

# **Distribution and variation of surface emitted air pollutants in UTLS under the control of Asian Summer Monsoon**

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The temporal and spatial distribution and variation of atmospheric chemicals in UTLS in Asian Summer Monsoon (ASM) region, play an important role determining the global climate and environmental change. One of the main factors controlling the atmospheric chemicals in UTLS is the influences by upward transport of air pollutants in lower atmosphere. Under the control of ASM system and through the dynamical transport processes, the surface emitted air pollutants enter upper world and may induce further impacts on the atmospheric chemical and dynamical systems in UTLS. By using the high-resolution surface emission data, the state-of-the-art remote sensing observations, and the 3-D global atmospheric chemical transport model simulations, we focus on the analysis of distribution and variation of air pollutants in UTLS and upward transport from lower atmosphere in ASM region. Also, we further investigate the different effects induced by faster transport of deep convections and slower transport of large-scale processes which, both are involved in the ASM system. Moreover, we conduct an exploration of the contribution of each individual surface emission regions and emission varieties to the distribution of air pollutants in UTLS.

Key words: Asian Summer Monsoon, UTLS, Air pollutants, Surface emissions, Dynamical transport