Clim. Past Discuss., 9, C436–C438, 2013
www.clim-past-discuss.net/9/C436/2013/

Climate of the Past Discussions

Interactive comment on "Towards a quasi-complete reconstruction of past atmospheric aerosol load and composition (organic and inorganic) over Europe since 1920 inferred from Alpine ice cores" *by* S. Preunkert and M. Legrand

Anonymous Referee #1

Received and published: 18 April 2013

Review of manuscript entitled 'Towards a quasi-complete reconstruction of past atmospheric aerosol load and composition (organic and inorganic) over Europe since 1920 inferred from Alpine ice cores' submitted by S. Preunkert and M. Legrand to Climate of the Past (doi:10.5194/cpd-9-1099-2013).

The manuscript presents a comprehensive set of impurity records from 3 ice cores obtained from Col du Dôme (CDD). The dataset covers the period 1920 to present

and the authors aim at obtaining an almost complete set of both organic and inorganic compounds.

To a large degree the manuscript presents previously published results by the same authors (that is reflected in the publication list where 16 out of 35 references are first-authored by the two authors). The present MS does, however, contain new records and I think the review is useful for a large community including modellers of recent atmospheric conditions.

The records presented in the MS are of relevance to the journal, the conclusion concerning increased biogenic emissions since the 1950s is compelling, and, in general, the data are well presented and the MS is well written. I have only minor comments and suggestions.

General comments:

The approach of separating summer and winter signals appears sound and relevant, but it does of course put high demands on the dating of the ice cores that needs to be truly annual. Based on the material presented in the figures it is hard to judge if the dating is really sufficiently good in all three cores. The comparison in Figure 1 looks rather convincing, but we don't see annual layers here. An example showing the annual layering in, say, a decade and how they correlate in all three cores would be useful.

Likewise, the separation of samples or sample fractions heavily influenced by Saharan dust is very reasonable, but we are not introduced to the criteria applied to identify the Saharan dust in this manuscript. Please repeat the principles here for completeness, and maybe show an example of records with/without strong influence of Saharan dust.

Whereas the CDD dataset presented in the MS is very comprehensive and complete, I do miss some comparisons to comparable records form the region, such as the Colle Gnifetti ice cores. For the future, it would be most useful for the paleo community if the authors of this and other alpine related records would join forces and cross-compile their records to provide a more general picture of the past regional climate. Looking forward to see such a compilation in a future publication.

Specific comments:

P. 1102: Dating: Do you see Katmai 1912AD in your CDK sulphate? It would make a nice reference point.

P. 1103: Thevenon et al., JGR, 2009 report on a 1000 yr ice core from the Colle Gnifetti glacier. They date it among others by identifying 'four visible yellowish dust horizons attributed to Saharan dust events of 1977, 1947, 1936, and 1901', and by the volcanic layer of Katmai 1912. Are those Saharan dust events also observed in your cores? If not, why is that?

P. 1103, l. 26: '…using an electric plane device' - what is that? Please be a bit more specific.

P. 1105, l. 24; p. 1106. l. 5: You talk about 'contamination' of the records by Saharan dust. Strictly speaking, the 'natural' Saharan dust input is not contamination?

Figure 6: The figures are very small and hard to read. Hopefully, they can be somewhat expanded?

Hopefully, the authors will make their important datasets public available somewhere? They should be of interest to a large community including atmospheric modellers.

Reference:

Thevenon, F., F. S. Anselmetti, S. M. Bernasconi, and M. Schwikowski (2009), Mineral dust and elemental black carbon records from an Alpine ice core (Colle Gnifetti glacier) over the last millennium, J. Geophys. Res., 114, D17102, doi:10.1029/2008JD011490.

Interactive comment on Clim. Past Discuss., 9, 1099, 2013.