Interactive comment on “Kinetics of the OH + NO₂ reaction: Effect of water vapour and new parameterisation for global modelling” by Damien Amedro et al.

Anonymous Referee #1

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This is an excellent and very careful study of the kinetics of the reaction of OH radical with NO₂, a reaction of central atmospheric significance. The main finding associated with this work (the second paper from this group on this reaction) is the finding of a significant enhancement to the OH/NO₂ rate coefficient in the presence of water vapor. This enhancement is quantified in both N₂ and He bath gas, and as a function of temperature. The data appear to be of the highest quality, previous data are discussed in detail, and the modeling work adds significantly to the atmospheric context, and hence the overall value of the manuscript. Overall a superb study! I recommend publication in ACP, after consideration of the minor comments listed below.
L12 – molecule misspelled.
L64 – exponent should be +3.
L127 – evaluation of atmospheric
L148- Maybe it is obvious, but it could be added to the text that fitting with an increased Fc gives a lower ko, (which doesn’t fit the data).
Page 4,5 - The pure He data are taken here at 292 K, somewhat below other ‘room temperature’ datasets that comparisons are being made with. Has this has been taken into account? If not, could this account for at least some of the systematic discrepancies with D’Ottoni or Morley? On a related point, there is a T-dependence to the He ko that appears in various places (captions to Fig 2, Fig 4b, L252). What is the origin of this value? (I think it is mostly unnecessary).
L209- delete molecules
L252 – temperature dependence
L254 – delete use
L275 and forward – The tests for HONO and HNO3 are really nice !
L297 – temperature instead of temperatures
L342 – H2O, not HO2, as product of (R7)
L406 – short at
L408 – temperature and pressure conditions