The impact of mineral dust on the day-to-day variability of stratiform cloud glaciation occurrence: Supplement information

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For figures S.1 to S.14:

a) Time average at -15°C (averaged in a 12 K range), 2007-2010.
b) Time-zonal average, 2007-2010.
c) Zonal average at -15°C (averaged in a 12 K range), 2007-2010.

S.1-S.3: Frequency phase ratio (FPR) variables.

S.4-S.7: Dust aerosol data from MACC reanalysis.

S.8-S.9: Cloud volume fraction of all and stratiform clouds (CALIOP-GOCCP).

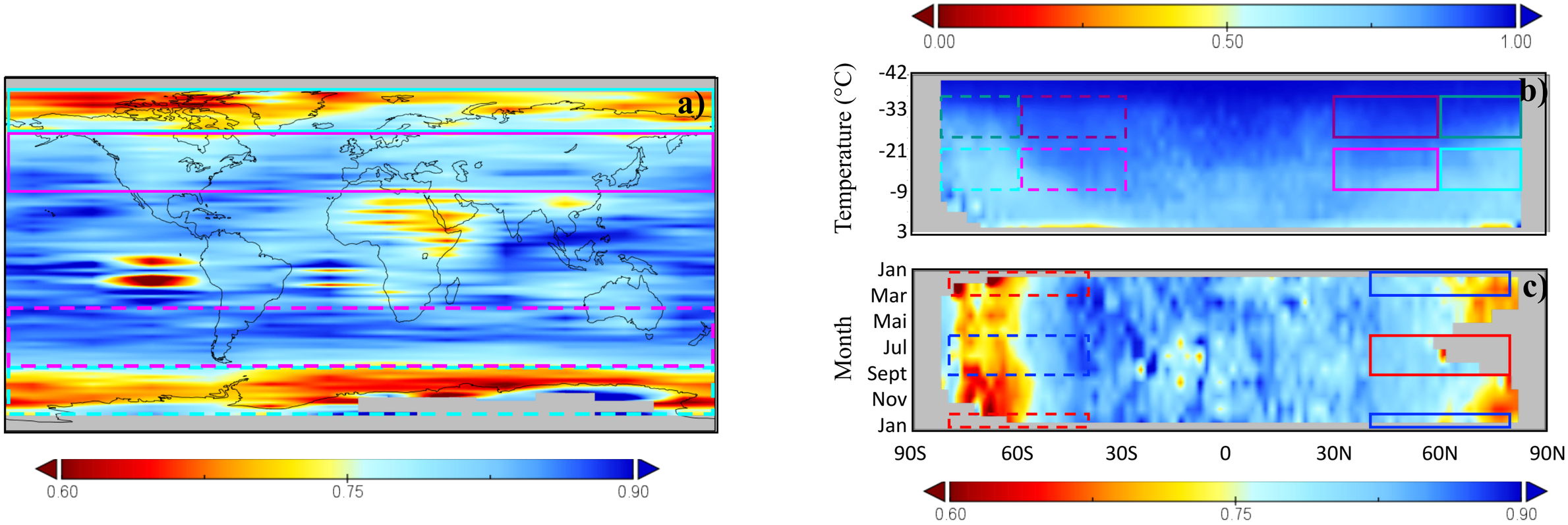
S.10-S.13: Vertical velocity (MACC), relative humidity (ERA-Interim), isotherm height and temperature (ECMWF-AUX).

S.14-S.16: Sample size.

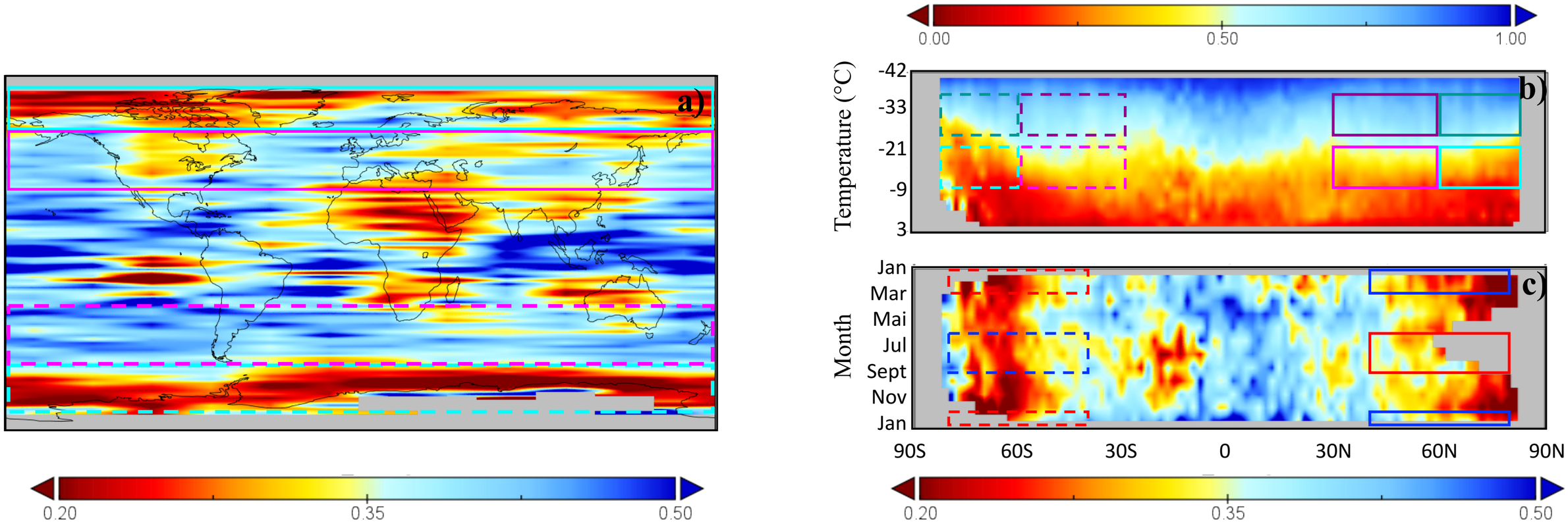
S.17: FPR_{GOCCP} vs. coarse dust at -30 °C (MACC reanalysis).

S.18-S.19: FPR_{GOCCP} vs. fine and coarse dust mixing-ratio deciles from the CAMS reanalysis (30.09.2018) at -15°C and -30°C.

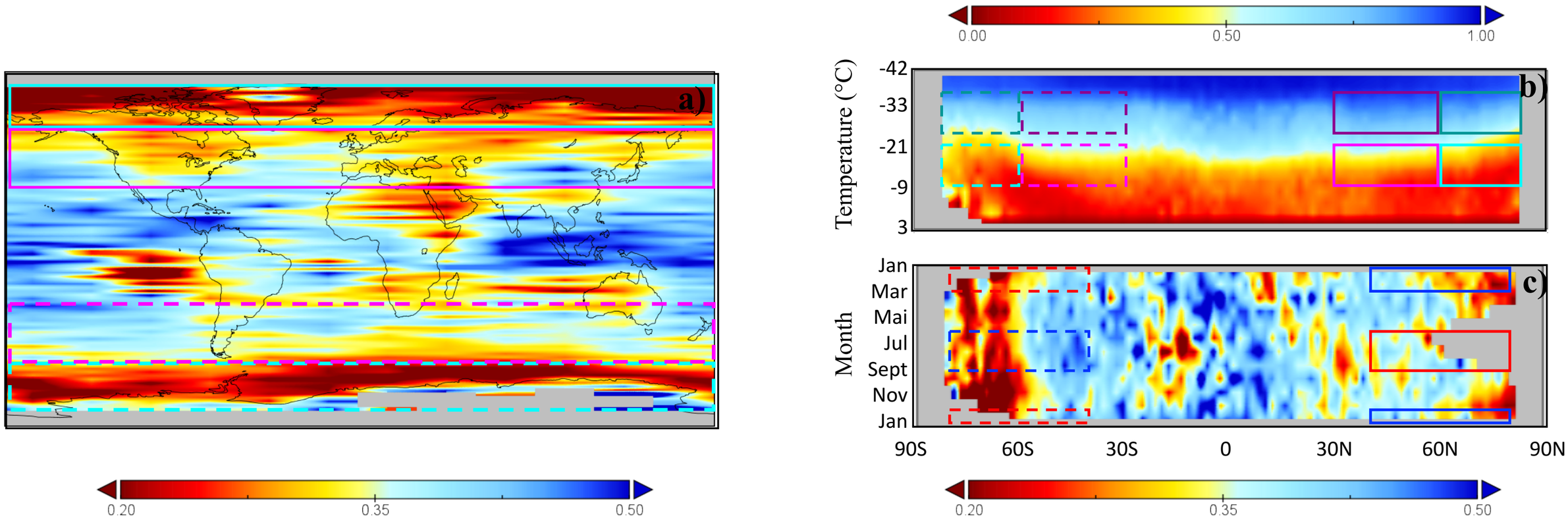
S.20 Diagram explaining the concept of day-to-day deciles.



