Recent temperature trends in the Antarctic troposphere and lower stratosphere have been examined using atmospheric temperature records obtained from GPS radio occultation (RO) measurements. GPS RO is an emerging satellite remote sensing technique which allows for the precise determination of atmospheric temperature, moisture and pressure vertical profiles. This technique is beneficial for obtaining upper air data in remote and difficult-to-access areas where conventional meteorological observations (e.g. radiosondes) are sparse or not available (e.g. over the Polar Regions). The German CHAllenging Minisatellite Payload (CHAMP) LEO space mission has provided over eight years of high quality atmospheric profiles with a global coverage. This study first evaluates the accuracy of CHAMP RO retrieved temperature profiles in the Antarctic region through comparing the satellite-derived data with radiosonde data. Different spatial and temporal collocation criteria have been applied in this analysis and the overall results have shown a good agreement between the two data sets. Seasonal temperature trends at several pressure levels in the Antarctic troposphere and lower stratosphere are then investigated using seven completed years of CHAMP temperature profiles. Detailed vertical structure of the Antarctic temperature trends is analysed and overall cooling in the Antarctic lower stratosphere and warming in the troposphere has been revealed which is in a general agreement with radiosonde measurements. While the suitability of the GPS RO data for climate change detection is demonstrated for the lower stratosphere and the upper troposphere, the GPS RO and radiosonde data are less consistent in terms of temperature trends in the lower to mid-troposphere.