

Supporting Information for ”Integrated Dynamics-Physics Coupling for Weather to Climate Models: GFDL SHiELD with In-Line Microphysics”

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Introduction

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Table S1. The abbreviated names in front of each row of Figure 2.

Pressure (hPa)	100, 200, 250, 500, 700, 850, 1000
h	geopotential height (unit: m)
t	temperature (unit: K)
u	zonal wind (unit: m/s)
v	meridional wind (unit: m/s)
omg	vertical velocity (unit: Pa/s)
q	specific humidity (unit: g/kg)
ql	cloud water mass mixing ratio (unit: g/kg)
qi	cloud ice mass mixing ratio (unit: g/kg)
qr	rain mass mixing ratio (unit: g/kg)
qs	snow mass mixing ratio (unit: g/kg)
cf	cloud fraction (unit: 1)
rh	relative humidity (unit: %)
intqv	vertical integrated water vapor (unit: kg/m ²)
intql	vertical integrated cloud water (unit: kg/m ²)
intqi	vertical integrated cloud ice (unit: kg/m ²)
intqr	vertical integrated rain (unit: kg/m ²)
intqs	vertical integrated snow (unit: kg/m ²)

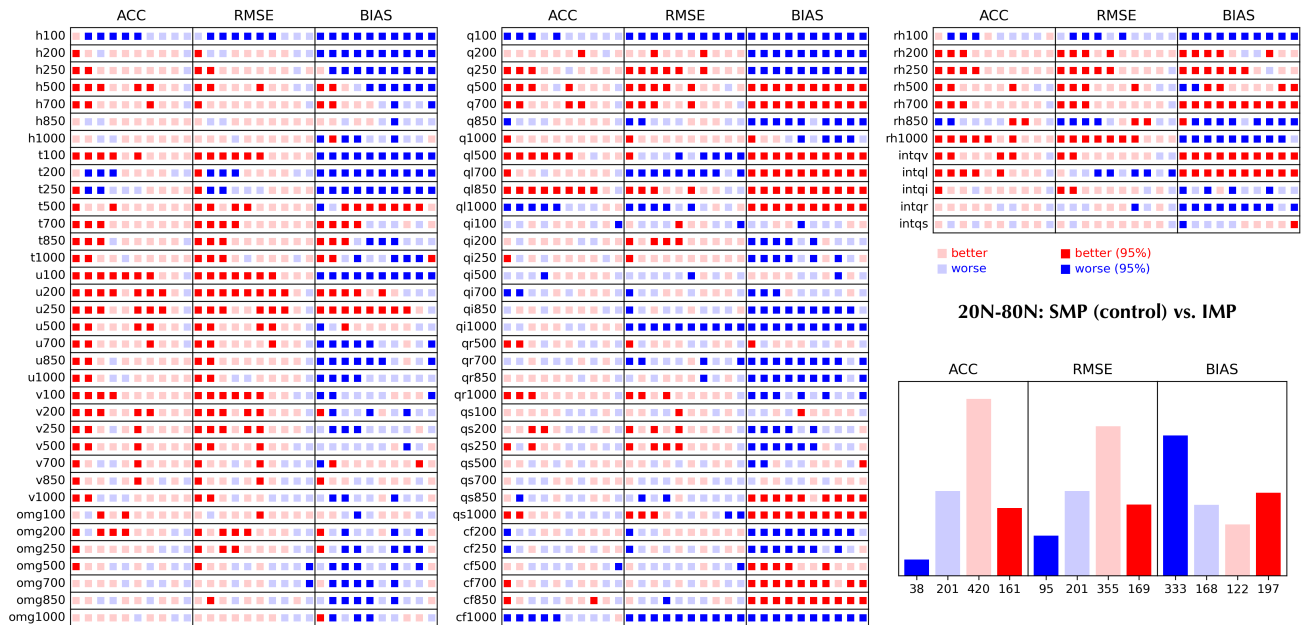


Figure S1. The same as Figure 2, but for northern hemisphere.

