ice cores show two peaks SP2001c1, DML-B32 and with a certain time lag also Siple station (page 1579, line 22). Furthermore they state that there is a lack of a SH signature of the 1453 CE event (page, 1580 line 3) which is not correct as other ice core records show a signal at this time (Gao et al., 2008, Ferris et al., 2011).*

The majority of SH ice cores lack a clear volcanic signature preceding the large signature attributed to Kuwae by ~5 years (1453 CE if we accept our date of 1458 CE in Law Dome (e.g. DML, G15, PS1, Plateau Remote, SP2001C1, Talos Dome, DT-401) (Traufetter et al., 2004; Moore et al., 1991; Delmas et al., 1992; Cole-Dai et al., 2000; Budner & Cole-Dai, 2003; Stenni et al., 2001; Ren et al., 2010). Whilst some of the SH cores in Gao et al., 2006, Fig. 3. exhibit a second (earlier) rise in their respective volcanic-senstive parameters, not all met the volcanic detection criteria for that specific core (e.g. DML-B32 and B33 (Traufetter et al., 2004)) A comparison of volcanic identification methods is beyond the scope of this study, however, mention of this may be prudent. Siple station (Cole-Dai et al., 1997) did report a possible volcanic event in 1443 CE, though the authors point out they cannot be certain the peak did not result from high background SO_4^{-2} in a high accumulation year. If we accept that it is a volcanic signal, the temporal difference between the large Kuwae eruption and this earlier event is twice as long as between the two events recorded in the NGRIP core. The South Pole ice core (Ferris et al., 2011) does observe an event at 1448 CE, 5 years earlier than their date for the eruption assigned to Kuwae. This does place it within the right time period to be analogous with the 1453 CE eruption in NGRIP, if we redate Kuwae on the South Pole timescale. Such a redate is within the error bounds of the core timescale.

page 1570, line 10 the aerosols are also deposited via dry deposition

At coastal sites (below 2000 m elevation and within 200 km of the coast) wet deposition dominates (Benassai et al., 2005), therefore at Law Dome (1360m elevation, and 150 km from the coast), dry deposition is not significant. However, at other locations, dry deposition may be a factor, therefore we have reworded this statement.

page 1573, line 16 "visual study", please explain

Volcanic identification by visual examination of sulphate chemistry time series was performed on the Law Dome record between 1995 and 1300 CE by Palmer et al., 2001. Both this study and Palmer et al., 2001 defined volcanic events as departures above the mean seasonal average in the non sea-salt sulphate (nss-SO_4^{2-}) record. Palmer et al., 2001 visually compared the nss-SO_4^{2-} time series to the 700-yr (1995-1300 CE) mean nss-SO_4^{2-} seasonal cycle to identify departures from the average. In this study, we calculated the residual nss-SO_4^{2-} record by subtracting the 31-yr mean seasonal cycle before identification of events. Events longer than 6-months in duration were considered volcanic.

page 1573, line 27 How large are these differences, within the range of uncertainty ?

The volcanic sulphate estimates from this study are ~20-25% lower than those reported by Palmer et al., 2002. The methods for removal of the non-volcanic background are different for the two studies, and can account for the difference. Both studies removed the background sulphate to produce a residual sulphate record. To do this, non-volcanic sulphate sources are removed from the sulphate record. The two studies differ in their methods for this. The Palmer study divided their non sea-salt sulphate (nss-SO_4^{2-}) record in to monthly bins (12 samples per year), and calculated the 695-yr average for each bin. This was then subtracted from the nss-SO_4^{2-} record. Because this study is considerably longer, and used analysis from deeper ice, the number of samples per year was decreased to approximately 8 due to layer thinning processes. Therefore we divided our record into 8 even bins (2.5-months) and calculated a 31-yr moving average. We chose a 31-yr moving average to account for variations in the sulphate record through time. The calculation of flux values requires accounting for flow thinning. The correction for this has been improved since the publication of the Palmer study (T. van Ommen, personal communication, 2012).

page 1578, line 23,24 How does this small gap influences your findings and how small is small?

There is a 10-month gap in our volcanic record from 1452.3 to 1453.1 CE. This is longer than our 6-month minimum window; therefore we cannot rule out the possibility of a volcanic eruption during this period. However, there are no indications of a volcanic signal (elevated residual) present either side of this gap, as there were with the 229 CE event. If a volcanic event were to have occurred in this time period, it would be a small eruption, considerably smaller than the postulated size of the Kuwae volcanic event. Dating through this period has not been degraded, as continuous oxygen isotope and hydrogen peroxide data is available, showing clear, unambiguous seasonal cycles.

Table 1 It might be good to indicate also the dating errors from the other ice core records as well.

The errors of each respective ice core are published by the authors of the original works.

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