



Supplement of

An advanced method of contributing emissions to short-lived chemical species (OH and HO₂): the TAGGING 1.1 submodel based on the Modular Earth Submodel System (MESSy 2.53)

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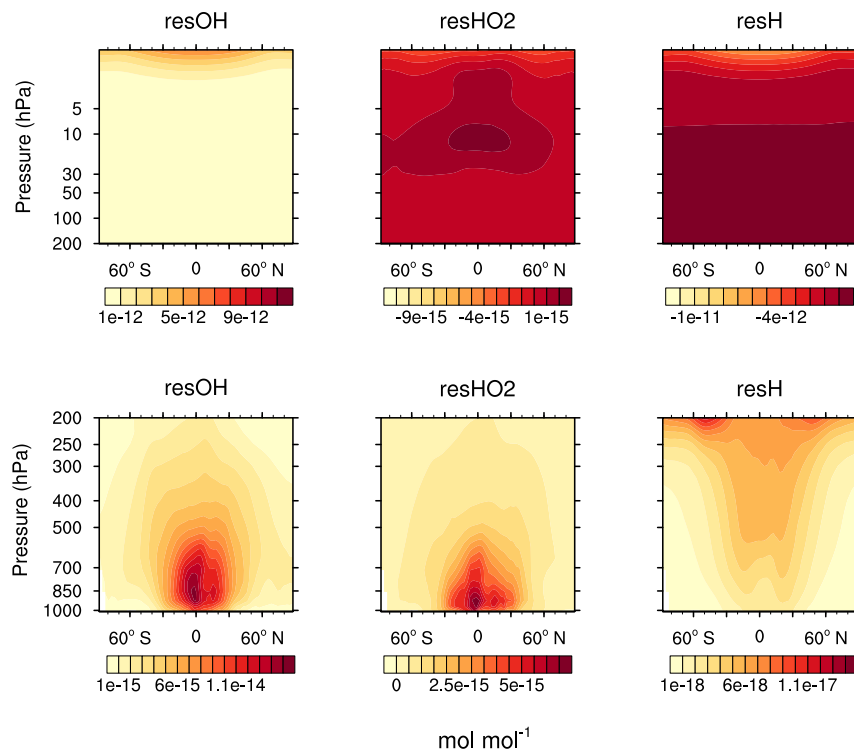


Figure S 1. Zonal mean of rest terms $resOH$, $resHO_2$ and $resH$. The first row ranges from 1 to 200 hPa, the second row from 1000 to 200 hPa.

This document provides additional material to the article: *Rieger et al., An advanced method of contributing emissions to short-lived chemical species (OH and HO₂): The TAGGING 1.1 submodel based on the Modular Earth Submodel System (MESSy 2.53)*. Figure S1 shows the zonal mean of the rest terms $resOH$, $resHO_2$ and $resH$. Figures S2 – S6 compare the contributions of the tagging method V1.0 and the advanced tagging method V1.1 for the ten source categories: emissions from anthropogenic non-traffic (e.g. industry and households), road traffic, shipping, aviation, biogenic sources, biomass burning, lightning, methane and nitrous oxide decompositions and stratospheric ozone production. Figures S7 – S8 show the contributions to OH and HO₂ concentrations in the troposphere for a simulation when the rest terms $resOH$, $resHO_2$ and $resH$ are not considered.