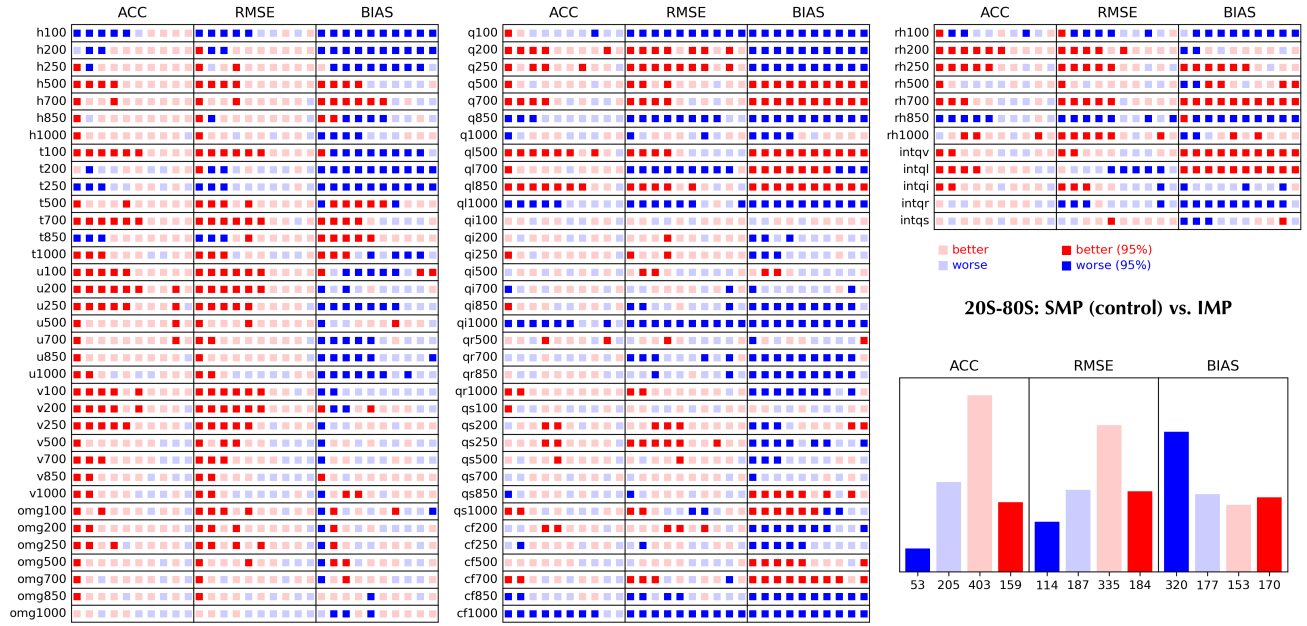


Figure S2. The same as Figure 2, but for southern hemisphere.

