Clim. Past Discuss., 4, S653–S654, 2008
www.clim-past-discuss.net/4/S653/2008/

Climate of the Past Discussions

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

Anonymous Referee #1

Received and published: 22 December 2008

This note deals with a paper that was published last year that suggested that climate sensitivity based on the Vostok data is much less than the more commonly accepted range of 2-4.5 deg C for 2xCO2.

I find the critique of Annan and Hargreaves to be compelling. In particular the sensitivity of the Chelyk and Lohmann result to a very reasonable averaging and the obvious (!) issue of using temporally coincident data points for the dust and isotope data, to my

mind, invalidates the whole exercise. These points are made well and with clarity.

One point that isn't addressed (and certainly could be) is whether the Vostok records of dust are actually globally representative in the linear sense implied by the C&L methodology. In particular, the high ˜40kya values don't have an obvious counterpart in the Greenland cores.

The authors could also add to their discussion of the appropriateness of the C&L model simulation. As they discuss, the calculation of radiative forcing from reflective aerosols is a function of the surface conditions. The more reflective the surface, the smaller the SW radiative forcing from the dust. And since the LGM was characterised by much more extensive snow and ice than today, the same distribution at present day will give very different forcings. Can the authors actually demonstrate that with a current model? (i.e. taking the same dust distribution and calculating the forcings with the different surface conditions?). I find it odd that the original authors did not address this themselves.

This is a short comment that feels like it was first submitted to JGR. I'm unsure as to why this was not published there since it obviously highlights some serious issues with the original paper. However, I am happy to support a role for Climate of the Past in providing space for commentary on papers that have appeared elsewhere. Hopefully the interactive commenting will be conducive to sorting out these issues.

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