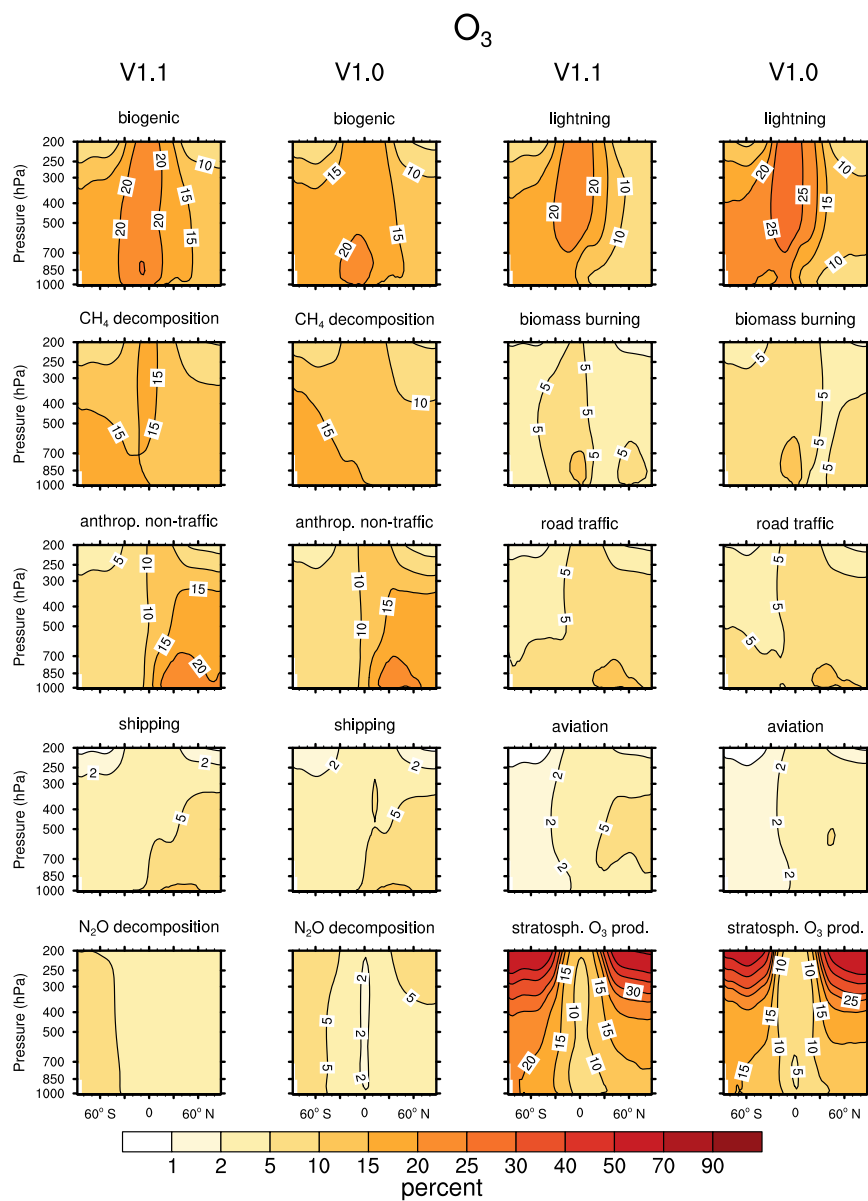


Figure S 2. Comparison of tagging method V1.1 and V1.0 for O_3 . First and third columns show the tagging method V1.1. Second and forth columns show the tagging method V1.0.