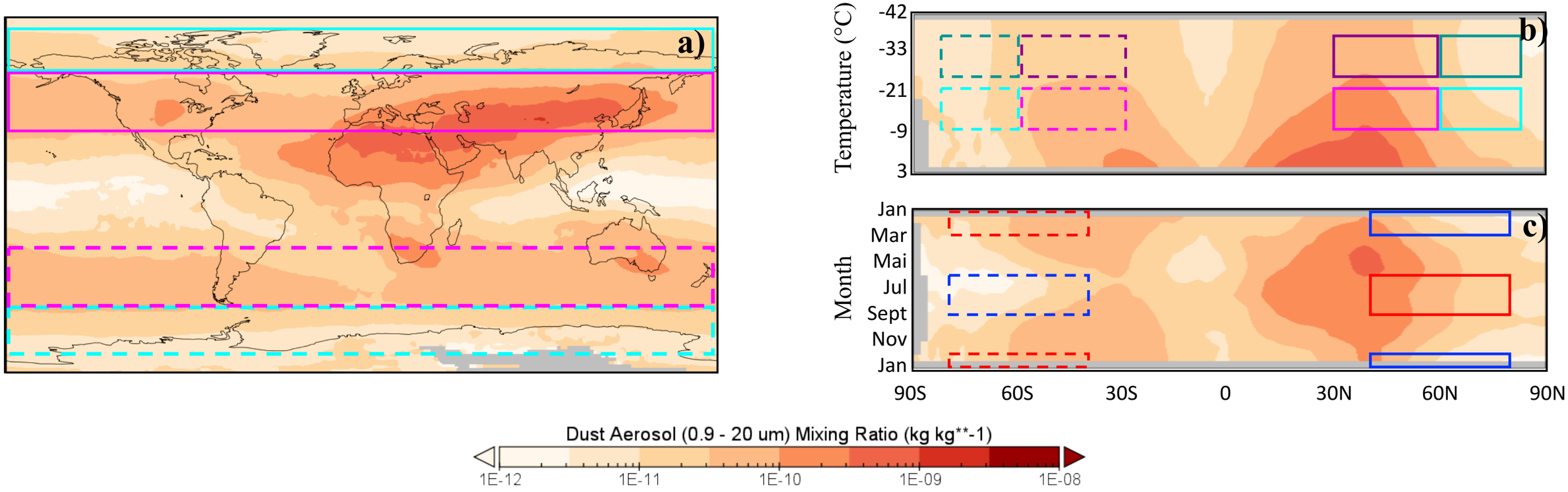
S1. FPR_{DARDAR} [%]



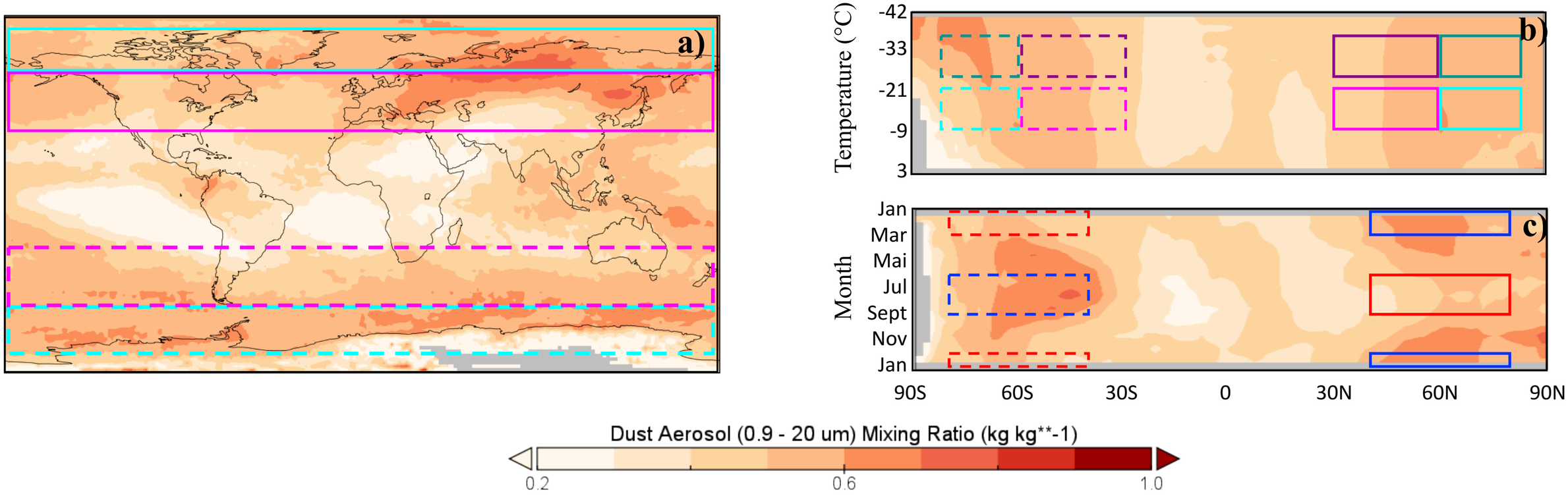
S2. FPR_ALT_{DARDAR} [%]


a)
0.20
0.35
0.50
0.00
0.50
1.00
Temperature (°C)
-42
-33
-21
-9
3
b)
Month
Jan
Mar
Mai
Jul
Sept
Nov
Jan
c)
90S
60S
30S
0
30N
60N
90N
0.20
0.35
0.50

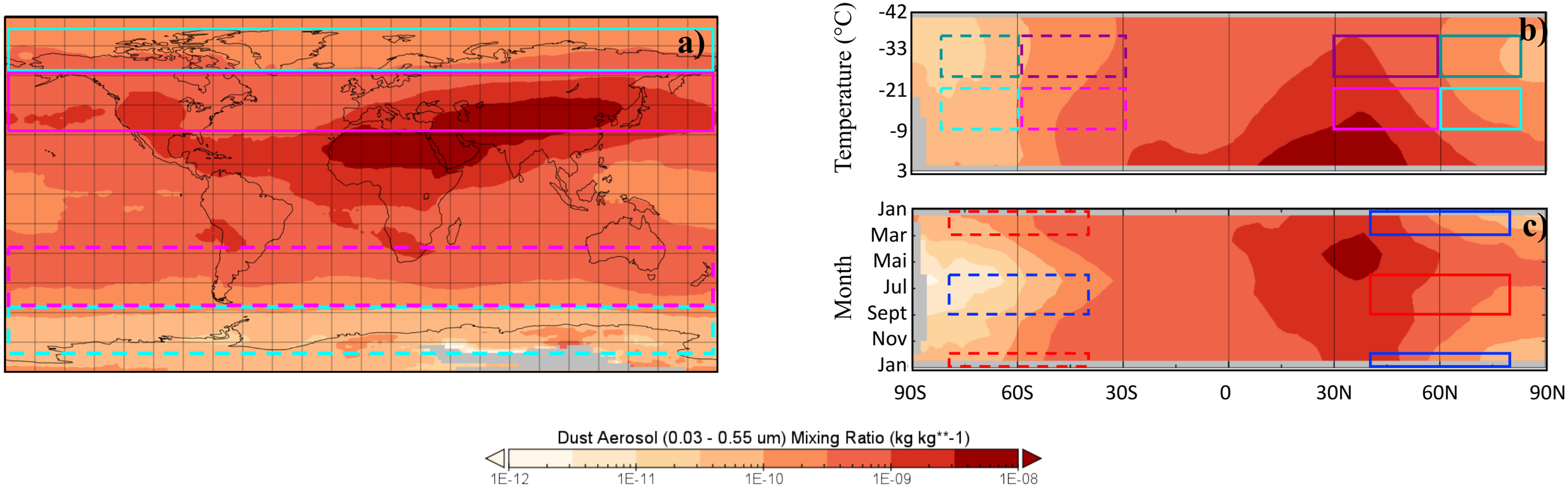
S3. FPR_{GOCCP} [%]



