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Interactive comment on "The direct radiative effect of biomass burning aerosols over southern Africa" *by* S. J. Abel et al.

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General comments:

This manuscript discusses the impact of biomass burning aerosol over southern Africa on radiative fluxes and uncertainties associated with estimates of these climate effects. The authors make use of a wide range of remote sensing data and of calculations performed by a global GCM and by a detailed column radiative transfer model. The paper is generally clear and well written and suited to publication in ACP. However, it seems (to the reviewer) that conclusions drawn from the paper need to be strengthened. In particular it would be helpful, if uncertainties regarding modeling and observations could be ranked, in order to learn, where future efforts should focus on. In

addition, the reasons for the large deviations between observed and model calculated aerosol optical depth (AOD) should be discussed. Why is the AOD over land underestimated even after 'corrections' were applied? (Simulated AOD fields reproduce the observed maximum at the west-coast but fails to mirror the high AOD levels observed over Zaire and Zambia).

Specific comments:

The calculated aerosol distribution (from a publication in 1996) may not have been the best available [these distributions could be compared with more recent estimates available through AeroCom efforts and its web http://nansen.ipsl.jussieu.fr/AEROCOM]. The emission inventory based from the early 1980s (due to decadal trends in domestic and agricultural fires) may not relate very well to observations taken in the late 1990s and early 2000s.

Page 1170: The authors point out that the model initiates the biomass burning too early in May and June. They are correct with respect to Southern Africa (e.g. Mozambique or southern Zambia). On the other hand, Barbosa et al. (GBC 1999) show - based on burned area maps from 1981-1991 - that at least towards central and western Africa (e.g. Zaire, Angola) an initiation in May or June would be correct.

P1184: The area impacted by fresh aerosol properties depends on the 'characteristic' aging time of smoke. The finding that radiative forcing simulations assuming only aged aerosol give similar results as the standard case, indicates that, if the simulation were correct, the aging time would be very short. Is this supported by observations?

Table 1: It would be more informative to indicate the number of months by location in a Figure. This would give a better idea about the regional coverage.

Figures 5, 6, 10 and 11: the numbers of the legend are much too small.

P1174 ln 24: replace -18N by -18S

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