Supplementary Materials for "Significant Response of Methane in the Upper Troposphere to Subseasonal Variability of the Asian Monsoon Anticyclone"

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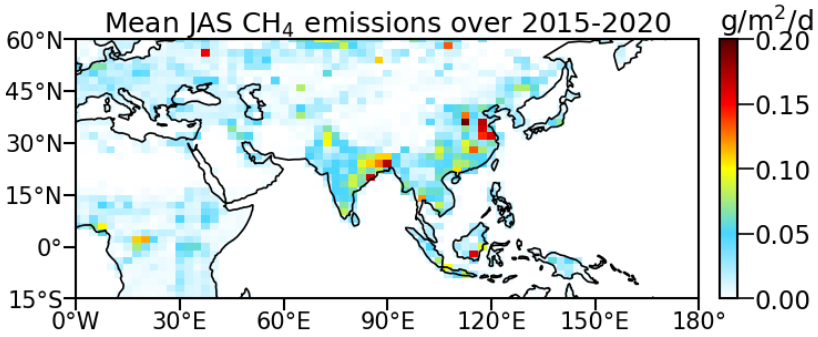

Figure S1: Map of mean CH_4 emissions during the JAS season (July–September) averaged over 2015–2020.

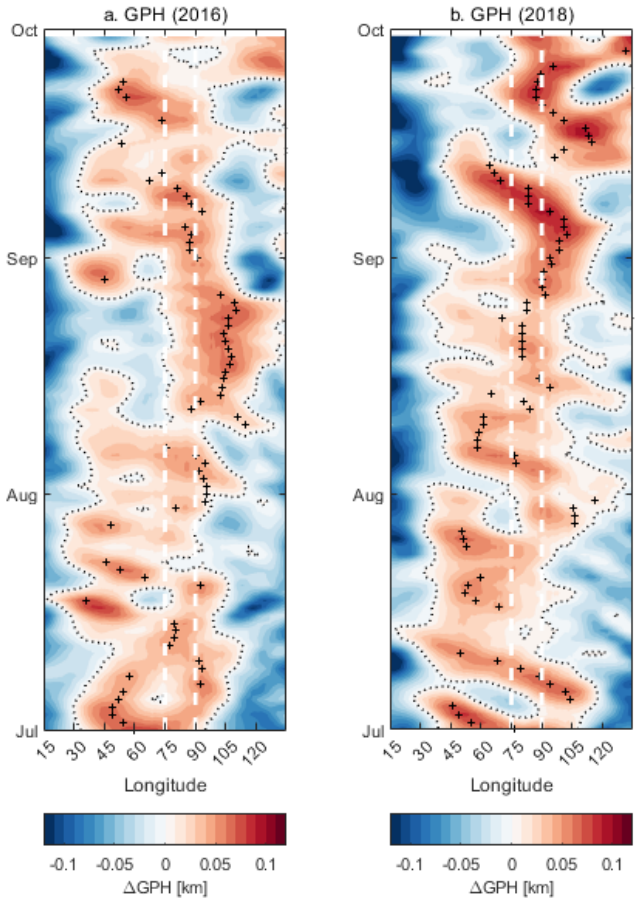

Figure S2: Hovemoller diagram of geopotential height for 2016 and 2018 JAS. The black crosses show the position of AMA center. The white dashed lines show the latitude range (75-90◦E) for WTP mode.

