

Chapter 3 Figures for Public Review

CHAPTER 3

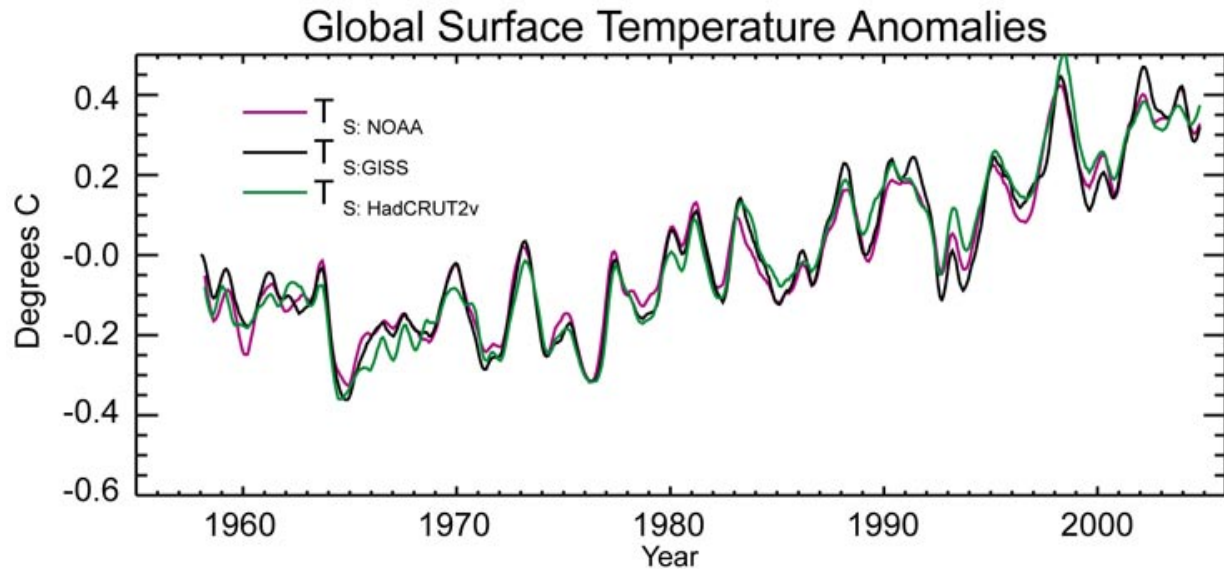


Figure 3.1 - Time series of globally averaged surface temperature (T_s) for NOAA (violet), GISS (black), and HadCRUT2v (green) datasets. All time series are 7-month running averages (used as a smoother) of original monthly data, which were expressed as a departure ($^{\circ}\text{C}$) from the 1979-97 average.