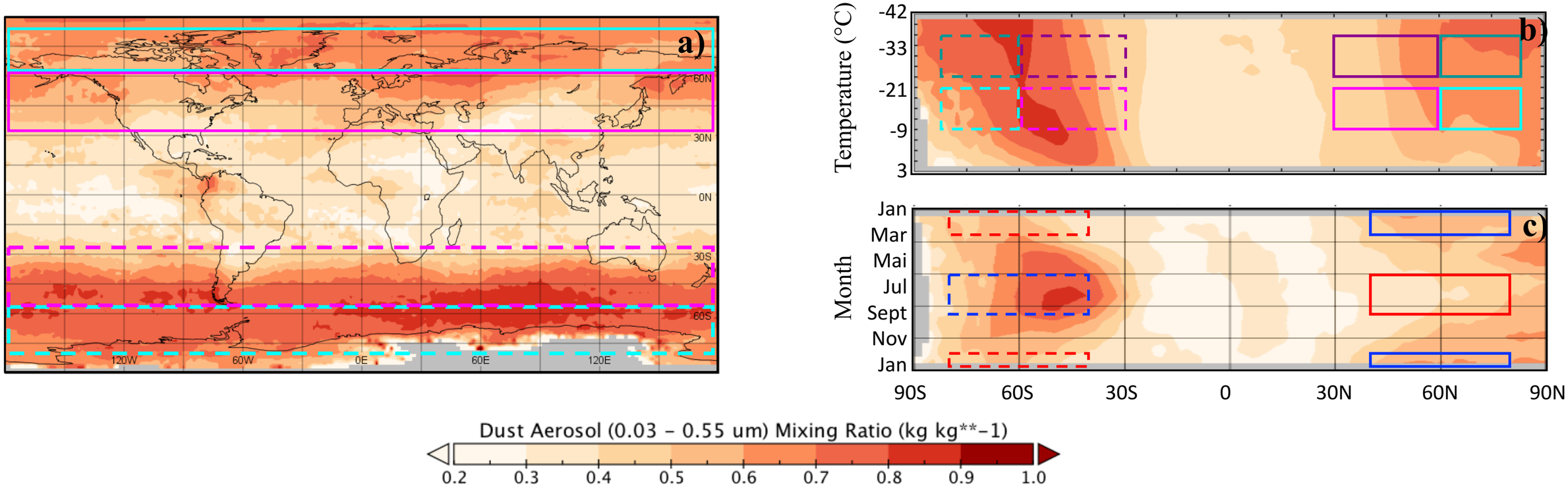
S4. MACC coarse dust [kg/kg].



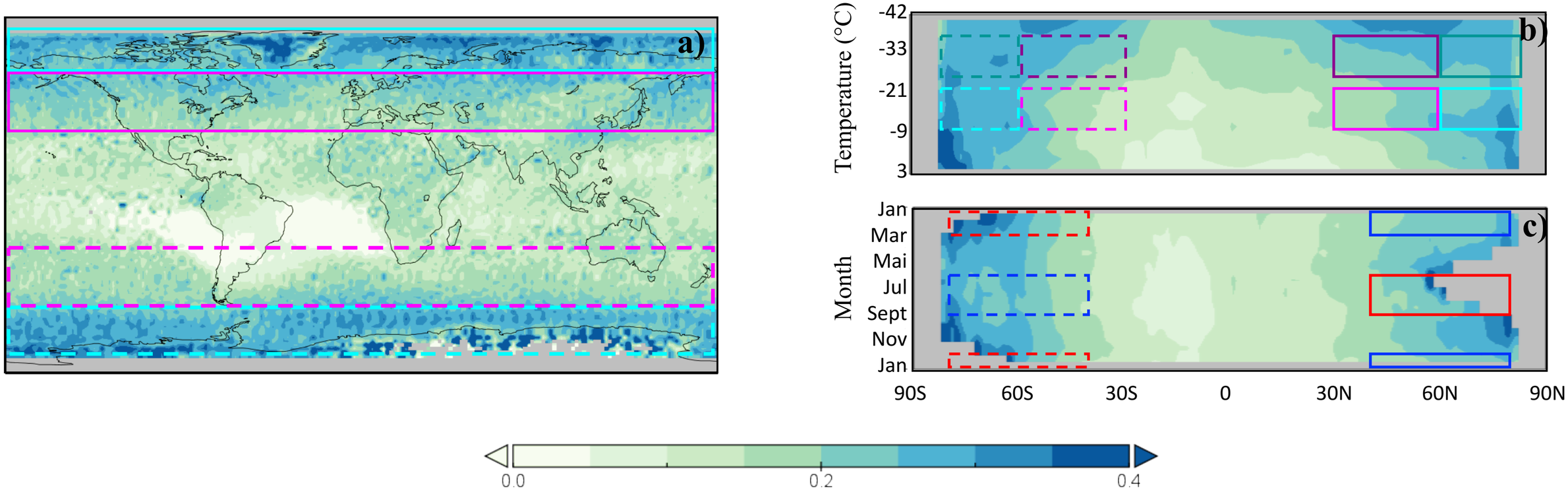
S5. Standard deviation of coarse log (dust) MACC [log(kg/kg)].



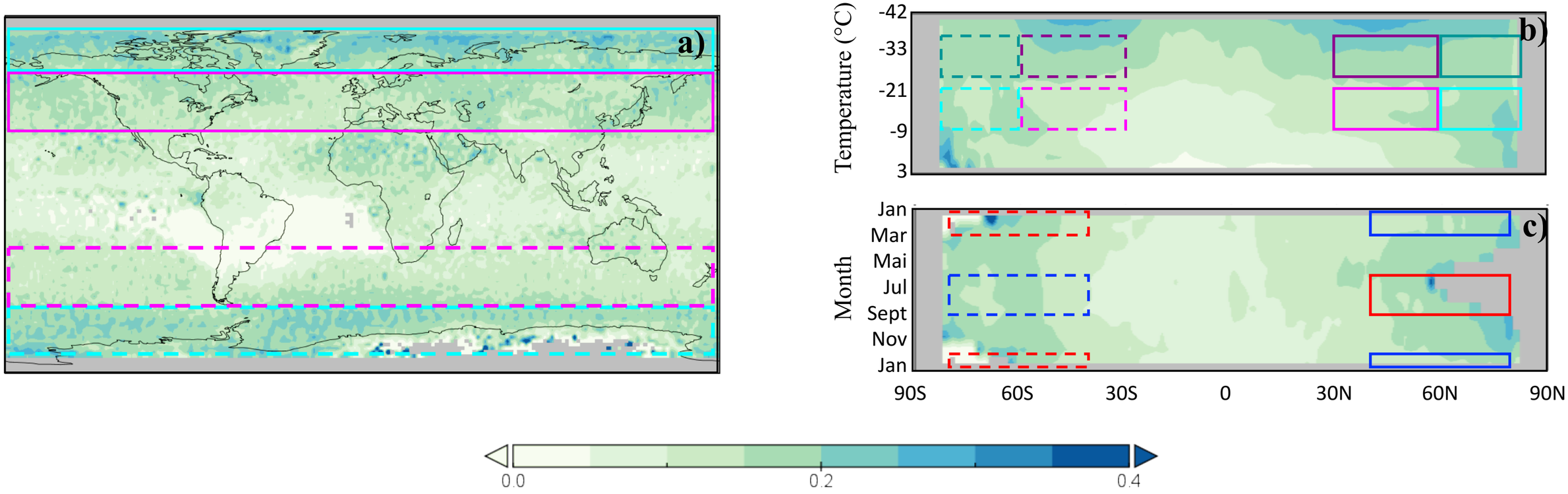
S6. MACC fine dust [kg/kg].