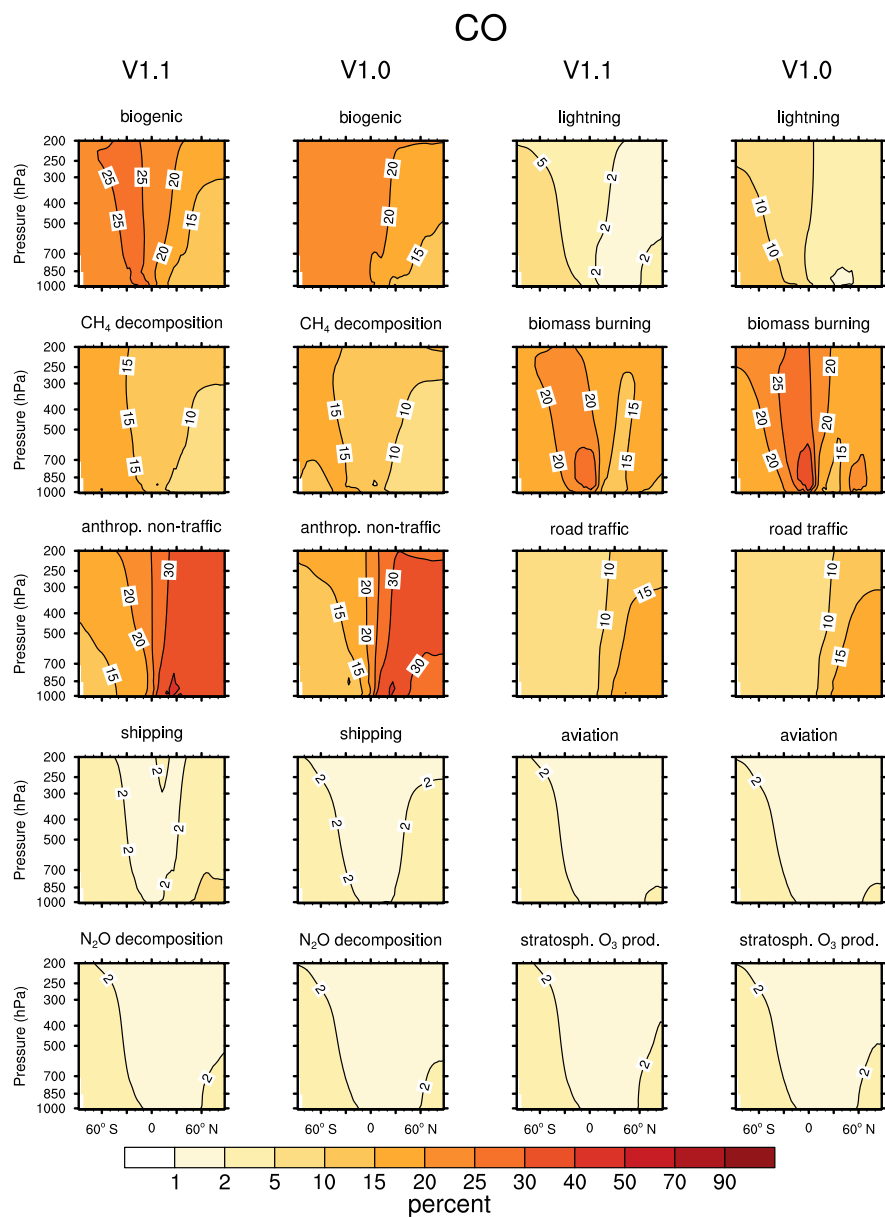


Figure S 3. Comparison of tagging method V1.1 and V1.0 for CO. First and third columns show the tagging method V1.1. Second and fourth columns show the tagging method V1.0.