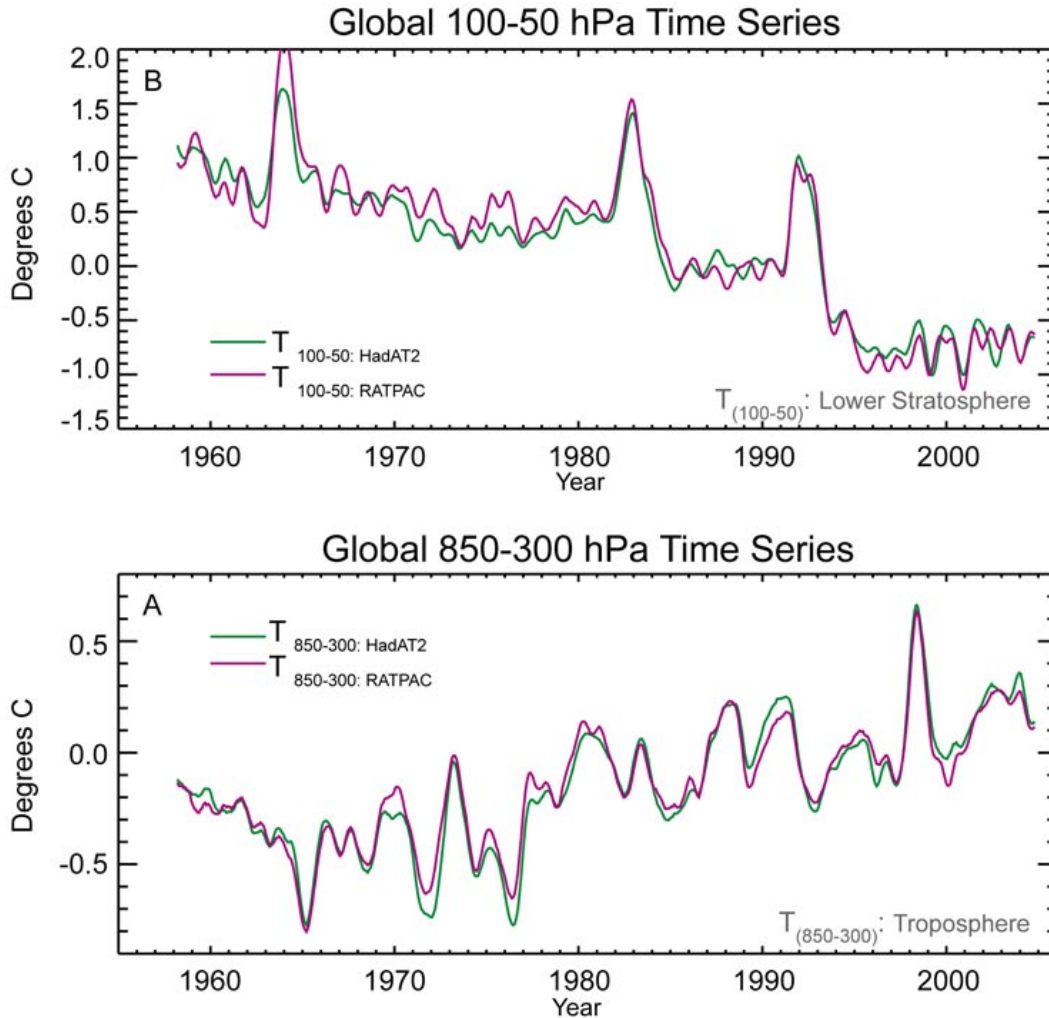


Figure 3.2a – Bottom: Time series of globally averaged tropospheric temperature ($T_{(850-300)}$) for RATPAC (violet) and HadAT2 (green) radiosonde datasets. All time series are 7-month running averages (used as a smoother) of original monthly data, which were expressed as a departure ($^{\circ}\text{C}$) from the 1979-97 average.

Figure 3.2b – Top: Time series of globally averaged stratospheric temperature ($T_{(100-50)}$) for RATPAC (violet) and HadAT2 (green) radiosonde datasets. All time series are 7-month running averages (used as a smoother) of original monthly data, which were expressed as a departure ($^{\circ}\text{C}$) from the 1979-97 average.