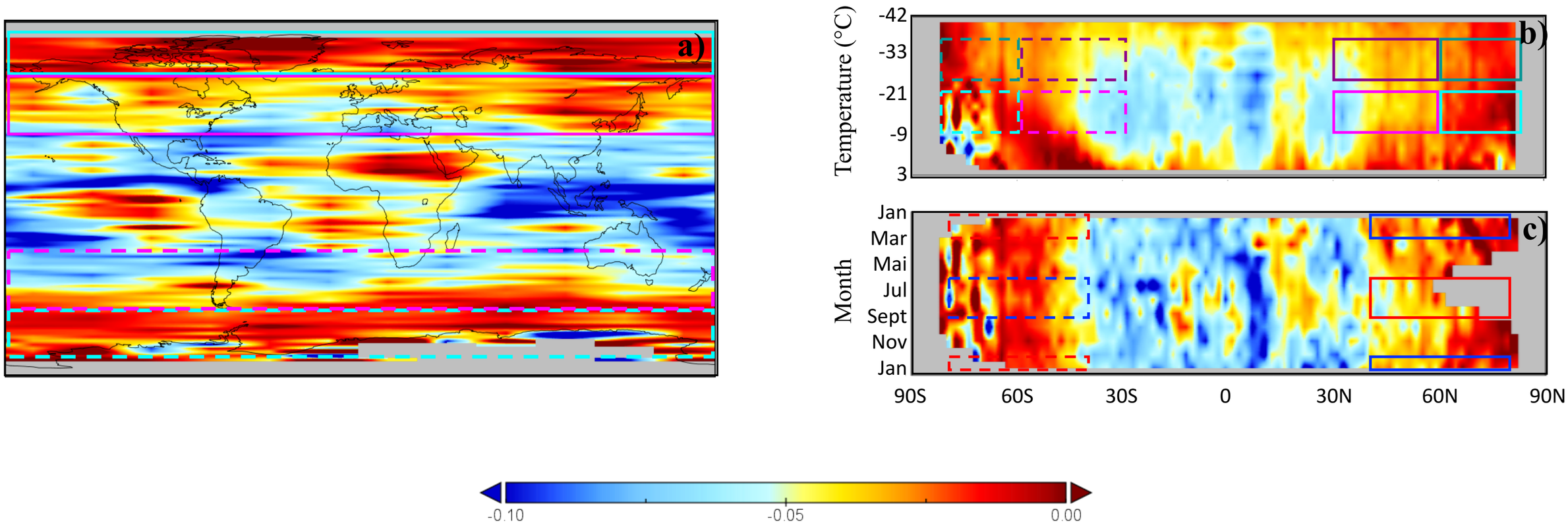
S7. Standard deviation of fine log (dust) MACC [log(kg/kg)].



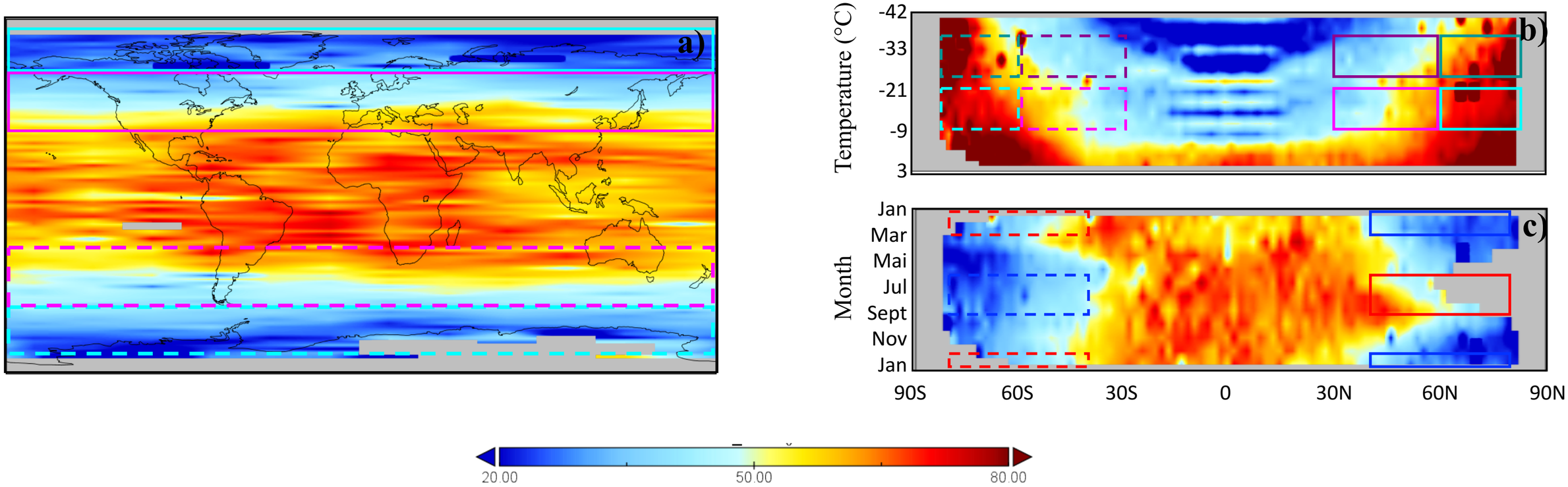
S8. Cloud volume fraction [%].



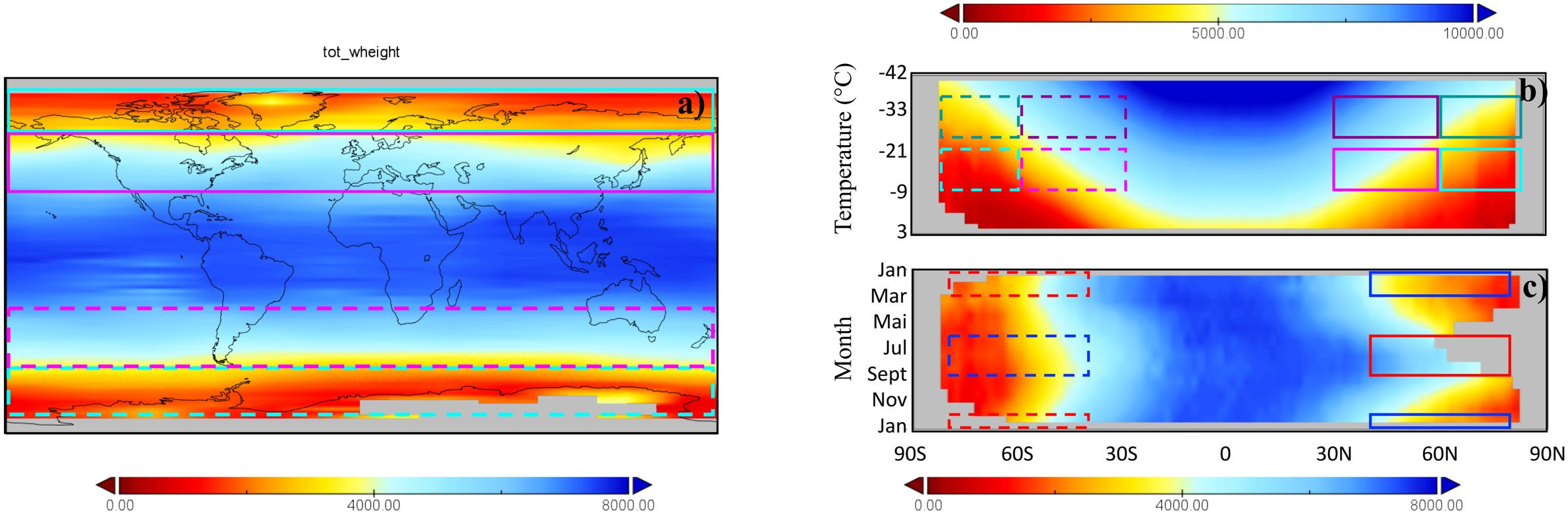
S9. Stratiform cloud volume fraction [%].