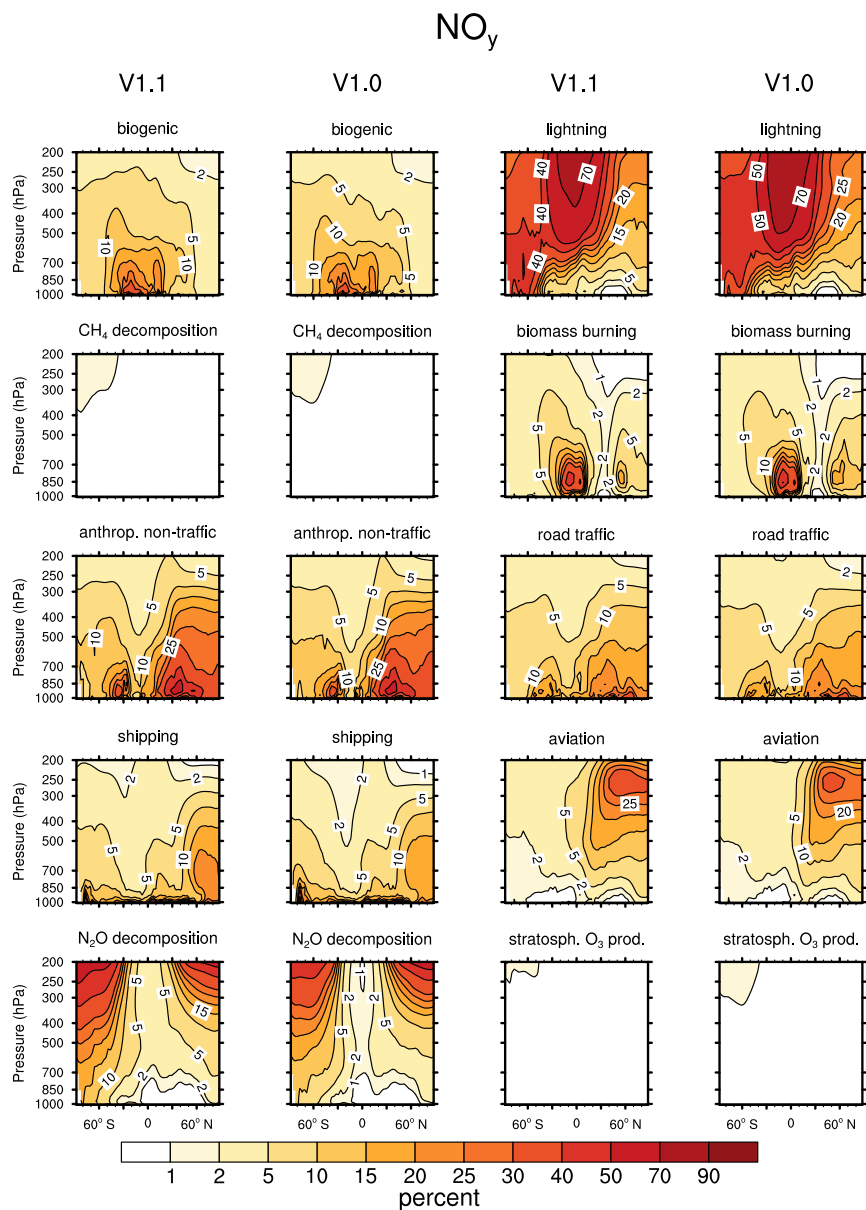


Figure S 4. Comparison of tagging method V1.1 and V1.0 for NO_y . First and third columns show the tagging method V1.1. Second and forth columns show the tagging method V1.0.