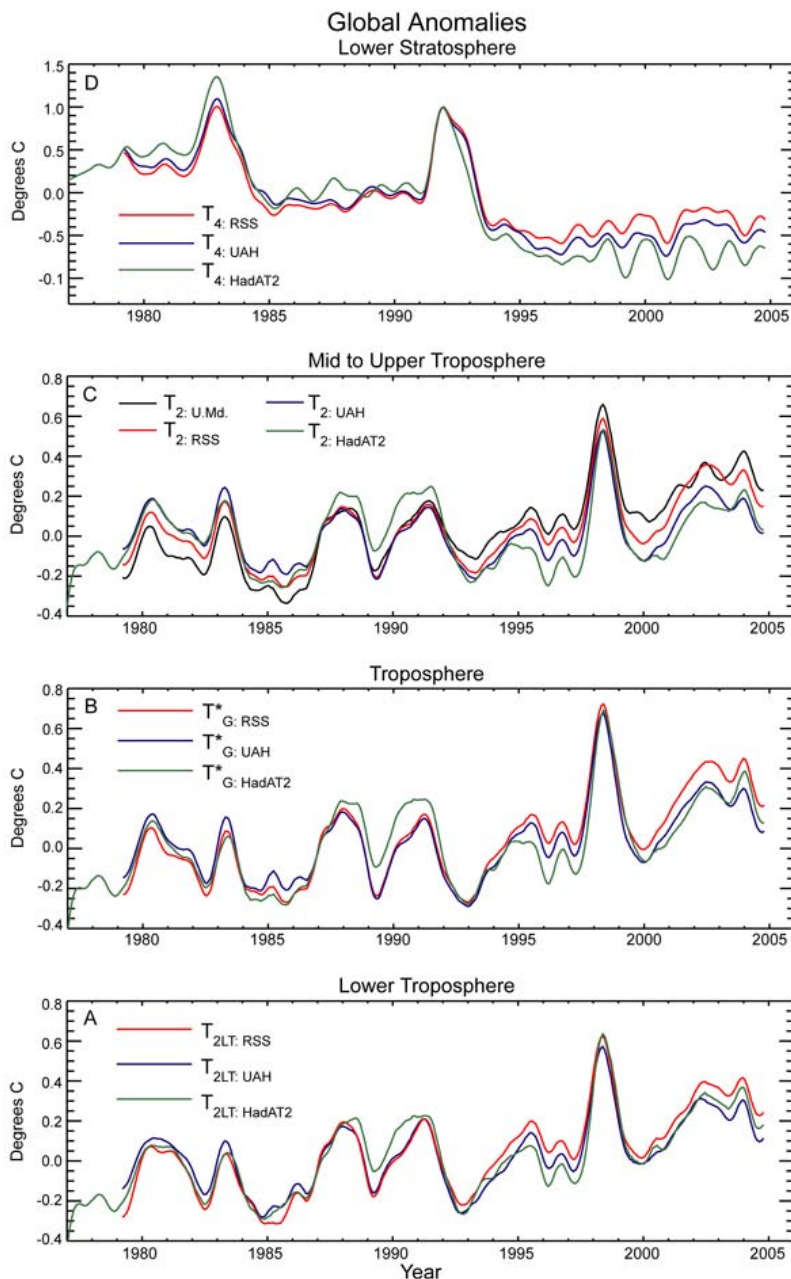


Figure 3.3d – Top: Time series of globally averaged lower stratospheric temperature (T4) as follows: UAH (blue) and RSS (red) satellite datasets, and HadAT2 (green) radiosonde data. All time series are 7-month running averages (used as a smoother) of original monthly data, which were expressed as a departure (°C) from the 1979-97 average.

Figure 3.3a– Bottom: Time series of globally averaged lower tropospheric temperature (T2LT) as follows: UAH (blue) and RSS (red) satellite datasets, and HadAT2 (green) radiosonde data. All time series are 7-month running averages (used as a smoother) of original monthly data, which were expressed as a departure (°C) from the 1979-97 average.

Figure 3.3b– Third: Time series of globally averaged middle tropospheric temperature (T*G) as follows: UAH (blue) and RSS (red) satellite datasets, and HadAT2 (green) radiosonde data. All time series are 7-month running averages (used as a smoother) of original monthly data, which were expressed as a departure (°C) from the 1979-97 average.

Figure 3.3c – Second: Time series of globally averaged upper middle tropospheric temperature (T2) as follows: UAH (blue), RSS (red), and U.M.d. (black) satellite datasets, and HadAT2 (green) radiosonde data. All time series are 7-month running averages (used as a smoother) of original monthly data, which were expressed as a departure (°C) from the 1979-97 average.

