

Tropopause Layer Change on Different Time Scales

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Together with a comparatively small warming trend in global surface temperature, or warming hiatus, during the last 15 years, there are stagnations in the rising and thickening trends in the tropopause layer, which is sensitive to climate change. In this study, the variation of the vertical boundaries and thickness of the tropopause layer on different time scales and their contributions to the recent tropopause layer hiatus are investigated using the radiosonde observations from the Integrated Global Radiosonde Archive during 1960-2013.

The results confirm that global trends of rising tropopause layer boundary heights and thickening of the tropopause layer have stalled during recent years. The seasonal amplitude of each tropopause layer parameter become larger during the hiatus period (2002-2013) than that during the pre-hiatus period (1960-1997), except for the tropical tropopause layer top boundary. Moreover, the correlations between the tropopause height and corresponding temperature suggested by previous studies exist in all latitude bands in the period 1960-2013, with anti-correlations in the extratropical tropopause layer and positive correlation in tropical tropopause layer top boundary. In addition, the seasonal trends in the tropopause layer parameters show that significant trend difference occur during winter and spring.

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