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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Influence of isoprene chemical mechanism on modelled changes in tropospheric ozone due to climate and land use over the 21st century" *by* O. J. Squire et al.

Anonymous Referee #2

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This manuscript compares the performance of a number of different mechanisms of tropospheric isoprene photochemistry, currently applied in global chemistry-climate and Earth system models, under various aspects of climate and land-use change with respect to ozone formation. The topic is timely and critical because large uncertainties still exist around the chemistry of isoprene in the troposphere. Furthermore, due to the large number of intermediate products and reactions an explicit isoprene mechanism comprises and due to the limited computing resources global models are forced to make simplifications to the representation of isoprene oxidation mechanism in those models. On the other hand, the interactions of anthropogenic emissions with the bio-

geochemistry of the natural environment are a crucial factor in the future evolution of atmospheric composition and, consequently, climate. Understanding the role of isoprene chemistry and the idiosyncrasies of different mechanisms that are routinely applied in climate models is, therefore, central to future climate predictions. These questions are examined in the manuscript applying the long-known concept of ozone isopleths for mechanism comparison in an innovative way. The results and conclusions are significant in our understanding of future changes in atmospheric composition and how this understanding depends on choices that mechanism developers have to make.

The paper is written excellently and is well structured making it an easy read. Concepts are presented clearly. Tables and figures complement the text in a helpful manner. In fact, the paper is prepared with so much care that I have no comments at all. For its timely nature, its scientific significance and its high standards of preparation I cannot but recommend publication as is.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 22385, 2014.