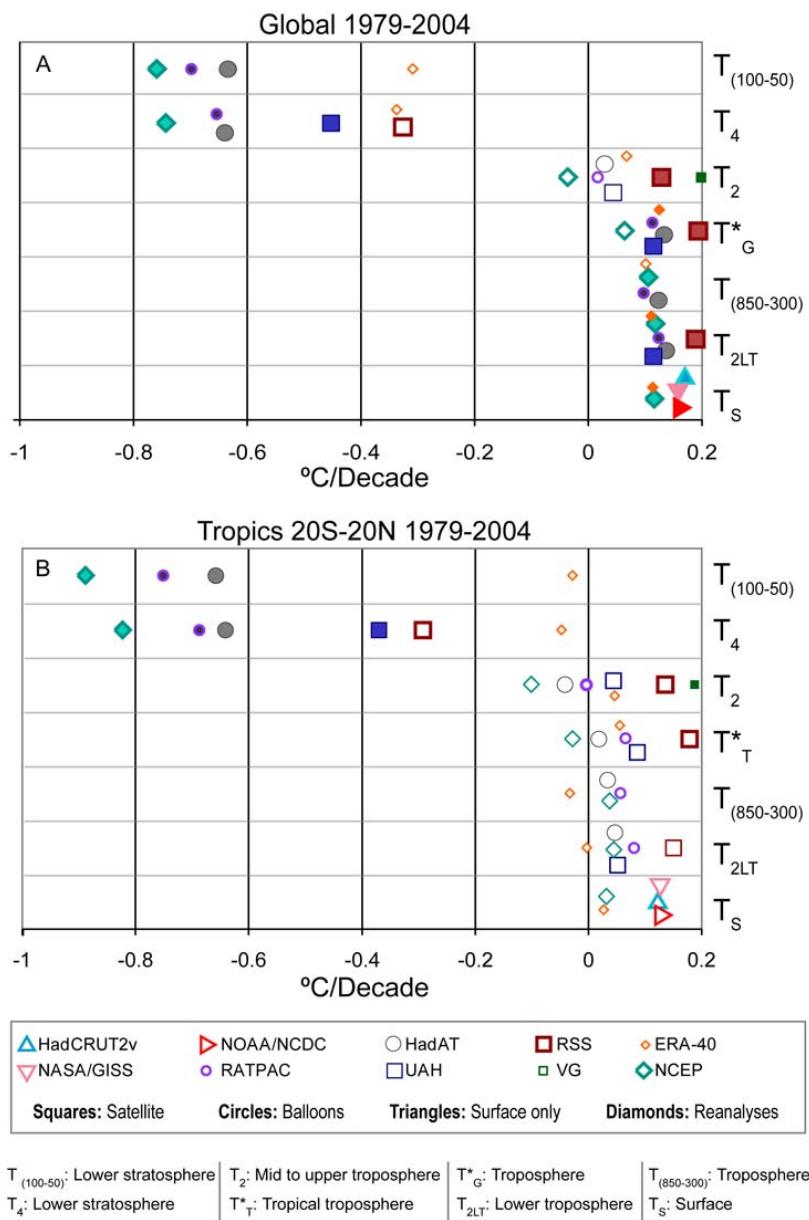


Figure 3.4a (top) – Global temperature trends (°C/decade) for 1979-2004 from Table 3.3 plotted as symbols. See figure legend for definition of symbols. Filled symbols denote trends estimated to be statistically significantly different from zero (at the 5% level). A Student’s t-test, using the lag-1 autocorrelation to account for the non-independence of residual values about the trend line, was used to assess significance (see Appendix for discussion of confidence intervals and significance testing).

Figure 3.4b (bottom) – Tropical (20oN-20oS) temperature trends (°C/decade) for 1979-2004 from Table 3.4 plotted as symbols. See figure legend for definition of symbols. Filled symbols denote trends estimated to be statistically significantly different from zero (at the 5% level). A Student’s t-test, using the lag-1 autocorrelation to account for the non-independence of residual values about the trend line, was used to assess significance (see Appendix for discussion of confidence intervals and significance testing).

