

Interactive comment on “The sensitivity of Southern Ocean aerosols and cloud microphysics to sea spray and sulfate aerosol production in the HadGEM3-GA7.1 chemistry-climate model” by Laura E. Revell et al.

Anonymous Referee #2

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This study examines model simulations of aerosol optical depth (AOD) and the relative contributions of the Aitken, accumulation, and coarse aerosol size modes to AOD throughout the seasonal cycle. Comparisons are made to MODIS and MISR satellite observations, which indicate that the model is overpredicting the amount of primary sea spray aerosol. The overprediction is attributed to the sea spray source function, and the sensitivity of the model to this source function is tested with a newly-developed empirical model derived from field observations (that is apparently explained in detail in a paper currently in preparation – Hartery et al.). Additional sensitivity simulations

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are performed to explore changes in the representation of gas- and aerosol-phase conversion of DMS to sulfate aerosol as described by Chen et al., 2018. Overall, the manuscript is well written, and the topic is relevant to ACP. I share the concerns of the other reviewer that the fundamental sea spray source function employed by this study is based on a paper that has not yet been even submitted, much less in a peer-reviewed form with only a cursory description (and no real validation) provided in this paper. Other than this issue, I recommend the paper for publication.

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