

Dear Editor,

Please find attached a revised version of our manuscript, which, as suggested, includes in the first part of the introduction some additional elements regarding the involvement of sulfuric acid in cluster formation processes. The different H_2SO_4 -driven nucleation pathways investigated in laboratory studies and the participation of ions in the process, which are both related to the conditions in which the process occurs, are in particular evoked. In contrast, we have not included any detailed discussion of the thermodynamics associated with these different mechanisms, since, although the knowledge of $[\text{H}_2\text{SO}_4]$ is of particular interest for nucleation and NPF studies, understanding of these processes is not part of the objectives of this study. Similarly, we have not made any specific focus on upper tropospheric conditions, since the lower tropospheric levels are likely impacted by volcanic eruptions as well, in particular when these are taking place in the planetary boundary layer (e.g. Stromboli, 924 m a.s.l.; Sahyoun et al., 2019).

In addition, all acronyms and equations are now displayed in regular font.

Thank you for considering our revised manuscript.

Sincerely,

Clémence Rose