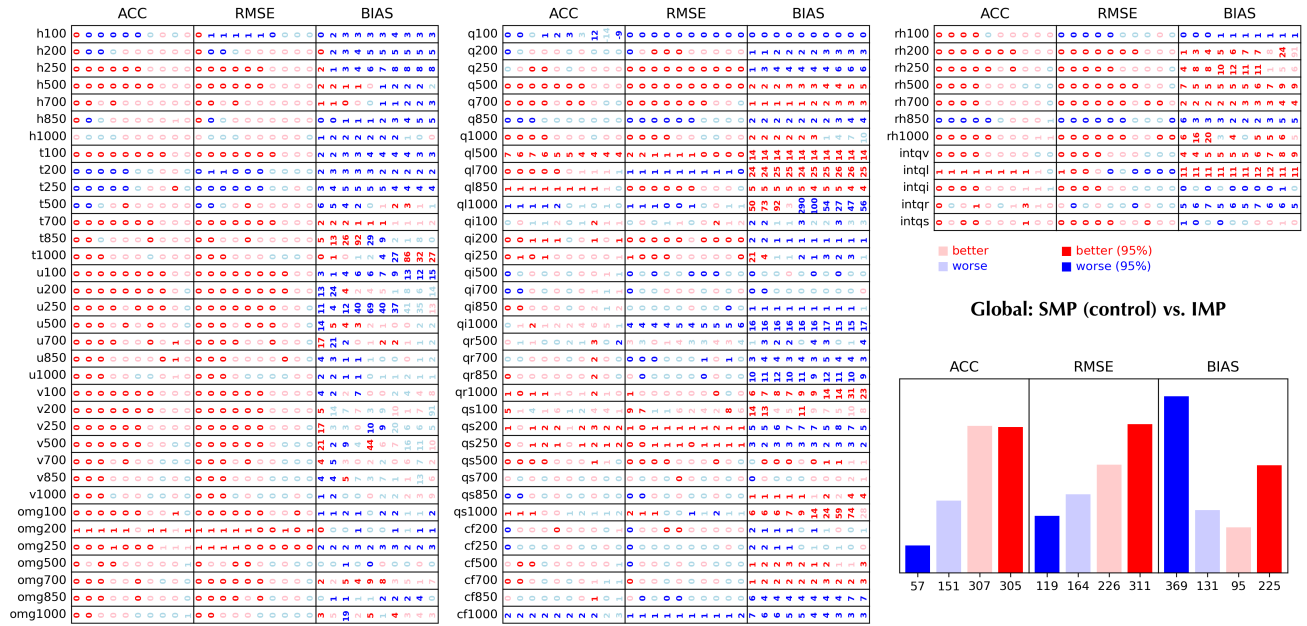


Figure S3. The same as Figure 2, except that the numbers represent the percentages (%) of improvement (red) or degradation (blue) with respect to the control experiment.

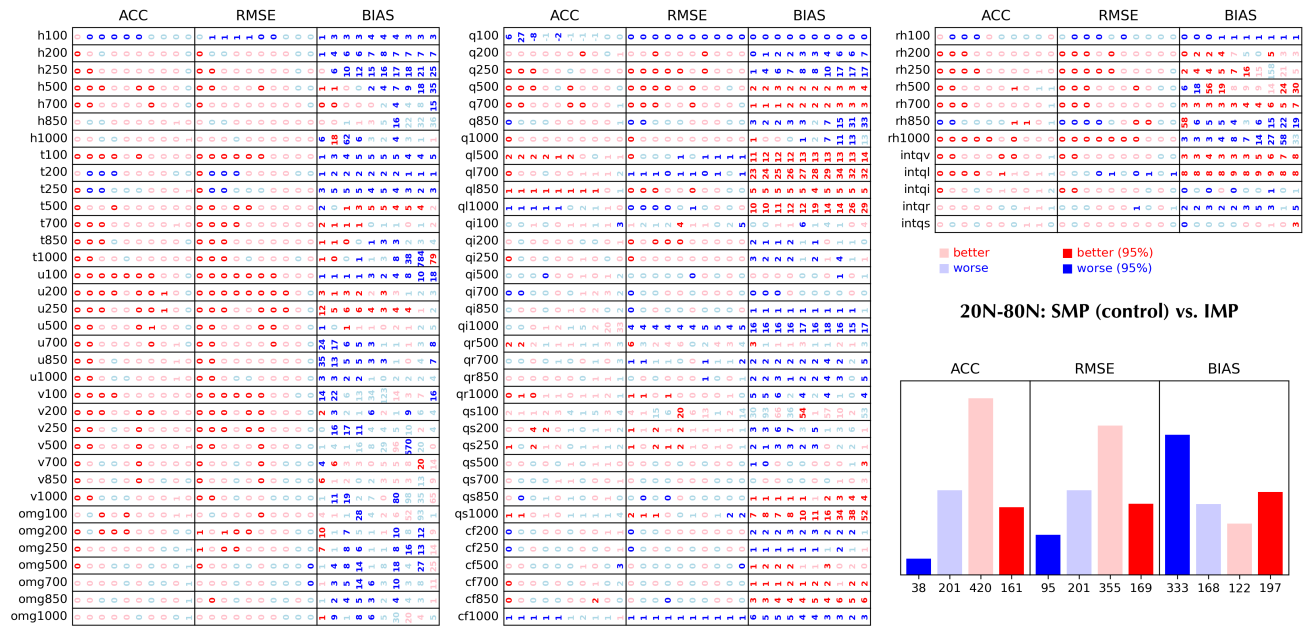


Figure S4. The same as Figure S3, but for northern hemisphere.

