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Interactive comment on "The calcium-dust relationship in high-resolution data from Dome C, Antarctica" *by* F. Lambert et al.

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Thank you for pointing out the lack of information. I will include some of the information below in the final version of the paper.

There have been several versions of the Klotz particle device that were in use at different times. The earlier versions used in NGRIP had only 4 channels, later versions had more channels and improved electronic and measurement software. The device used by Ruth et al. for the intercomparison was not the same than the one used in Dome C, although similar in hardware. The 4:1 ratio comes from direct comparison between EDC data CC counts and the LPD counts. Ruth et al.'s device may have been better at counting than the one we used in Dome C. Additionally, they extrapolated the measurements based on the theoretical size distribution curve to the same detection

limit than the CC.

The problem with the Klotz devices we used in Dome C is that, although we could define several channels (in mV), we have never been able to assign a specific particle size range to these channels (we don't know where each channel starts, nor how large they are), and without a size distribution we couldn't directly calculate a corresponding mass profile. Hence the use of the total particle counts only. Ruth et al. used an improved software that measured size distribution at every data point, which allowed direct comparison with the CC data for each measured sample. Unfortunately we don't have this possibility with the Dome C data.

The larger scatter compared to the Ruth et al. paper is partly due to the fact, that they used 40 points and we used 500. But the rest comes, as you correctly point out, from the direct number-to-mass conversion. If we could assign a particle size to our channels, this would definitely reduce the scatter (and thus the error of the LPD), and maybe make the calibration curve more linear, instead of curved. I doubt, however, that the slope would be significantly changed.

In summary, I think we are better off with the inherent direct number-to-mass uncertainty than to subjectively assign some particle size ranges to the channels. The number-to-mass uncertainty is taken into account by the larger error in the LPD due to the larger scatter. This error is not large enough, however, to explain the differences in Ca:dust ratio.

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