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Plain Language Summary: Mesoscale Convective Systems (MCSs) play an important role in the global hydrological cycle. This study hypothesizes that the GPM-detected echo objects of Wide-Convective-Core (WCC) and Deep-Wide-Convective-Core (DWC) are parts of MCSs, because they satisfy both the criteria of excessive cloud coverage and active convective activity by which MCSs are commonly defined. Through the comparison with a detailed MCS tracking database developed over the Continental United States (CONUS), results show more than 70% of the WCC and DWC objects can be validated by the MCS tracking database. Based on the GPM detection, a global view of MCS distribution is presented.

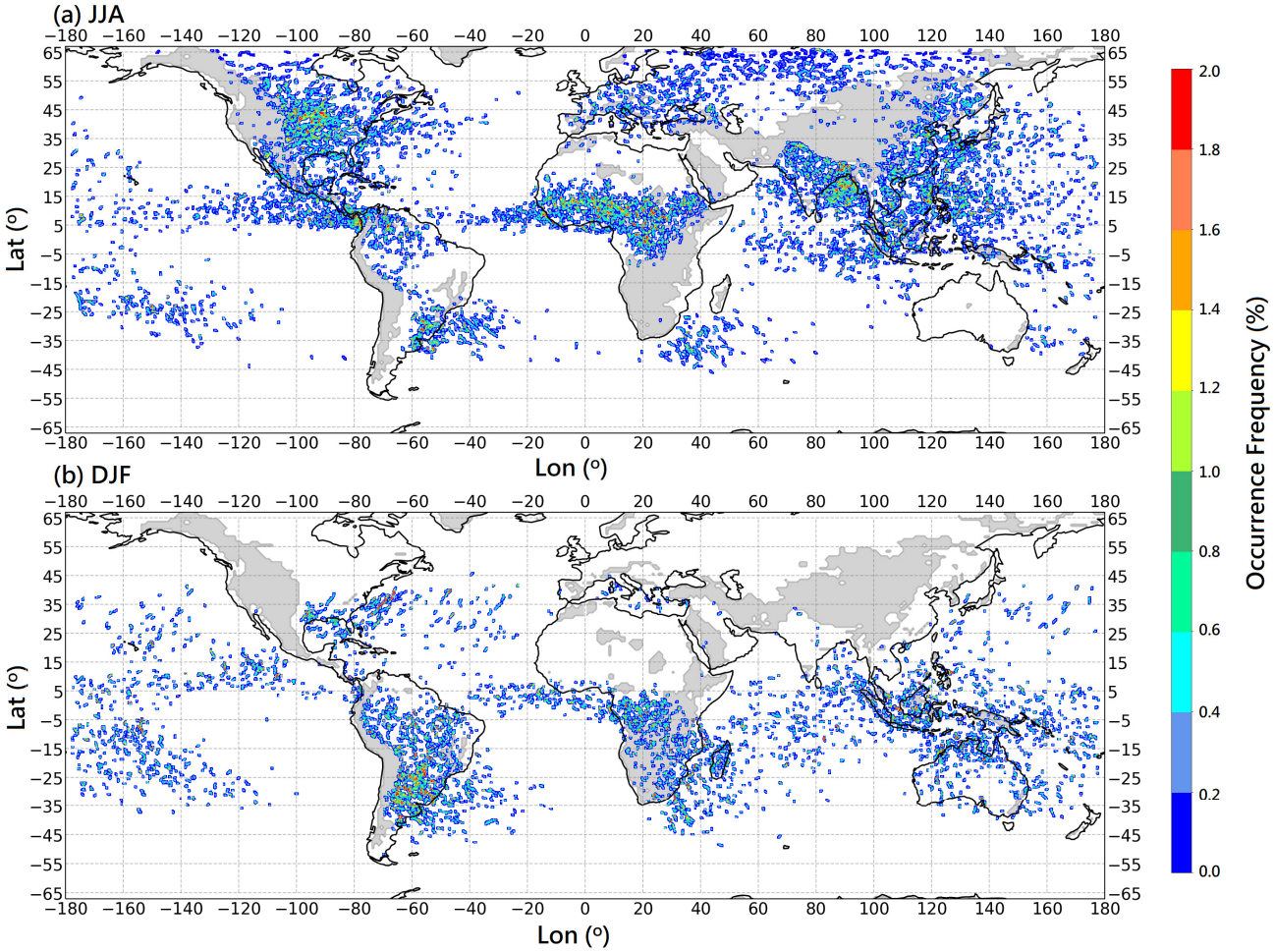

Figure 1. Geographical distribution of the probability of MCS occurrence frequency detected by GPM during the months of (a) June-July-August (JJA) and (b) December-January-February (DJF). The gray shaded areas inside the continental regions represent the 700 m elevation. The probability is on a scale of 0 to 100% and is computed as the number of pixels identified as either DWC or WCC divided by the total number of GPM overpasses within a 0.25° × 0.25° gridbox.

- GPM observed radar reflectivity is in a good agreement with the Next Generation Weather Radar (NEXRAD) over the CONUS.
- More than 70% of GPM-detected WCC and DWC echo objects can be validated as MCSs by the MCS tracking database developed over the CONUS.
- A global MCS distribution is presented based on the GPM detection, and the “hot-zones” of MCS occurrence revealed in previous studies are further confirmed.