



Evaluation of chemistry-climate model SOCOL version 3.0

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We present version 3.0 of the chemistry-climate model (CCM) SOCOL. The new model version is now based on the 5th generation of the general circulation model MA-ECHAM, which states a substantial progress compared to previous model versions. One main new feature is that the chemical species are transported by the operational flux-based advection scheme of ECHAM5 instead of a Semi-Lagrangian scheme. Therefore unphysical mass fixer corrections, which had to be applied in the former model versions to enable global mass conservation, can now be avoided. However, as a consequence of the time-dependent pressure coordinates in the sigma-layer system, it is still necessary to apply a family based correction scheme for species of the nitrogen, chlorine and bromine group.

By means of these changes, SOCOL version 3.0 simulates physically realistic distributions of the chlorine and bromine containing species. Furthermore, total ozone shows a much more pronounced seasonal variability than in former model versions, which is close to observations, and the timing of the simulated ozone hole is improved.