The role of stratified turbulence in the cold summer mesopause region

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The primary physical mechanism behind the formation of the summer mesopause at middle and high latitudes is related to atmospheric gravity waves. An insight into this extreme thermal phenomenon can be gained from investigating the mesoscale energy spectrum. In this work, we decompose the frequency spectrum into divergent and rotational parts and find that their energy contributions are equipartitioned at high frequencies. This mesoscale energy equipartition indicates the effect of stratified turbulence. Analysis of the power spectra of observed and simulated horizontal winds at middle latitudes reveals the role of stratified turbulence in the formation of the summer mesopause region.