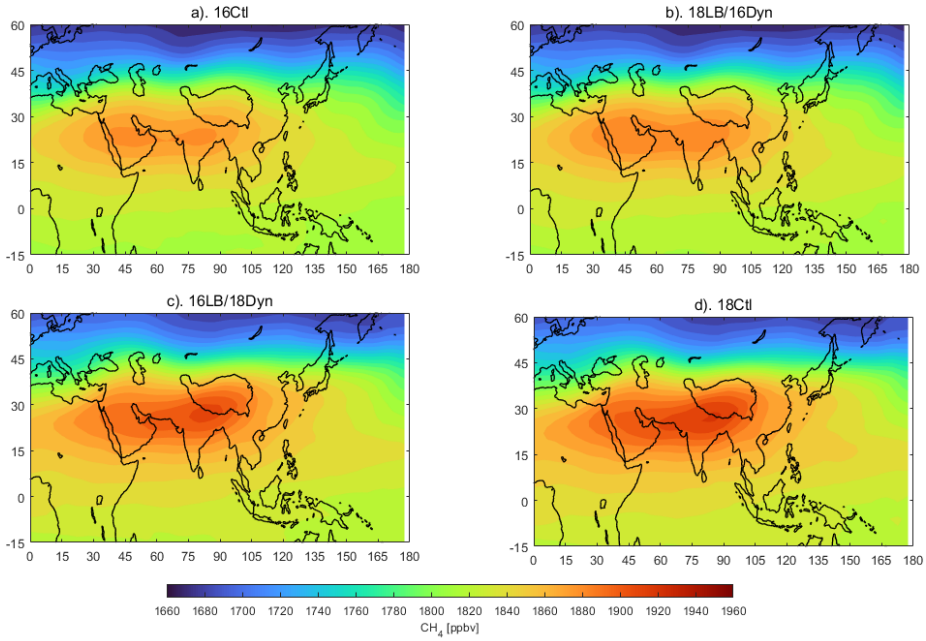

Figure S3: The mean CH_4 distribution during JAS at 100hPa based on 4 test runs for the year 2016 and 2018 listed at Table 1 (fixed L.B. runs).

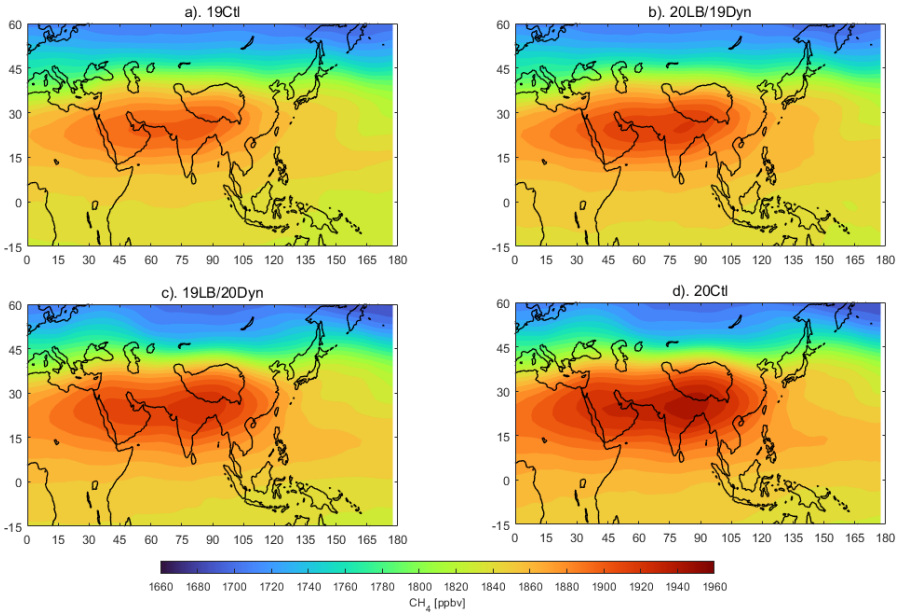

Figure S4: The mean CH_4 distribution during JAS at 100hPa based on 4 test runs for the year 2019 and 2020 listed at Table 1 (fixed Dyn. Runs).

As we can see in Figure S3 and S4, the mean CH_4 distribution at 100hPa over ASM region are not sensitive to the shift of boundary condition but more sensitive to change in the dynamical configuration. Moreover, in Figure S3, we find that difference between 16LB/18Dyn (c) and 16Ctl (a) are almost identical to the difference between 18Ctl (d) and 18LB/16Dyn (b). So are the corresponding difference shown in Figure S4.

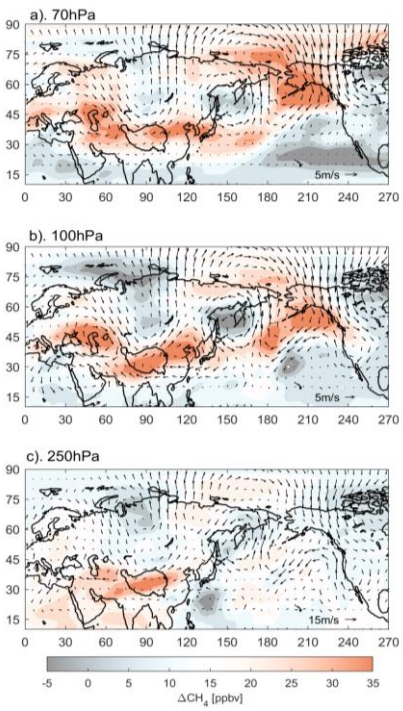

Figure S5: Similar as Fig. 6 (b1-3) but for larger spatial range. The arrows indicate the differences in horizontal wind between the dynamical fields of 2016 and 2018.