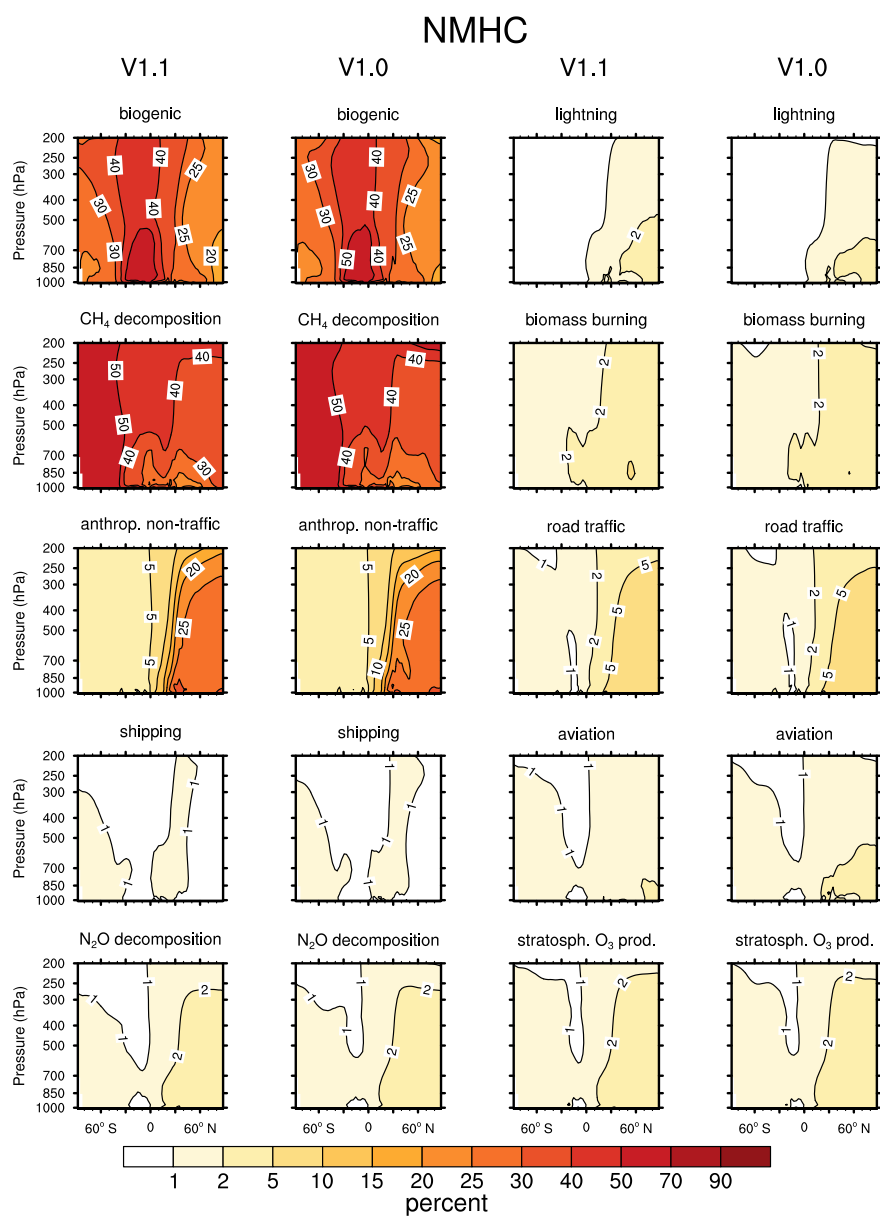


Figure S 5. Comparison of tagging method V1.1 and V1.0 for NMHC. First and third columns show the tagging method V1.1. Second and forth columns show the tagging method V1.0.

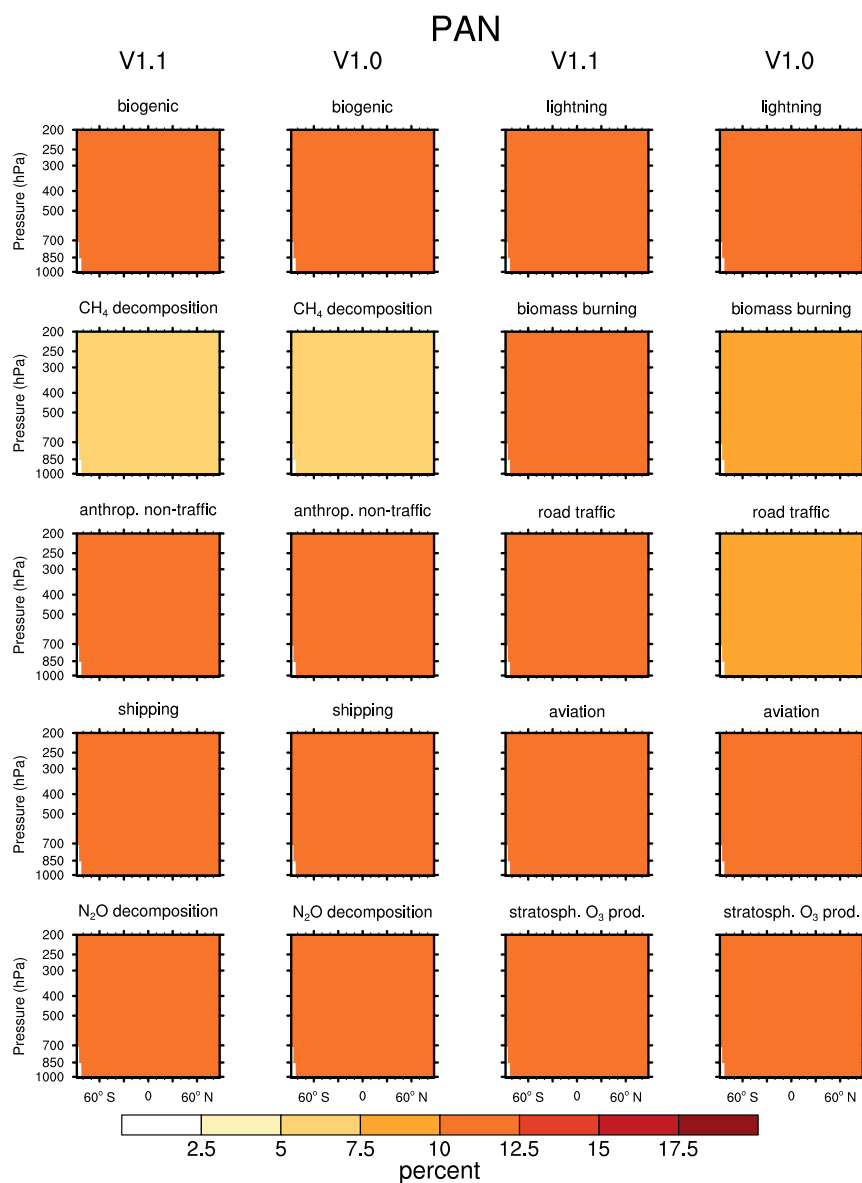


Figure S 6. Comparison of tagging method V1.1 and V1.0 for PAN. First and third columns show the tagging method V1.1. Second and forth columns show the tagging method V1.0.

