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# Sub-seasonal variability of Asian summer monsoon transport of aerosols and CO to the UTLS in the context of recent aircraft observations in the Asia

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We present our study on the sub-seasonal variability of UTLS aerosols and CO that is a result of the variability induced by the sub-seasonal variability of the Asian summer monsoon dynamics. We use the NASA global model GEOS simulations that incorporates emissions from anthropogenic, biomass burning, volcanic, and other natural sources to simulate CO, aerosols and related gases and the model experiments separating source types (anthropogenic, biomass burning, volcanic) and source locations (East Asia, South Asia). With model results and observations from recent aircraft measurements (StratoClim, ACCLIP) in the UTLS over the Asian summer monsoon regions, we will discuss (1) the sub-seasonal variability of transport pathways of surface-generated pollutants to reach UTLS, and (2) sub-seasonal variation of aerosol composition that is determined by the variability of source type originating in different locations.