The manuscript presents a protocol for the Regional Aerosol Model Intercomparison Project (RAMIP). The effort is timely, as aerosol-climate interactions over different regions will emerge as a more important issue when various emission reductions will occur in the next few decades in different regions around the world. Current MIPs do not address this topic adequately. The manuscript documents the experiment designs and show some preliminary results from three models as the proof of the concept. However, I feel that some key technical details related with model physics and emission setup are missing, and some designed experiments need more justifications. Overall, the work is appropriate for GMD. I provide my specific comments below for the authors to address before I can recommend acceptance.

- To gain insight of the model spreads in predicting the regional climate impacts, we need to know how sophisticated each model treat aerosol, cloud, and radiative processes. Therefore, it would be a much valuable effort to summarize and intercompare the following aspects of the CMIP6 models in this paper: 1) how they consider mixing state of different aerosol species; 2) how they consider vertical distribution of some primary emissions, such as BC from biomass burning; 3) what cloud microphysics is being used and how CCN-cloud interactions are treated, etc. A few tables can serve this purpose. If there exists this type of synergy in the literature, please refer to them. If it is not feasible for all participating models, analyzing the three GCM mentioned in the paper should be a good starting point.

- It is unclear to me why BC and OC emissions are perturbed together in Tier 2 experiments? Are they considered to come from the same source, i.e. combustion? L218-220 mentioned the carbonaceous aerosols, but substantial amount of OA are formed via chemical processes in the populous regions like South Asia. Hence, it raises another related question: will the precursor gases of OA be perturbed in those experiments?

- It is good to see Africa is one of the target regions in RAMIP. One issue is that lots of BC are emitted by biomass burning, but burning can be either a natural process (wildfires) or anthropogenic activity. Please clarify whether and how the RAMIP emissions distinguish them.

- For the fSST experiment, pre-industrial SST and sea ice extent will be used. However, it is widely accepted that the climate responses/sensitivity hinge on the mean climate states. Therefore, we cannot expect the same aerosol impacts by running those experiment using present-day SST and SI.

- L70-73, the attribution and explanation here are way too simple. Many other factors can affect different precipitation responses to aerosol versus GHG, such as aerosol-cloud interactions. Even for absorbing aerosols like BC, the way it impacts precipitation (by altering vertical heating profile) works quite differently with GHG.

- L99-101, it has to be mentioned that for the CMIP6 models, the aerosol microphysical interactions with cloud and precipitation are considered only on the model grid scale, not the subgrid scale like shallow/deep convective cloud parameterizations. The models with explicit aerosol-cloud interactions in the subgrid cloud physics (e.g. superparameterized models) predict quite distinctive aerosol effects on cloud and precipitation (Wang et al., 2014, PNAS, "*Assessing the Effects of Anthropogenic Aerosols on Pacific Storm Track Using A Multi-Scale Global Climate Model*").

- Some important references are missing during the discussions of the importance of aerosol-climate interactions. I list two below as examples:
- L74-75, Li et al. (2017, Rev. Geophys, "*Aerosol and Monsoon Climate Interaction over Asia*") nicely summarized the state-of-the-art understanding of aerosol impacts on Asian monsoons.
- L78-85, Wang et al. (2015, JGR-Atmo, "*Atmospheric Responses to the Redistribution of Anthropogenic Aerosols*") showed the Hadley cell, jet stream, and precipitation belt responses to aerosol geospatial shifts in the past few decades in CESM1.

- Table 4, please spell out the MIP names, so people can understand what they are.

- Section 3 “RAMIP core goals and analyses” should moved forward as section 2, as readers need to know your overarching objectives before they understand your experiment design.

- Appendix A and Fig. A2, it is not appropriate to use ERA surface radiation fluxes and precipitation as truth. They are essentially predicted by the ERA modeling framework without much observational constraints.