OH

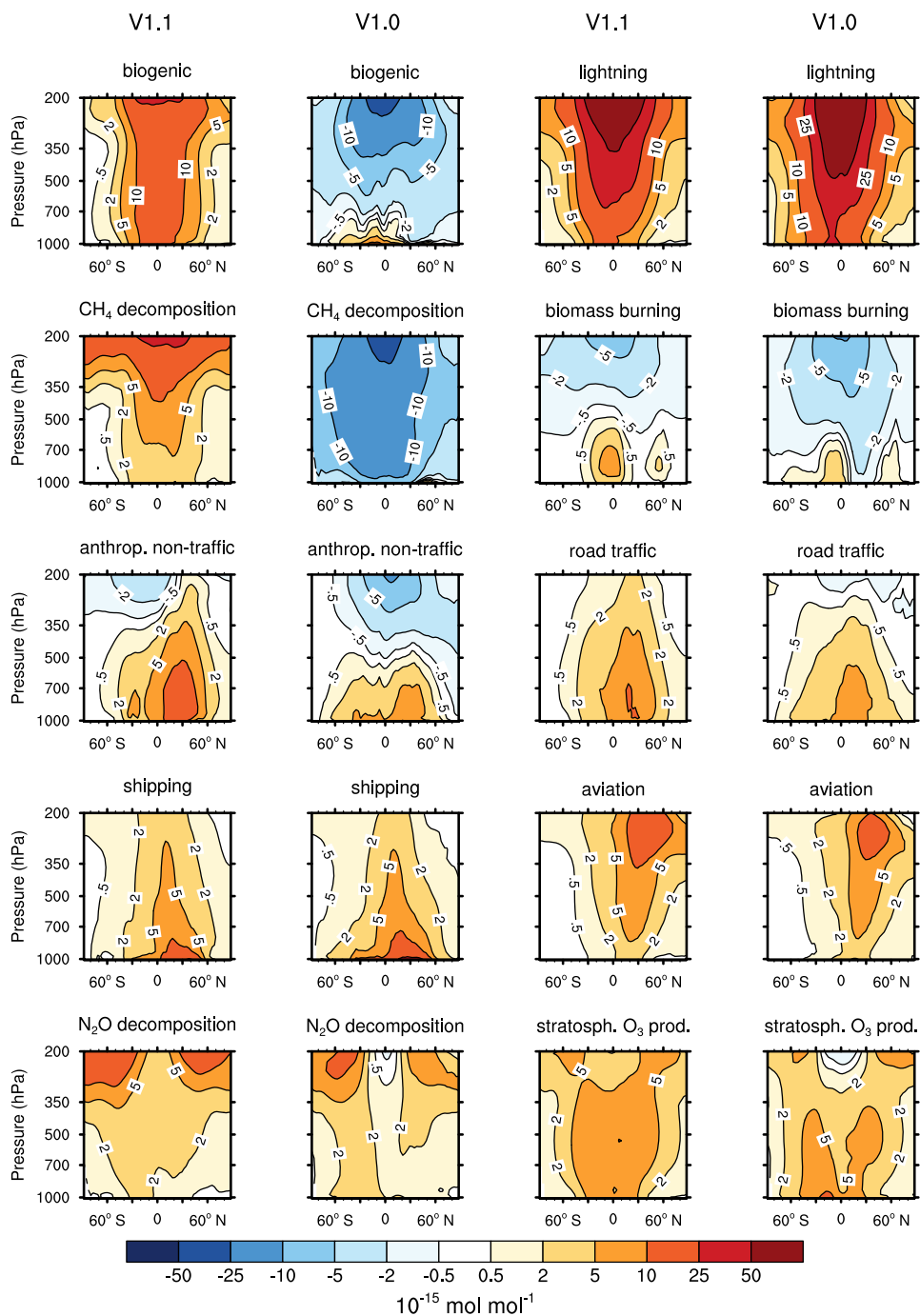


Figure S 7. Contribution of ten source categories to OH in $10^{-15} \text{ mol mol}^{-1}$ for a simulation when the rest terms are neglected. Zonal means of the year 2008 are shown. First and third columns show the tagging method V1.1. Second and forth columns show the tagging method V1.0. Simulation is performed with EMAC.