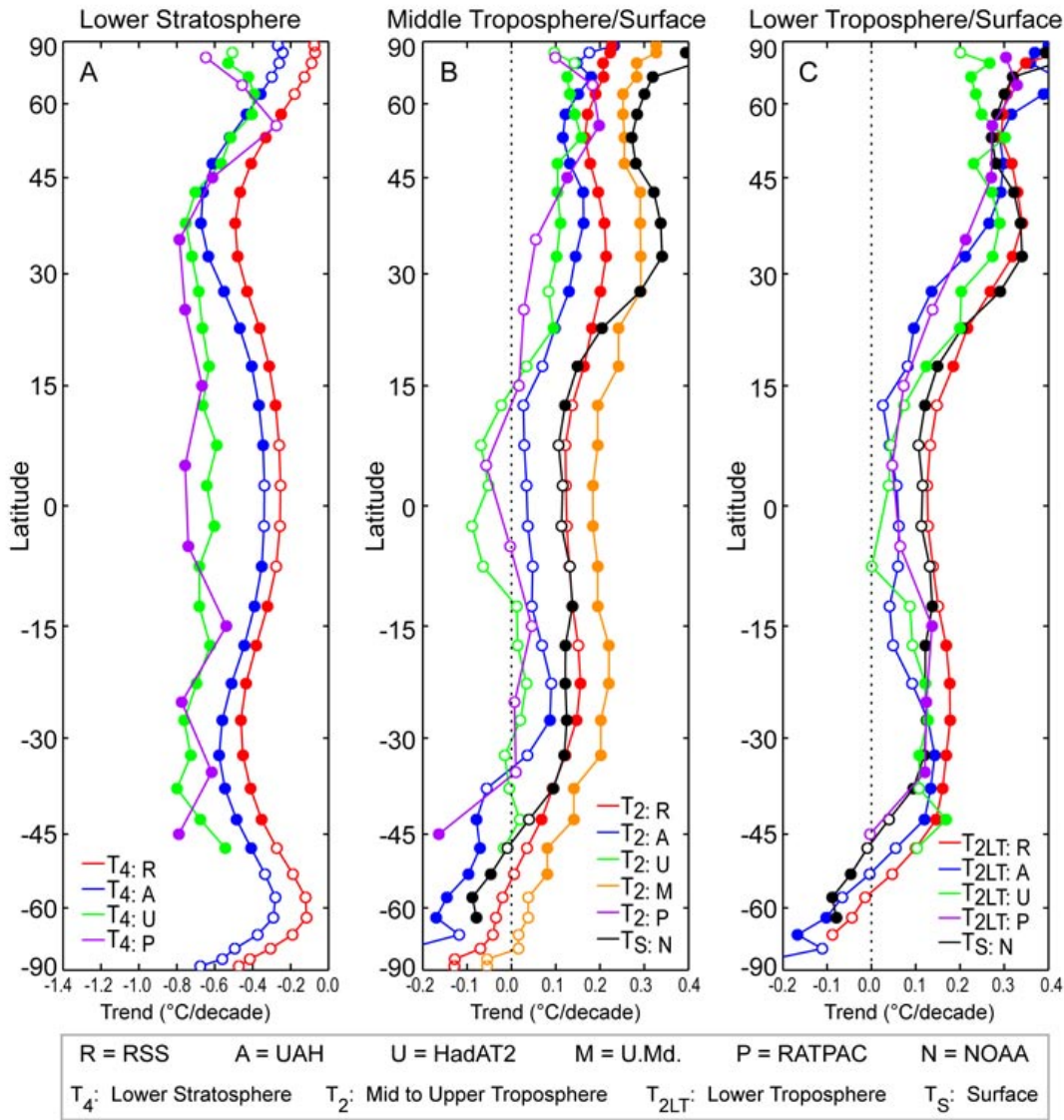


Figure 3.5 -- Temperature trends for 1979-2004 (°C/decade) by latitude.

Left: stratospheric temperature (T_4) based on RSS (red) and UAH (blue) satellite datasets, and RATPAC (violet) and HadAT2 (green) radiosonde datasets.

