Recent studies identify an expansion of the global tropics. This finding comes from satellite observations and parameters derived from different global reanalysis products. Nearly all sources indicate an expansion, but the magnitude of the global rate of expansion is quite variable.

Here, the rate of the expansion of the Southern Hemisphere tropics is estimated using the Integrated Global Radiosonde Archive. Data limitations mandate a focus on regional estimates of tropical expansion over Australia/New Zealand (ANZ) and South America (SA) between 1989 and 2009. We use averages of the annual distribution of tropopause height in 8 or 10 (ANZ) zonal bands to estimate the rate of expansion.

Over both regions, the rate of tropical expansion is smaller than 0.7 deg/dec, and two-sigma confidence intervals are of comparable magnitude to the trends. Interannual variability is prominent, and considerable regional differences are identified. In ANZ, the largest expansion is in the subtropics. In SA, a contraction of the tropics is indicated at some latitudes.

It is likely that data quality issues accentuate these issues. However, a comparison with three reanalyses broadly confirms these regional differences. The ERA Interim best reproduces the radiosonde analysis.

Globally, the ERA-I indicates little or no expansion of the tropics. Together with the results of the radiosonde analysis, this questions whether the reported tropical expansion is a long term climate change-related phenomenon or a manifestation of shorter-term climate processes. A meteorological understanding the factors that drive the observed regional responses is crucial for answering this question.