Atmos. Chem. Phys. Discuss., 2, S452–S453, 2002
www.atmos-chem-phys.org/acpd/2/S452/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "On the use of ATSR fire count data to estimate the seasonal and interannual variability of vegetation fire emissions" *by* M. G. Schultz

M. G. Schultz

Received and published: 2 October 2002

First of all I want to thank all three reviewers for their helpful and encouraging comments. I will strive to take as much of these into account as possible when preparing a revised version for ACP.

I recognize a certain uneasiness about the scaling approach in all three reviews, and I am very happy about this, because it underlines the main point, which I want to make with this paper: the global modeling community urgently needs better and globally consistent estimates of vegetation fires emissions for individual years, so that the trends and variability of trace gases and aerosols can be assessed. Clearly, the scaling approach cannot improve the uncertainty of the underlying base inventory, and - as discussed in the paper - it will not reproduce the interannual (or seasonal) variability of

vegetation fire emissions with a precision better than a factor of 2. Nevertheless, as an interim solution, the scaling approach allows global modelers to attempt somewhat more meaningful simulations of the 1990s than have been possible with the use of "climatological" inventories in the past, and it might be of value (perhaps in a modified form taking into acount daytime observations?) for realtime forecasting applications - provided such data will become available near-realtime in the future.

The greatest concerns were expressed with respect to emissions from small fires in Africa. It is true, that the scaling approach is most uncertain in these circumstances. Nevertheless, there may be some degree of "scale-invariance" even for these fires, because the amount of material burnt depends on similar factors (rainfall during the wet season, soil dryness during the dry season, etc.) for many vegetation types in the semi-arid regions. Thus, if there are more (and larger) nighttime fires, there is some reason to believe that there are also more (and larger) daytime fires in a particular year. But, of course, this remains a speculative argument and would have to be proven with a size-resolved analysis of fires (such as the study by Hely et al., in press). An extensive analysis of these fires using data from other satellites would clearly go beyond the scope of this study. Results from the MOZART 2 model presented on my poster at the IGAC conference last week, showed considerable improvement of the simulation of CO over the South Pacific when the new inventories were used. The scaling approach does not give new quantitative estimates of vegetation fire emissions, but at least it indicates the direction and some estimate of the magnitude of their variability.

Interactive comment on Atmos. Chem. Phys. Discuss., 2, 1159, 2002.