



Trends in the tropopause thickness during the warming hiatus

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Despite the continued increase in atmospheric greenhouse gas concentrations, the global temperature has not risen in the twenty-first century, termed a hiatus. In this study, the changes in the thickness of the tropopause layer are analyzed during the hiatus and the prehiatus periods based on radiosonde data in the Integrated Global Radiosonde Archive. Accompanied by overall increasing of 105 ± 38 m/decade in the top of tropopause layer, tropopause layer has been thickening for the entire globe with the positive trends of 65 ± 38 m/decade in the prehiatus period of 1960-2002. Statistically significant thickening is observed in the extratropics and the poles but not in the tropics. For the hiatus period from 2002 to 2013, however, the significant thickening of tropopause layer can be found only in the Northern Hemispheres extratropics with the positive trends of 133 ± 98 m/decade. Moreover, our result captures major regional characteristics of the hiatus of the tropopause thickening, including the thinning in the southwest North America.