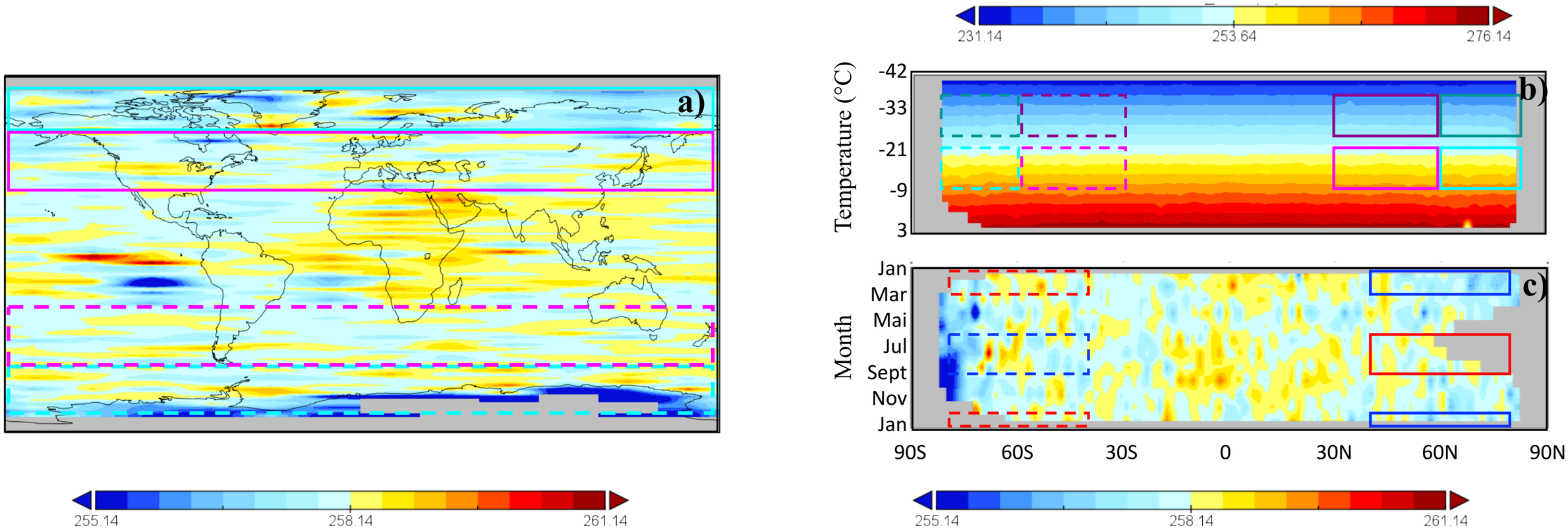
S10. MACC vertical velocity [Pa/s] for stratiform clouds.



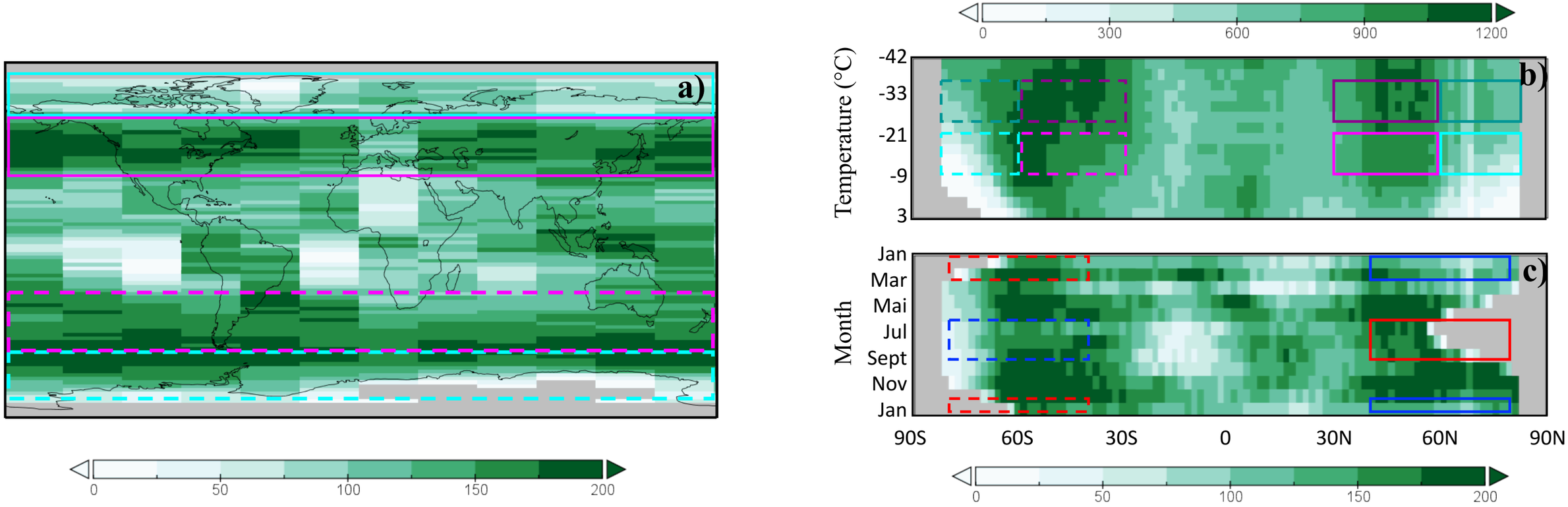
S11. MACC relative humidity [%] for stratiform clouds.



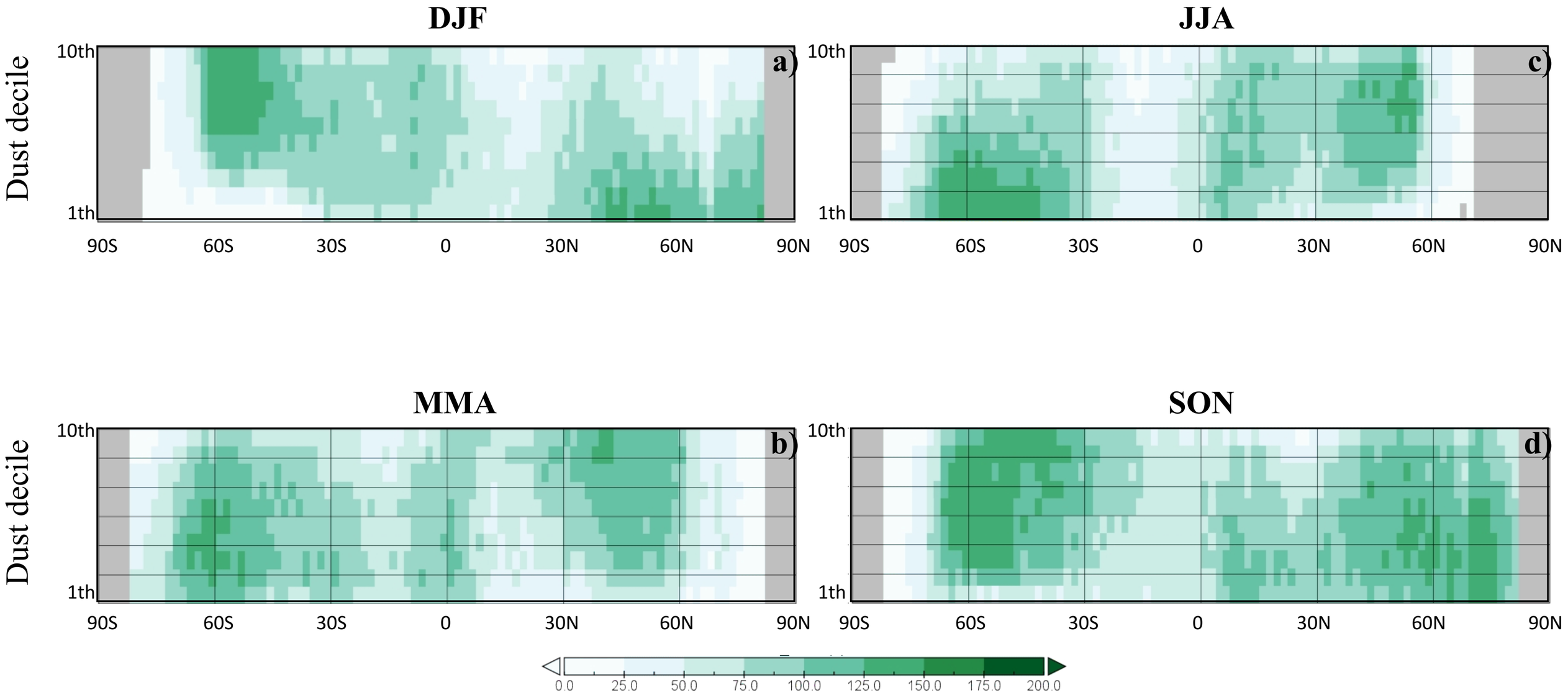
S12. ECMWF-AUX isotherm height [m] for stratiform clouds.