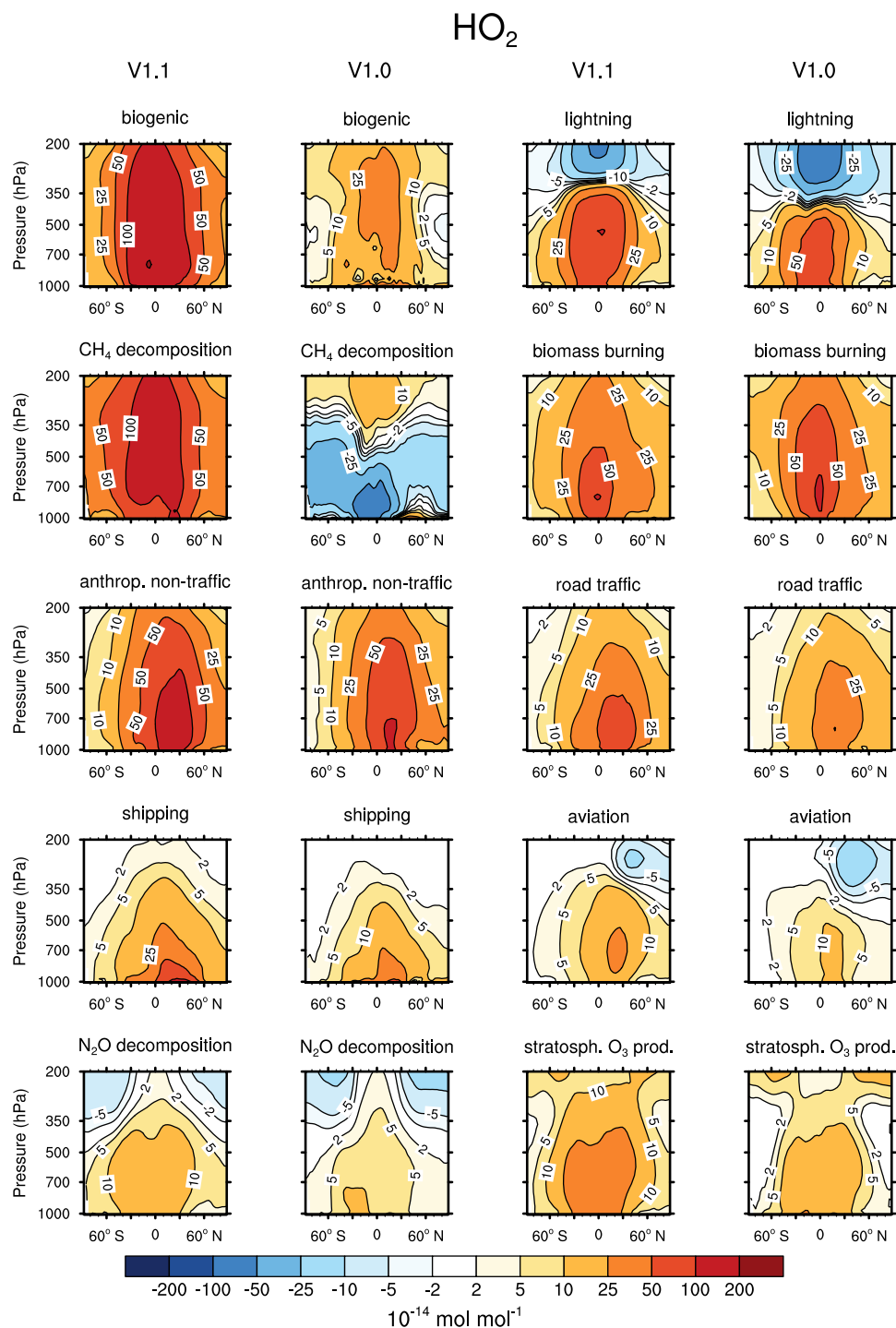


Figure S 8. Contribution of ten source categories to HO_2 in $10^{-14} \text{ mol mol}^{-1}$ for a simulation when the rest terms are neglected. Zonal means of the year 2008 are shown. First and third columns show the tagging method V1.1. Second and forth columns show the tagging method V1.0. Simulation is performed with EMAC.