

Interactive comment on “Comment on “Aerosol radiative forcing and climate sensitivity deduced from the Last Glacial Maximum to Holocene transition”, by P. Chylek and U. Lohmann, Geophys. Res. Lett., 2008” by J. C. Hargreaves and J. D. Annan

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Chylek and Lohmann: Reply to comment of Hargreaves and Annan

Hargreaves and Annan state:

“However, their (means Chylek and Lohmann 08) results depend critically on their selection of single unrepresentative data points from time series...” and again “Their

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(Chylek and Lohmann 08) analysis is based on specific data points highlighted in red (Fig. 1. in Hargreaves and Annan). That is, from the temperature data they picked the lowest value around the LGM period, the highest temperature around 42 ka and also the warm peak at the start of the Holocene, without providing any explicit justification of these choices.”

The above statement is a clear misrepresentation of our paper. Although we show the Vostok temperature series and comment on temperature differences observed, they never enter into our calculation. How the temperature differences are selected in our calculation is clearly described in Chylek and Lohmann paper. Here is a direct citation from our paper:

“The polar region temperature changes are about twice as large as the global temperature; however, the exact ratio of the global to Vostok temperature change is not known. To account for this uncertainty, we consider three scenarios in which the global temperature difference between the Holocene and the LGM is taken to be 4.1, 4.6 and 5.1K. This is in agreement with past investigations suggesting the global temperature difference between the Holocene and the LGM to be at most 5K.”

Thus we consider a spread of temperatures between 4.1 and 5.1K for the LGM to Holocene transition and not a single unrepresentative point as claimed by Hargreaves and Annan. Similarly we consider the spread of temperatures between the LGM and preceding warm period. Due to uncertainty in temperature and other parameters we consider altogether an ensemble of 231 different cases and the results given in Chylek and Lohmann are the ensemble averages of those cases. Where is a single unrepresentative data point claimed by Hargreaves and Annan ?

The fact that two anonymous reviewers were not able to see the misrepresentation presented by Hargreaves and Annan suggest that the reviewers might have not read our original paper and relied only on the (incorrect) information provided by Hargreaves and Annan.

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The time of the warm period at about 42 ka before present was carefully selected in Chylek and Lohmann in order to have a simultaneous warming of the southern (Antarctic event A-2) and the northern (Dansgaard-Oeschger event 12) hemisphere. This simultaneous warming lasted only a few hundred years. Therefore it does not make sense to take an average over 4,000 years as suggested by Hargreaves and Annan or to choose another time, as they did, when one hemisphere experiences warming while the other experiences cooling.

Finally, the deduced range of climate sensitivity (Chylek and Lohmann) cannot be directly compared with the range of sensitivity given by the IPCC. Our range is deduced from one data set only, while the IPCC result is based on results obtained using many different data sets and many model calculations.

Interactive comment on Clim. Past Discuss., 4, 1319, 2008.

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