



EGUsphere, referee comment RC2
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Comment on egusphere-2022-80

Anonymous Referee #2

Referee comment on "Dynamical perturbation of the stratosphere by a pyrocumulonimbus injection of carbonaceous aerosols" by Giorgio Doglioni et al., EGU sphere,
<https://doi.org/10.5194/egusphere-2022-80-RC2>, 2022

Review of "Dynamical Perturbation of the stratosphere by a pyrocumulonimbus injection of carbonaceous aerosols" by Goglioni et al., 2022, submitted to ACP

Doglioni et al. successfully modeled the anticyclone (SWIRL) in a pyrocb event using GEOS CCM. This study finds that the diabatic heating from the smoke aerosol is critical to maintain the SWIRL structure. In general, I find this study very interesting and important, and the author team has done a very impressive job by simulating the SWIRL in a climate model. I suggest publication with minor revision.

Can the authors comment on the resolution of a model needed to reproduce the SWIRL? This study uses 50 km, will 100-km or 200-km models will fail?

Just curious, since the author have successfully modeled the SWIRL, it is very interesting (at least to me) to know how much smoke mass is associated with the SWIRL vs. how much smoke are out of SWIRL. Will that be different between the 2017 PNE and 2019 ANY events? Note, I am not asking for more runs, some comments are helpful here if the authors know that.

I agree with the authors that seems the vertical resolution of a climate (usually 1 km near tropopause) can be limiting in simulating the SWIRL.

I found there is limited comparison between model and observations. I understand it is free running mode, I still think comparison like the size of SWIRL; smoke masses; altitudes/durations are helpful to provide readers knowledge of what was happening in the real world.