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The influence of the vertical distribution of emissions on tropospheric chemistry

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Abstract. The atmospheric chemistry general circulation model EMAC (ECHAM5/MESSy atmospheric chemistry) is used to investigate the effect of height dependent emissions on tropospheric chemistry. In a sensitivity simulation, anthropogenic and biomass burning emissions are released in the lowest model layer. The resulting tracer distributions are compared to those of a former simulation applying height dependent emissions.

Although the differences between the two simulations in the free troposphere are small (less than 5%), large differences are present in polluted regions at the surface, in particular for NO_x (more than 100%), CO (up to 30%) and non-methane hydrocarbons (up to 30%), whereas for OH the differences at the same locations are somewhat lower (15%). Global ozone formation is virtually unaffected by the choice of the vertical distribution of emissions. Nevertheless, local ozone changes can be up to 30%. Model results of both simulations are further compared to observations from field campaigns and to data from measurement stations.

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