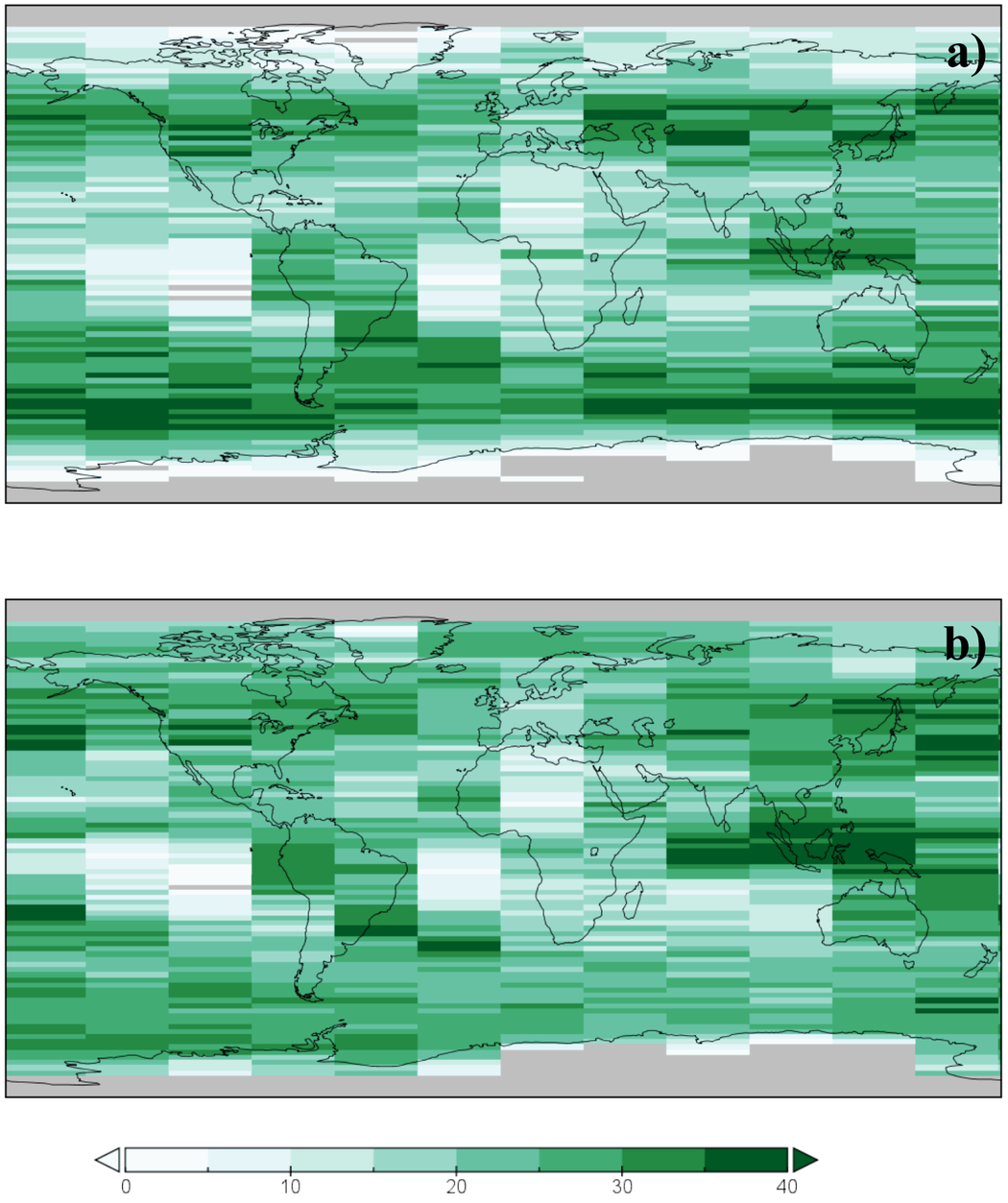
S13. ECMWF-AUX temperature [K] for stratiform clouds.

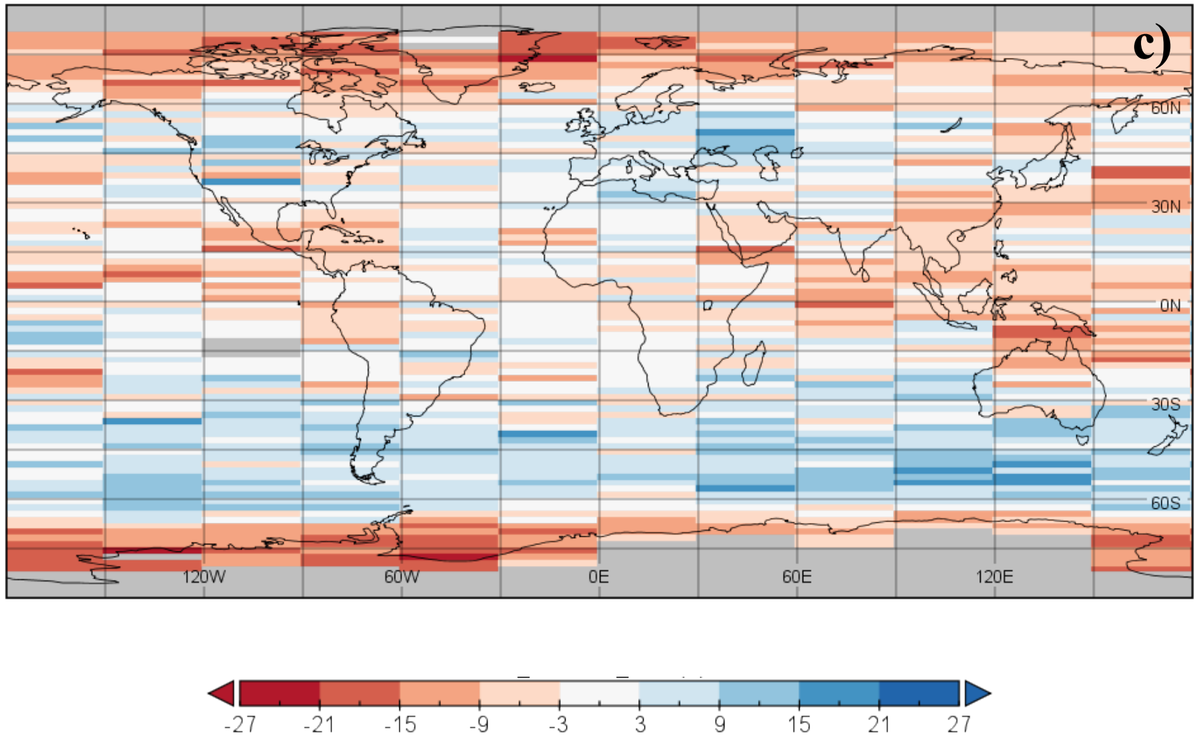


S14. Sample size of stratiform clouds [#gridboxes(month, dust decile, temperature, latitude, longitude)].

