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Climate of the Past Discussions

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

Anonymous Referee #1

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Comments on the manuscript CP Discussion 7, 1113-1137, 2011 "The calcium-dust relationship in high resolution data from Dome C, Antarctica by F. Lambert, M. Bigler, J.P. Steffensen, M. Hutterli and H. Fisher

This paper reports high resolution measurements of Ca++, Na+ and insoluble particles in the EDC (EPICA Dome Concordia) ice core over about 800 000 years. From these measurements, the authors derive estimates of the sea-salt, nss-Ca++ and dust contents in the melted ice. The paper proposes to discuss the respective merits of these proxies in terms of deposited dust. This question is mainly treated in relation with the glacial/interglacial periods. Hypothesis implying changes in source regions or in acidic atmospheric conditions are involved to explain the variations of the Ca++/dust or nssCa++/dust ratios.

General comments: The data provided are valuable and probably of high quality. From this point of view, they should be published. However, the discussion is poor and not really demonstrative. Indeed, most of the statements summarized in the conclusion are obvious and could have probably been proposed without data, just by thinking. And since they are not really demonstrated by the work performed in the submitted manuscript, they remain hypothesis. The discussion is not clearly organized: there is no sub-chapter in part 3 (as in other parts of the manuscript) and this lack of clear structure does not help to understand how the discussion is built and what the different questions the authors want to address are.

Many of the references in the introductive part are not well selected: they are second "hands" references (for example, Murphy, 1998 for the radiative effect of aerosols; Fung et al., 2000 or Rothlisberger et al. 2004 for the role of dust on the micronutriment supply to terrestrial and marine ecosystems; Bellouin et al., on the dependence of the radiative effect of dust on mineralogy, etc...).

If the discussion cannot be reinforced, my recommendation is to significantly reduce the length of the text and to focus on factual comments on the data.

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