



# A 65-year-long air temperature series for Admiralty Bay (~62°S ~58°W)

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Long series of weather data are rare for Antarctica, and the current interest in climate variations makes them essential to detect and analyze temperature tendencies. This paper presents a 65-year-long series of air temperature data for Admiralty Bay, King George Island, South Shetland Islands, that is based on: a) records at the same place (62°05'07"S; 58°23'33"W; 20 m elev.) for the periods of March/1948 to December/1960 and January/1986 to December/2009, and; b) data that cover the remaining years, from the closest possible stations, transposed with the use of monthly coefficients determined for each set of data.

The overall tendency for the 65-year span of the series shows a warming of 0.23°C/decade, along the much announced warming of the Antarctic Peninsula; however, the last 29 years present no tendency in temperature change, and the last 14 years actually present a relatively steep cooling of 0.6°C/decade.

## 1. Data Sources and Procedures.

This series relies basically on the old records of the British Admiralty Bay station, also known as Base "G", which operated almost 13 years, from Mar/1948 to Dec/1960 as WMO #88934, and on 24 years of more recent data since 1986, from the Brazilian Ferraz station, located at that very same place, and now as WMO #89252 (62°05'07"S; 58°23'33"W; 20 m elev.) – see <http://antartica.cptec.inpe.br/>

Both Base "G" and Ferraz were depicted in stamps issued by the UK and Brazil, respectively, as shown in Figures 1a and 1b. The place of weather data collection was essentially the same for #88934 and #89252, and it is worth noting that the same weather tower erected in the late 1940s for the wind measurements has been preserved and is still in use for the same purpose as seen in Figures 2a and 2b.

Data from the lacking periods were obtained by extrapolation from nearby stations, adjusted by adding monthly individual coefficients calculated with the comparison of simultaneous measurement periods of the stations used. All the data can be found at <http://antartica.cptec.inpe.br/~rantar/data/resumos/climatolbaia.xls>

For Jan/1944-December/1945, Jan/1947-Feb/1948 and Jan/1961-Dec/1967, the data is from the old British station at Deception Island (62°59'S, 60°34'W) distant 150 km SW. From Mar/1977-Mar/1977, the data is from the Russian Bellingshausen Station at King George Island (62°12'S, 58°58'W), 33 km WSW, and from Apr/1978-Dec/1985 plus a few other months, from the Polish Arctowski Station at Admiralty Bay, just 10 km SSW, and which stopped collecting data in 1997. For the periods of Deception Island the use of reanalysis data was also tried, but it proved to be less consistent than the extrapolation, and was thus disregarded. Figure 3 shows the location of the stations used to assemble the 65 years of data.

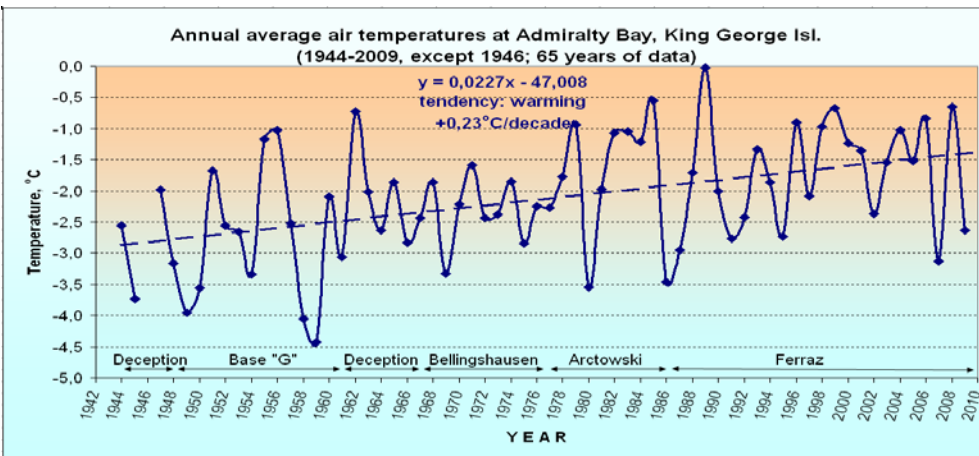
The monthly coefficients used for Deception were: May, -0.2°C; Jan and Feb, 0.1°C; Mar, Apr and Jul 0.2°C; Jun and Dec, 0.3°C; Aug, 0.4°C; Oct, 0.5°C; Nov 0.6°C; Set, 1.0°C. For Bellingshausen: Jul, 0.1°C; Feb, 0.2°C; Apr and Jun, 0.3°C; Jan, May and Aug, 0.4°C; Mar and Sep, 0.5°C; Oct, 0.6°C; Dec, 0.8°C and Nov, 1.0°C. No adjustments were needed for the Arctowski records.