Middle: mid-tropospheric temperature (T_2) based on U.Md. (orange), RSS (red) and UAH (blue) satellite datasets, and RATPAC (violet) and HadAT2 (green) radiosonde datasets; and surface temperature (T_S) from NOAA data (black).

Right: surface temperature (T_S) from NOAA data (black) and lower tropospheric temperature (T_{2LT}) from RSS (red) and UAH satellite data (blue), and from RATPAC (violet) and HadAT2 (green) radiosonde data. Filled circles denote trends estimated to be statistically significantly different from zero (at the 5% level). A Student's t-test, using the lag-1 autocorrelation to account for the non-independence of residual values about the trend line, was used to assess significance (see Appendix for discussion of confidence intervals and significance testing).

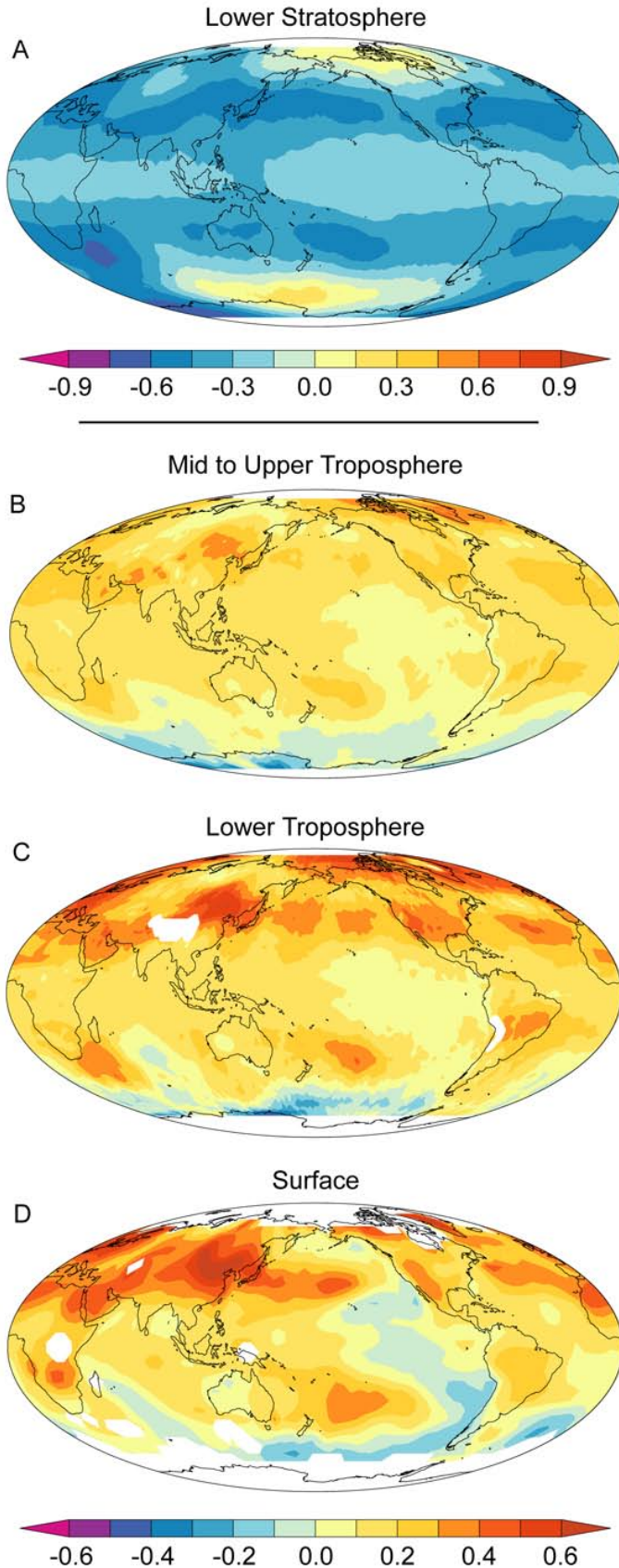


Figure 3.6 – Temperature trends for 1979-2004 (°C /decade).