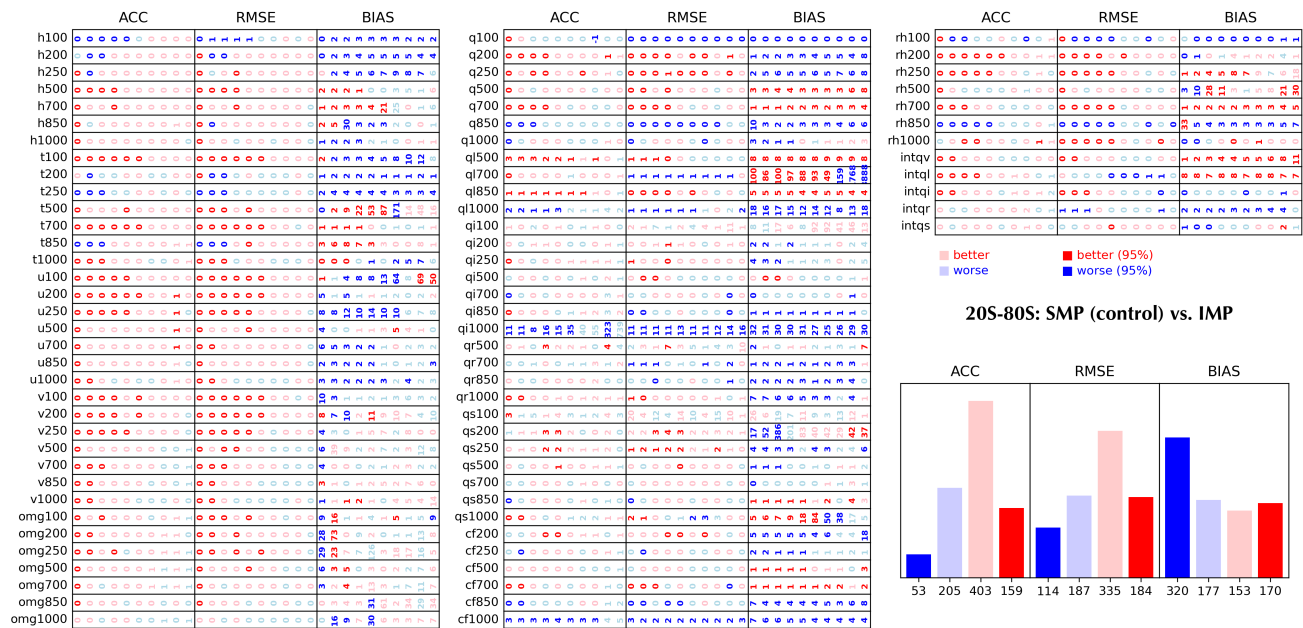


Figure S5. The same as Figure S3, but for southern hemisphere.

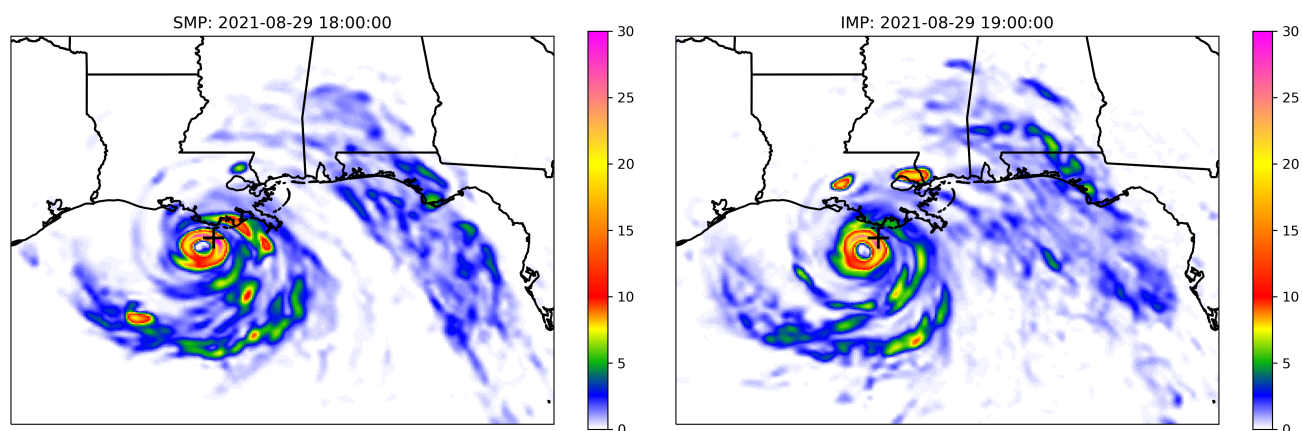


Figure S6. A snapshot of total cloud condensate at the forecast hour of 66 (18Z August 29, 2021) for the split GFDL MP (SMP, left) and 67 (19Z August 29, 2021) for the in-line GFDL MP (IMP, right). Cross mark is the location (91.139°W , 28.5314°N) where Hurricane Ida (2021) passed by and cloud microphysics analyses are done in the main text.