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Changes in the tropical tropopause region

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The tropical tropopause has cooled and risen in altitude over the past few decades. The cooling has not been a smooth continuous trend, but the change in altitude appears to be rather more conintuous, and may possibly be related to changes in sea surface temperature also occuring over this time period, as noted in Rosenlof and Reid, 2008, JGR. Changes in the near tropical tropopause started in the early 1990s, and there was a sharp decrease at the end of 2001 that is also reflected in changes in stratospheric water vapor. In this paper, we will present an analysis of these changes, and also show how the mean meridional Lagrangian circulation has changed, as well as the width of the tropical upwelling region.