Bottom (d): NOAA surface temperature (T_{S-N}).

Third (c): RSS lower tropospheric temperature (T_{2LT-R}).

Second (b): RSS upper middle tropospheric temperature (T_2-R).

Top (a): RSS lower stratospheric temperature (T_4-R).

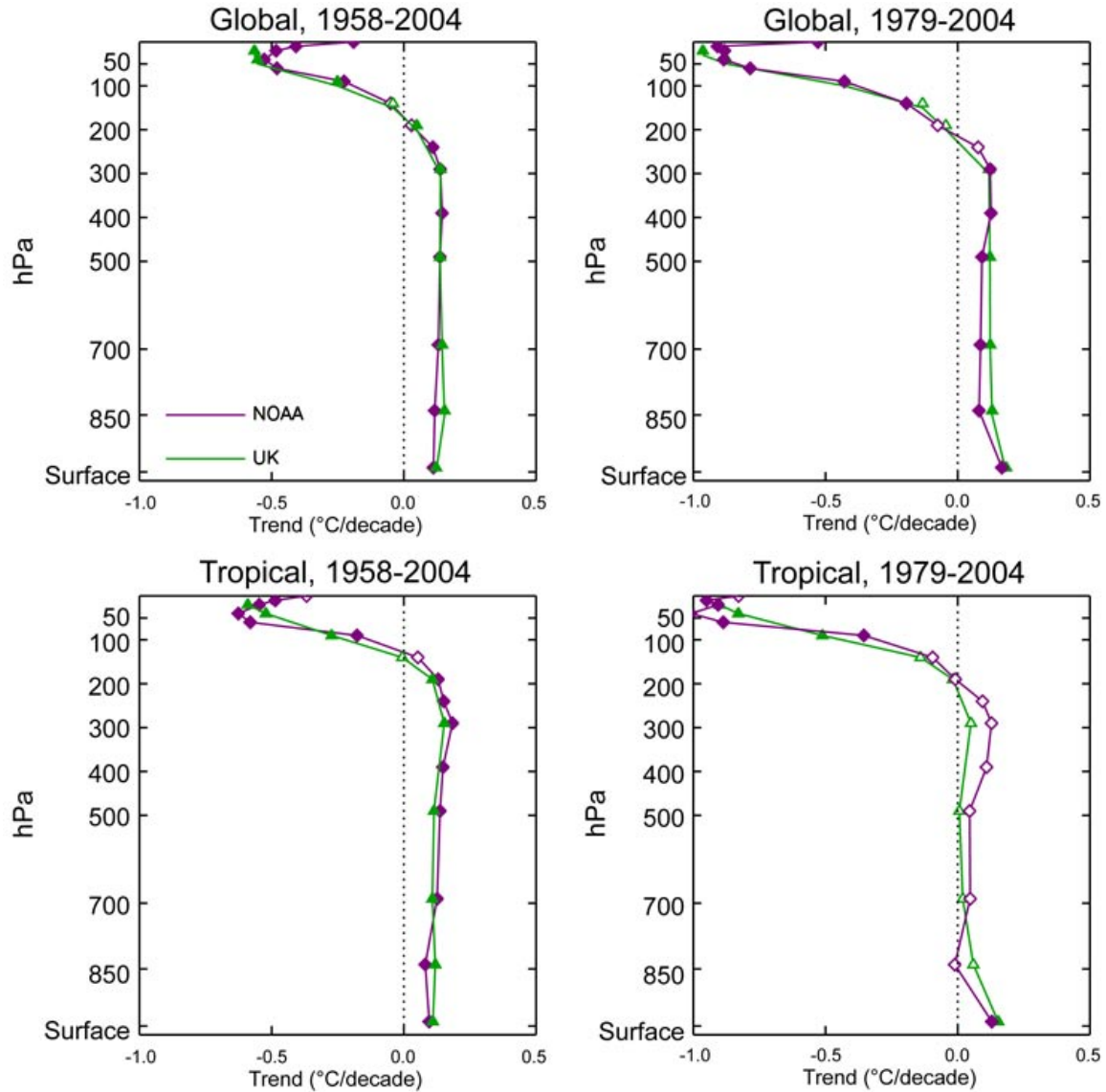


Figure 3.7 -- Vertical profiles of temperature trend ($^{\circ}\text{C}/\text{decade}$) as a function of altitude (i.e., pressure in hPa) computed from the RATPAC (violet) and HadAT2 (green) radiosonde datasets. Trends (which are given in Table 3.5) have been computed for 1958-2004 (left) and 1979-2004 (right) based on temperature that has been averaged over the globe (top) or the tropics, 20°N - 20°S (bottom). Surface data for the HadAT2 product is taken from HadCRUT2v since the HadAT2 dataset does not include values at the surface; the surface values have been averaged so as to match their observing locations with those for the radiosonde data. By contrast, the surface temperatures from the RATPAC product are those from the RATPAC dataset, which are surface station