Response to referee #2

We thank the referee for her/his efforts to provide an assessment of this manuscript, and the work presented therein, and are grateful for her/his generally positive review. Below we provide a point-by-point response to the comments. The referee comments are in blue, and our response is given in black.

The paper presents a complete description of the components of a configuration of the ECMWF IFS available to the community. A rather standard evaluation of the model results are provided through comparisons to ozonesondes, satellite observations of CO, NO2, and satellite and Aeronet AOD, demonstrating reasonable performance.

Thank you for this.

The paper, and in particular the Conclusions section, rather lacks clear recommendations for the use of this model. The limitations are acknowledged, and improvements planned for future versions are mentioned, but it would be nice to see some positive statements of the value of this current version. Some recommended applications could be mentioned.

We acknowledge that the manuscript was kept compact in mentioning use cases, particularly in the conclusions section. In the introduction section we describe one of the key motivations for engaging in this work, in the framework of climate modeling, and also refer to the use of atmospheric composition modeling for the generation of satellite retrieval products. To better provide recommendations on the potential use for OpenIFS/AC, in the conclusions section we now more explicitly write:

"As such, OpenIFS/AC may foster research projects by connecting communities at the interface of meteorology, climate and atmospheric chemistry, enabling studies of trace gases and aerosols in interaction with meteorology and climate"

I think the paper is appropriate for publication in GMD.

Technical corrections:

Abstract: define OpenIFS

We now include in the abstact:

"OpenIFS is a portable version of ECMWF's global numerical weather prediction model"

l.40: define BASCOE

done

l.120: 'allows to study' should be 'allows study of' or 'allows one to study'

done, thank you

done

The revised text will provide the following additional details:

"Photolysis rates were computed offline by **an early version of** the TUV package (Madronich and Flocke, 1999), and are provided as lookup tables as a function of log-pressure altitude, ozone overhead column and solar zenith angle. **This version of the TUV package was originally developed for the two-dimensional model SOCRATES (Chabrillat and Fonteyn, 2003). It uses cross-section and quantum yield data from the JPL evaluation 15 (Sander et al., 2006) except for the cross-section of Cl_2O_2 and the quantum yields of H_2O_2, which were updated to the JPL evaluation 17 (Sander et al., 2011)**."

This reflects that Remy et al. (who describe the AER module in IFS in considerable detail) refer to Reddy et al. for this particular aspect. We now write:

"as first proposed by Reddy et al. (2005)"

References:

Chabrillat, S. and Fonteyn, D.: Modelling long-term changes of mesospheric temperature and chemistry, Adv. Space Res., 32, 1689–1700, doi:10.1016/S0273-1177(03)90464-9, 2003.

Sander, S., Friedl, R., Golden, D., Kurylo, M., Moortgat, G., Keller-Rudek, H., Wine, P., Ravishankara, A., Kolb, C., Molina, M., Finlayson-Pitts, B., Huie, R., and Orkin, V.: Chemical Kinetics and Photochemical Data for Use in Atmospheric Studies. Evaluation Number 15, JPL Publication 06-2, Jet Propulsion Laboratory, Pasadena, available at: http://jpldataeval.jpl.nasa.gov (last access: 31 August 2016), 2006.