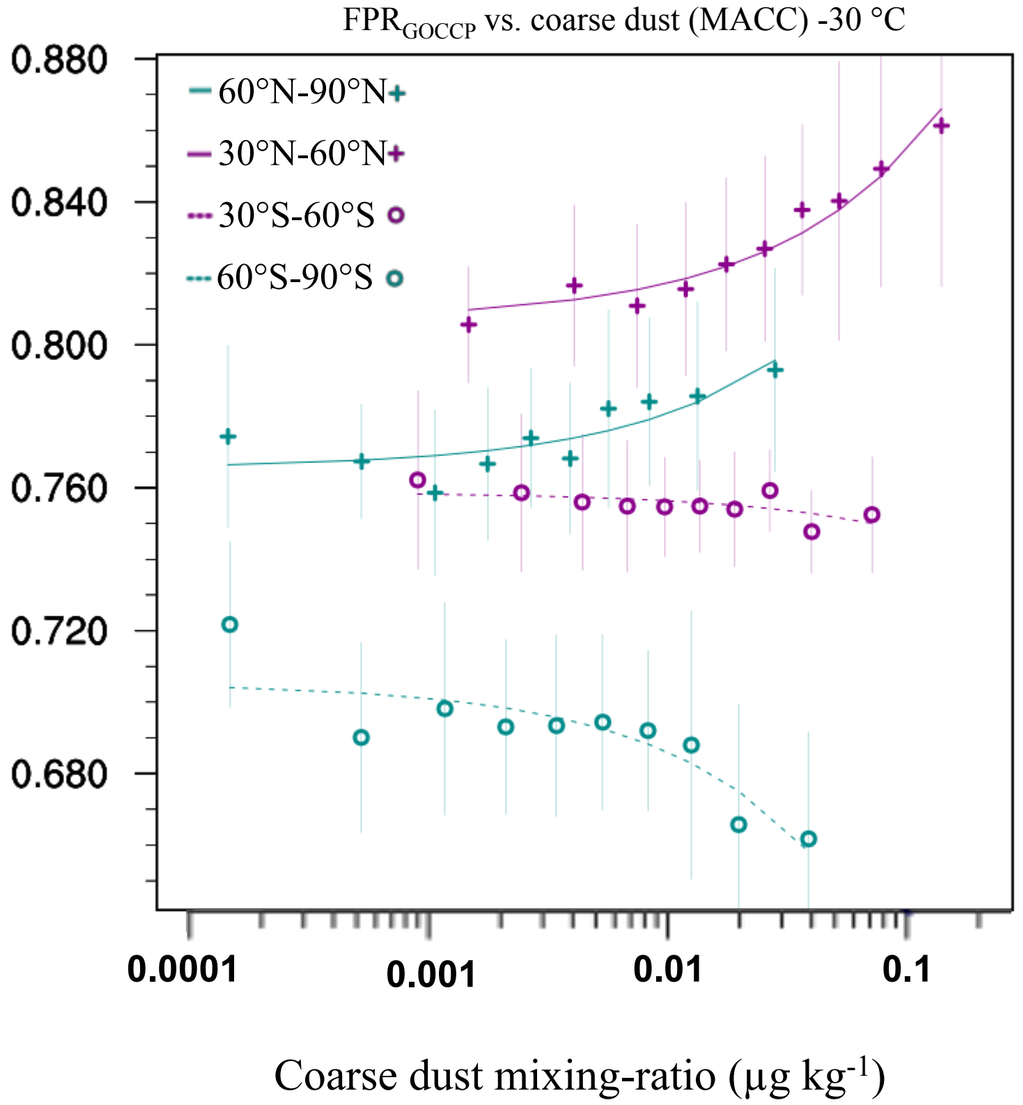


S15. Sample size of stratiform clouds [#gridboxes(month, dust decile, temperature, latitude, longitude)] for different seasons.

