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Dear Editor

Thanks for your email dated 6 May 2023 that remind us of the final response to our manuscript [egusphere-2024-4188]. We believe we have now addressed all reviewers' comments and are pleased to submit our revised manuscript, entitled "*Significant Response of Methane in the Upper Troposphere to Subseasonal Variability of the Asian Monsoon Anticyclone*", for further consideration in *Atmospheric Chemistry and Physics*. We have attached our point-by-point response to the reviewer comments. Broadly, in our revised manuscript, we have:

Clarification of Monsoon Dynamics in Methane Transport

We have expanded the discussion on the monsoon dynamical system's role in methane transport, emphasizing (a) rapid vertical lifting by deep convection and (b) the influence of the Asian Monsoon Anticyclone (AMA) position relative to monsoon convection during slow upwelling to the UTLS region. Revisions include an enhanced background discussion in the Introduction, a thorough update to Section 3.2, and the addition of new panels in Figure 4 (deep convection and lower tropospheric methane) to illustrate these mechanisms.

Improved AMA Mode Classification

To better characterize the AMA's spatial variability, we have revised Section 2.2 and added Figure 1, which now clearly depicts the morphology of different AMA modes and the statistical distribution of anticyclone centers.

Terminology Precision

Ambiguous terms (e.g., "anomalies," "enhancement," and "transport pathway") have been rigorously redefined or replaced to ensure conceptual and terminological accuracy throughout the text.

We believe these revisions have significantly strengthened the clarity and scientific rigor of our manuscript. We are grateful for the reviewers' constructive feedback and the opportunity to refine our work.

Thank you for your time and consideration.

Sincerely,

Dr. Mengchu Tao

On behalf of all co-authors