The authors report a theoretical study on the gas phase oxidation of SO_2 by $O3-(H_2O)_{0-5}$ cluster, that has interest in the chemistry of the atmosphere in relation with the gas phase formation of sulfuric acid. This work deserves publication in Atmospheric Chemistry and Physics after considering the following points.

My main concern refers to the theoretical approach employed to calculate the energy barriers. Although it has been shown that theCAM-B3LYP method provides good energy barriers for model systems and the authors provide reaction energies in good agreement with experimental data, the fact that the studied reaction involve the breaking of an O-O bond and the forming of an S-O bond, and that the reaction investigated involves ozone anion, suggest me the need for a further check for the reliability of the computed values. Therefore, I would suggest the authors performing CCSD(T) calculations on the naked reaction and/or on the reaction involving $O_3 \cdots H_2O$, and looking at the T1 diagnostic to prevent for a possible multireference character of the wavefunction.

It is not clear whether the authors have performed IRC calculations to make sure that a given transition state correlates with the desired reactants and products. This should be clarified

It would be very useful to extend the charge analysis to the $SO_3O_2(H_2O)_n$ product complexes and to include a bond analysis on these species. Do the unpaired electrons play any role in the binding of these species?

Along the text the authors mention the binding energies of the complexes investigated the energy barriers and reaction energies. However, no indication is done that these values are partially reported in the supplementary information. This should be mentioned explicitly in the text, and the whole set of values should be reported in the supplementary information.

In page 29655, line 17 reads O_3S-O_2 complex and should read O_3S-O_2 complex.

In page 26959, lines 20 and 21, the authors should indicate how the collision cross section d has been computed.

It would be very useful that the authors report, in the supplementary information, the values of the computed rate constants and lifetimes.

It would be also very useful that the authors include in Figure 4 the distances of the forming and breaking bonds.