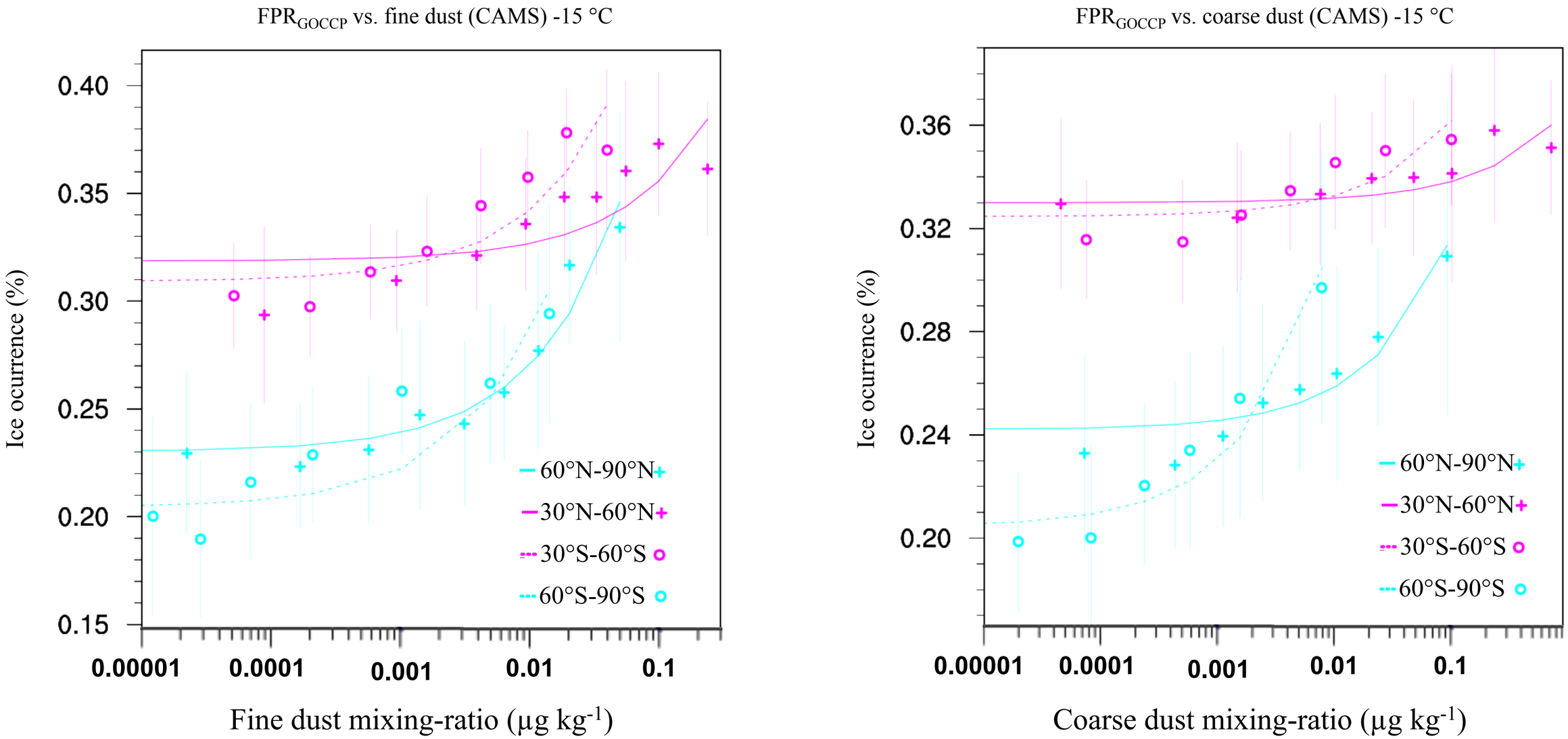




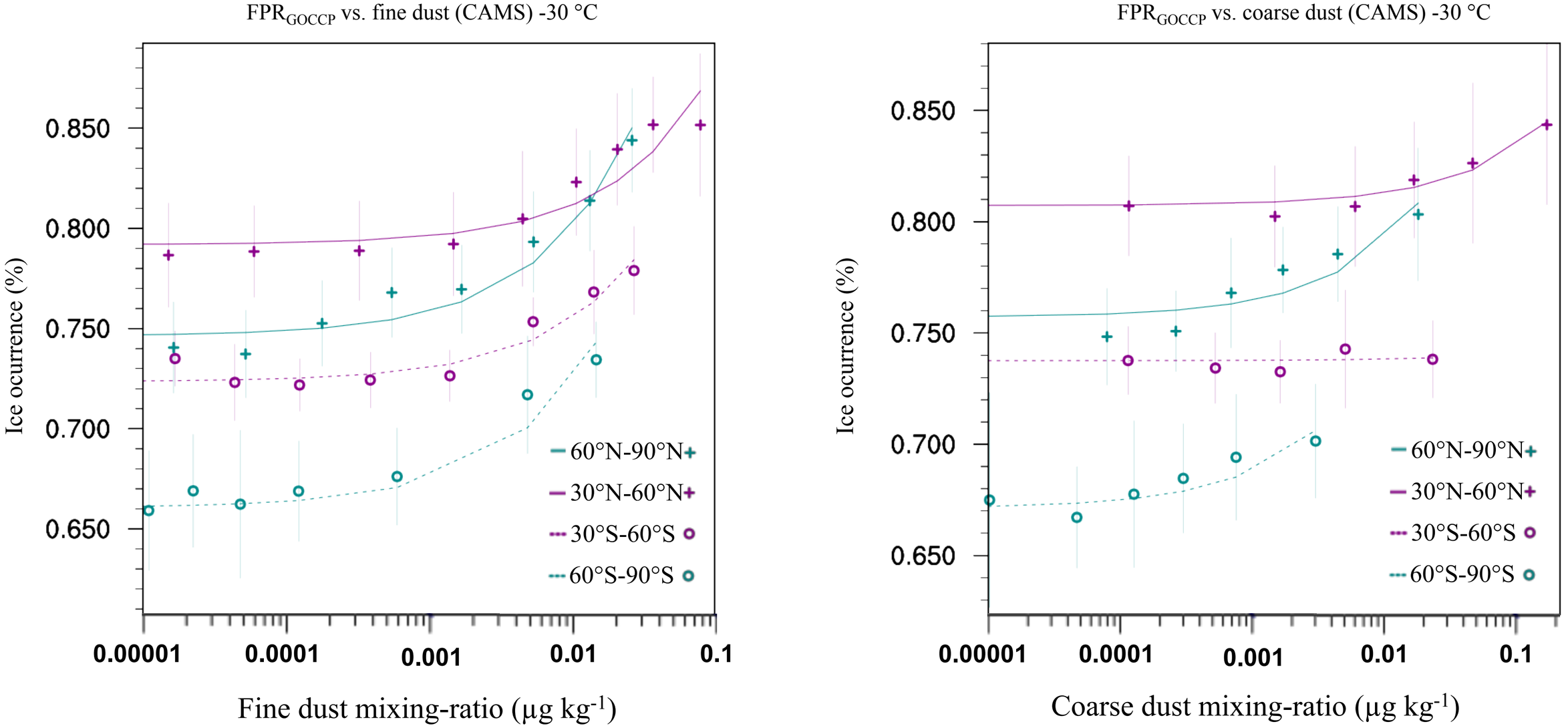
S16. Sample size for a) highest fine dust decile b) lowest fine dust decile. c) difference between highest and lowest decile.



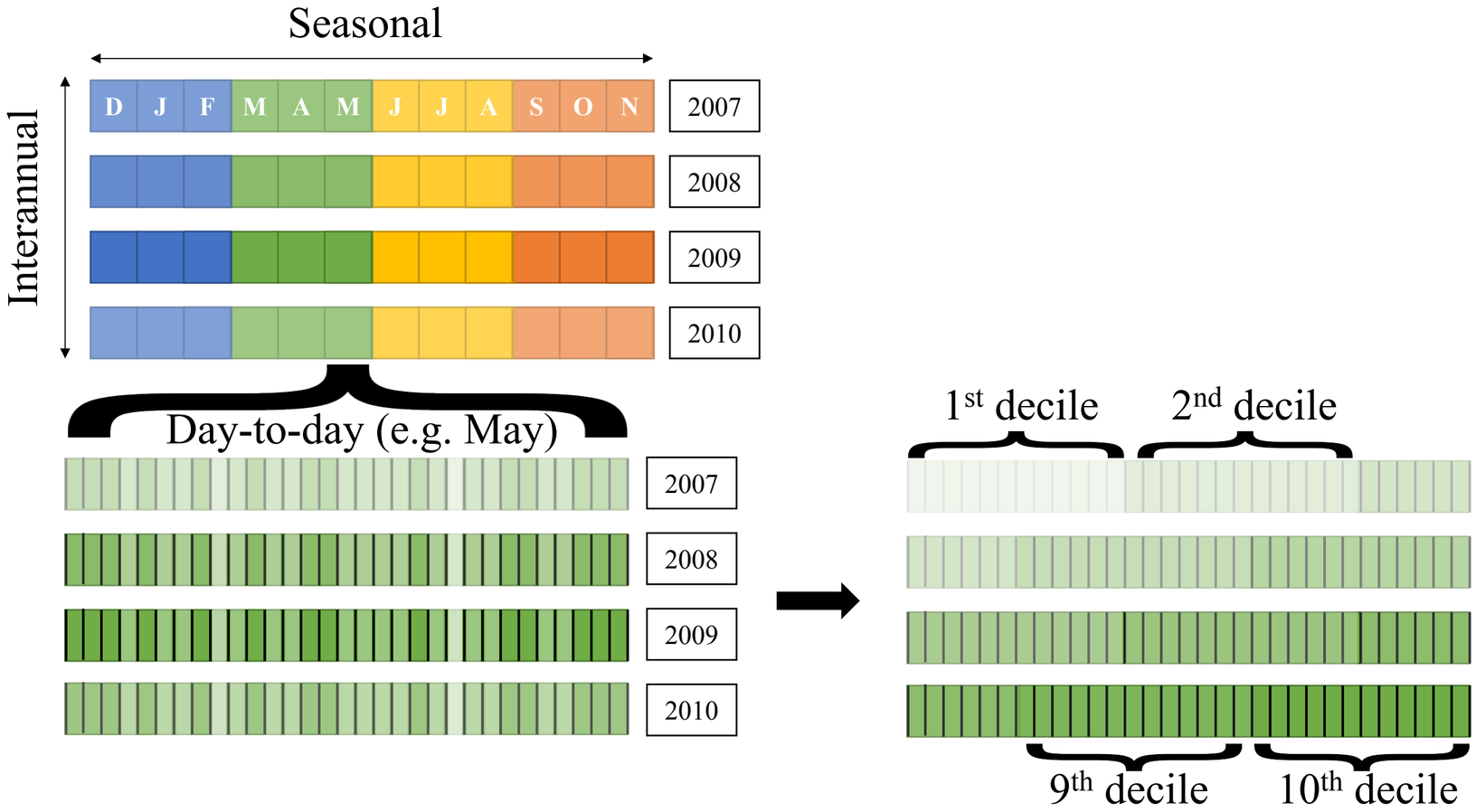
S17. FPR$_{GOCCP}$ for the different coarse dust mixing-ratio deciles from the MACC reanalysis at -30°C (12 K range), 2007-2010.



S18. FPR$_{GOCCP}$ for the different dust mixing-ratio deciles from the new released CAMS reanalysis at -15°C (12 K range), 2007-2010. Mixing-ratios lower than 10^{-5} µm/kg are not shown. Dataset downloaded 30.09.2018.



S19. FPR$_{GOCCP}$ for the different dust mixing-ratio deciles from the new released CAMS reanalysis at -30 °C (12 K range). 2007-2010. Mixing-ratios lower than 10^{-5} µm/kg are not shown. Dataset downloaded 30.09.2018.



S20. Seasonal, day-to-day and day-to-day decile concept as used in this study.
For this example, the day-to-day analysis of Mai contains 124 daily datapoints.