Figure 1. The same site at Admiralty Bay, King George Island, South Shetland Islands, as honored in recent mail stamps. a) The old British Base "G" (left) built in the late 1940s, and; b) the current Brazilian Ferraz Station, established in the austral summer of 1983-84.



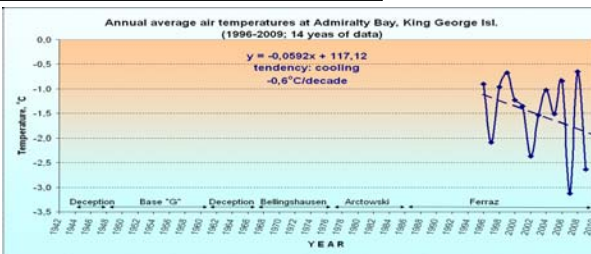
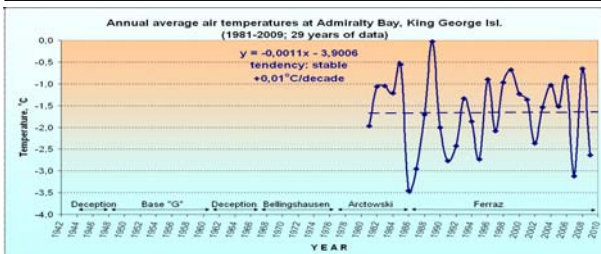
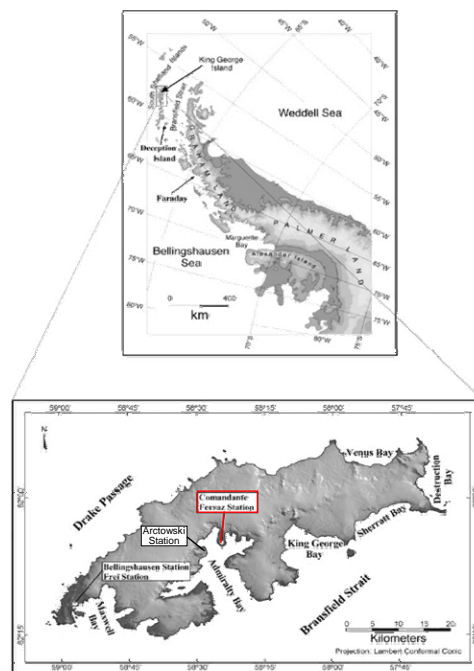
Figure 2. The same weather tower at Admiralty Bay, King George Island, South Shetland Islands. a) In the late 1940s' (left picture), close to the left margin and with the weather shelters in the foreground as #88934, and; b) still in use today (right picture) with the shelter close to its base as #89252.



## 2. Results and Conclusion.

The graph above presents the 65-year-old series obtained, indicating an overall warming gradient of 0.23/decade. However, due to the high regional climatic and weather variability, and the peak warming in 1989, the same series show other gradients depending on the time scale: 0.0°C for the last 29 years; +0.3°C for the last 24 years, and -0.6°C (cooling) in the last 14 years - see the two graphs below.

Longer series of air temperature allow a better understanding of climate variations in the multidecadal temporal scale. On a climatic standard, which requires 30 years of data as a reference for any interpretation, one can not say that the air temperature in the north of the Antarctic Peninsula is increasing. The melting of ice platforms observed in the region during the last two decades is therefore dependent also on other variables, such as warmer ocean temperatures at surface level, and even higher wind speeds.



## 3. Acknowledgements.

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