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Interactive comment on "Release and dispersion of vegetation and peat fire emissions in the atmosphere over Indonesia 1997/1998" *by* B. Langmann and A. Heil

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In our final authors comment we would like to make some clarifications as suggested by the reviewer (F. Dentener). These clarifications deal with explicit and implicit assumptions made in the model and with emission factors. A necessary correction of the emission factors used for the model simulations leads to modified conclusions of the paper, as discussed below.

In the final paper it has to be emphasised, that our model calculations for the atmospheric particle concentrations represent a lower boundary for the following reasons: We considered only primary emissions of particles released from fires, no secondary aerosol formation and no other anthropogenic or natural particle sources are included. The principal overestimation of precipitation and related wet deposition tends to re-

move too much particles from the atmosphere in our model calculations. Additionally, we assume the published estimates of the area burned for 1997 by Page et al. (2002) to represent the 1997 and 1998 area burned, thereby neglecting the contribution of the 1998 fires. For these reasons modelled atmospheric particle concentrations should be expected to be smaller than measured values.

Only recently, we realised an inconsistency in the determination of particulate matter emissions in Levine (1999). The particulate matter emissions are given in 'tons of carbon' by Levine (1999) (see equation 5 and table 2 of his paper), but the emission factors for particulate matter used by Levine (1999) refer to the total mass of particulate matter - not carbon - when checking the original reference of Ward (1990). The emission factor for Indonesian peat (35tons/kilotons) was obtained when burning material with 25 % organic soil from extra tropical regions (Ward, 1990). However, a nearly identical particle emission factor of 38 tons PM10/kilotons was measured recently from burning Sumatran peat during a laboratory campaign of the EFEU project (http://www.tropos.de:8088/afo2000g3) (personal communication, 16.4.04, O. Schmid, MPI Chemistry, Mainz), thereby giving confidence to the value of Ward (1990).

In our discussion paper, the emission estimate is based on Levine (1999), therefore corrections are necessary. The correction from TPMC (Mt C) to TPM (Mt) emissions results in about 6 % less total emissions in the standard (378 Mt C, corrected value) and high emission case (1609 Mt C, corrected value). The conclusion drawn from comparison of modelled atmospheric particle concentrations with measurements are shifted more considerably, as a conversion from TPMC to TPM according to Artaxo et al. (20020) is redundant after the correction (section 4.2.4 and 4.2.5 of the discussion paper). With the standard emission estimate particle concentrations near the fire regions are now slightly lower than observed and underestimated downwind to the fires. In the high emission case, modelled particle concentrations are too high near the fires, but only slightly overestimated downwind to the fires. When comparing modelled and measured particle concentrations at Indonesian and Malaysian stations by taking into

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account that we model a lower boundary particle concentration, we expect the most realistic emission estimate in between our two emission estimates in the range of about 1000 Mt C.

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 2117, 2004.