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Atmospheric Chemistry and Physics Discussions

Interactive comment on "^{36}Cl bomb peak: comparison of modeled and measured data" *by* U. Heikkilä et al.

U. Heikkilä et al.

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Interactive comment on “36Cl bomb peak: comparison of modeled and measured data” by U. Heikkilä et al. Anonymous Referee #2 Received and published: 13 March 2009

General comments

-Heikkilia et al. present a useful and interesting analysis of the global transport and deposition of nuclear-bomb produced 36Cl and compare it with concentrations measured in 8 ice cores, the majority of which are from the Northern Hemisphere. It is unfortunate that Antarctica has been poorly represented in this analysis; I know of unpublished measurements that were made on a well dated ice core from the high-accumulation Law Dome site, East Antarctica, which could have been a valuable addition to this data

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set.

We present one data set from Antarctica, the Berkner Island, as well as one from Greenland. Unfortunately we have no access to this unpublished data from Law Dome, which indeed would have been an interesting addition to the analysis.

-The model was run under the simplifying assumption that all 36Cl was particulate, rather than gaseous, and was attached to aerosols. The rapid rise of the 36Cl flux peak at most sites is used as an argument that the loss of gaseous 36Cl was minimal, although this might be one of the reasons why it was necessary to scale down the model 36Cl input. More likely is that less 36Cl was initially produced than under assumption 1, due to attenuation of the neutron flux by land mass and by differing detonation scenarios.

Although some gaseous Cl-36 escapes from firn and flattens the shape of the fallout curve the integrated total mass of the bomb-produced Cl-36 should be almost the same because most of the escaped Cl-36 is redeposited. Therefore this phenomenon cannot have a large influence on the estimated total mass.

Specific comments

-36Cl concentrations are measured in ice cores, 36Cl fluxes must be calculated. The authors do not explain how this was done.

This is explained in the references related to the published ice core data. We added a citation to these studies.

-2510 l 14. It is stated that the high altitude Huascaran site saw the bomb pulse earlier than the other sites, yet this is based on just one data point. Couldn’t the same argument be used for the similarly high altitude Guliya site?

Yes, definitely. However, we do not observe anything similar in the Guliya data set which is why it was not mentioned.

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Technical comments

-2504 l 8. The statement ’The 36Cl concentrations in ice were all measured at the AMS facility of ETH Zurich/PSI’ is not correct. For example, Elmore (1982) measured 36Cl in Dye3 at Rochester; I haven’t checked all the other cores.

We talked only about the data which is shown in this study. The Dye-3 data which is shown in the analysis was measured at ETH/PSI. This is now clarified in the text as well.

-2506l 26. The reference to Sachsenhauser appears as a footnote, not as a reference.

This is the formulation policy of the journal.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 2501, 2009.

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Interactive Comment