

Interactive comment on “The photolysis module JVAL-13.99gmdd, compatible with the MESSy standard, and the JVal PreProcessor (JVPP)” by R. Sander et al.

Anonymous Referee #1

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This paper documents a widely used photolysis module that is necessary for atmospheric chemistry study because photochemistry is a driving reason behind many atmospheric reactions. This kind of study is suitable for GMD. The paper is well written. However, the paper in its current format greatly undermines its value since it lacks details on its novel work and sufficient interpretations of the module improvements. A major revision is necessary as suggested here.

General remarks: 1. The paper needs expand on its explanation of novel module (i.e. JVAL-13.99gmdd) improvements, particularly on physical changes. It would be good to introduce the background of these changes and how to implement them. What scientific advantages would be expected due to these changes? 2. The paper would be

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improved if the authors add a description of how the upgraded photolysis module treats aerosol and cloud. Unlike those of tracer gases, the optical properties of aerosol and cloud depend on particle size distributions and other physical and chemical properties. What is the aerosol speciation considered in the module? Are the aerosols treated as internal mixed or external mixed? Is the cloud microphysics (i.e. cloud droplet size distribution and shape) considered in deriving its optical properties? A good representation of cloud and aerosol is a challenge for an online dynamics photolysis module. 3. The paper needs in-depth evaluation and analysis of the module improvement. The authors need not only to show the changes of chemical fields due to the module upgrade, but also to explain the reasons for the changes. The authors could also explain the implication of the changes for air quality and climate. In addition, evaluation of the module improvement using observations is highly desirable. It may be difficult to evaluate the improvement of tracer mixing ratios using observations directly since atmosphere can be a buffer for its photolysis change. However, it is worth trying to evaluate photolysis rates directly using aircraft measurements.

Specific comments: 1. Please clearly indicate the novel module improvements of this work in abstract. 2. Sections 4.1 and 4.2 seem unnecessary since the authors do not present any evaluations of the photolysis module using these two approaches.

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