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RECENT SURFACE AND UPPER AIR TEMPERATURE CHANGES ACROSS THE ANTARCTIC

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A difficulty in Antarctic climate studies has always been to obtain a high quality data set of in-situ, mean meteorological observations. The SCAR READER (REference Antarctic Data for Environmental Research) project was established to create a new data set of monthly and annual mean near-surface and upper-air climate data (temperature, surface and mean sea level pressure (MSLP), wind speed and height of pressure surfaces) for the Antarctic using historical observations. Where possible, 6 or 12 hourly surface and upper-air synoptic and automatic weather station observations were used to compute the means, allowing a rigorous quality control of the data to be carried out at the level of the individual observations. This has produced a much better data set than previously available. The monthly mean data are available on the web at http://www.antarctica.ac.uk/met/READER/.

The data set indicated that near-surface air temperatures on the maritime, western side of the Antarctic Peninsula have risen more than anywhere else on Earth over the last 50 years. However, other parts of the continent, such as the South Pole, have exhibited a statistically significant cooling.

The picture at upper levels is more consistent and the radiosonde data indicated a major warming of the Antarctic winter troposphere. The data show that regional mid-tropospheric temperatures have increased at a statistically significant rate of 0.5 – 0.7 deg C /decade over the last 30 years. Analysis of the time series of radiosonde temperatures indicates that the data are temporally homogeneous. The available data do not allow us to unambiguously assign a cause to the tropospheric warming at this stage.