values reported with the radiosonde data. Note that these differ from the NOAA surface dataset values (ER-GHCN-ICODAS) as indicated in Table 3.1. Filled symbols denote trends estimated to be statistically significantly different from zero (at the 5% level). A Student's t-test, using the lag-1 autocorrelation to account for the non-independence of residual values about the trend line, was used to assess significance (see Appendix for discussion of confidence intervals and significance testing).

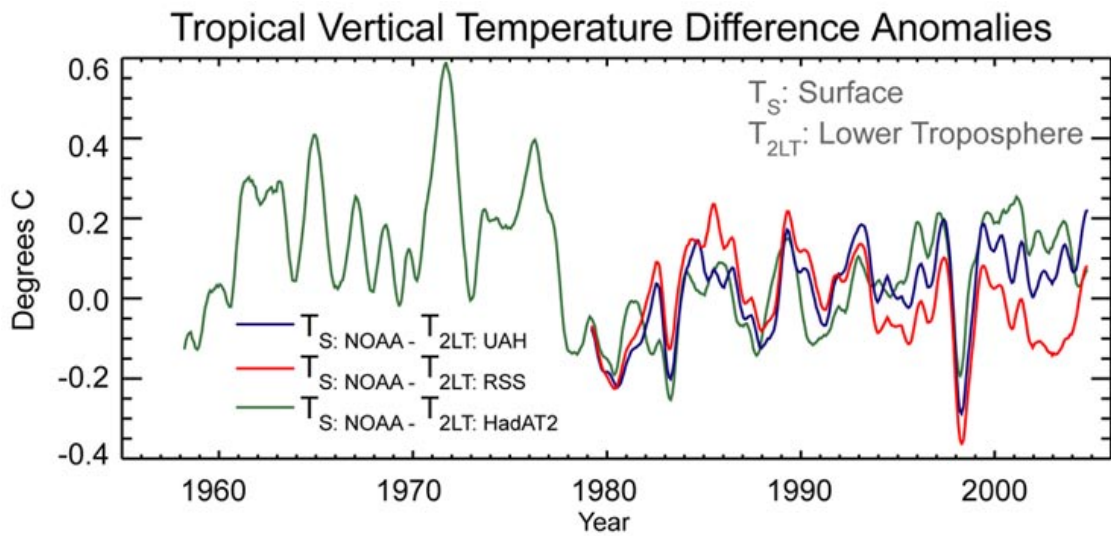


Figure 3.8 - Time series of vertical temperature difference (surface minus lower troposphere) for the tropics (20°N-20°S). NOAA surface temperatures (T_S -N) are used in each case to compute differences with lower tropospheric temperature (T_{2LT}) from three different groups: HadAT2 radiosonde (green), RSS satellite (red), and UAH satellite (blue). All time series are 7-month running averages (used as a smoother) of original monthly data, which were expressed as a departure (°C) from the 1979-97 average.