

Antarctic Peninsula Climate Variability: History, Causes and Impacts



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Abstracts

The Antarctic Peninsula is one of the most rapidly warming areas on Earth. Understanding the cause of this dramatic regional change, its future predictability and likely impacts requires a truly interdisciplinary approach.



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CLIMATOLOGY AND ATMOSPHERIC TEMPERATURE WARMING TREND FOR KING GEORGE ISLAND, ANTARCTICA

Francisco E. Aquino^{1,2}, Jefferson C. Simões¹, Alberto W. Setzer² and Francisco A. Ferron^{1,3}

¹ Núcleo de Pesquisas Antárticas e Climatológicas - NUPAC, Departamento de Geografia, Universidade Federal do Rio Grande do Sul, Porto Alegre, RS, Brazil

² Centro de Previsão de Tempo e Estudos Climáticos - CPTEC, Instituto Nacional de Pesquisas Espaciais - INPE, Cachoeira Paulista, SP, Brazil

³ Laboratoire des Sciences du Climat et de l'Environnement - LSCE, Bât. 709, Orme des Merisiers, Gif-Sur-Yvette, France

This paper updates a previous 1995 King George Island (KGI) climatology up to 2003. Interannual variability and trends of wind speed, atmospheric pressure and air temperature at the Brazilian Comandante Ferraz Station (62°03'S; 58°54'W), Admiralty Bay, from 1986 to 2003, show the same patterns observed at other weather stations, in the northwestern side of the Antarctic Peninsula (AP). Mean monthly data reported by several local meteorological stations, at different periods, were used to build the atmospheric temperature time series for Admiralty Bay, from 1947 to 2003. Increasing average temperatures, particularly during winter months, were associated to a total warming trend of 0.031 °C a⁻¹ (i.e., 1.8 °C in 57 years). Reanalysis data for a cell of 5 x 5 degrees for the same area and period show a tendency with a remarkably similar gradient of 0.035 °C a⁻¹. A cycle of about 5.5 years was identified in this KGI temperature time series. This cycle is also present at Vernasky, former Faraday (65°15'S; 64°16'W), AP. When cross-correlated to monthly mean temperatures, a 1-month time lag in the sea-ice extent series was observed for the period 1976-95, at 60° W longitude. Of particular importance is the temperature tendency indicating a marked decrease of about -0.28 °C a⁻¹, since 1999, in opposition to the previous trend. The surface atmospheric pressure, which for the reanalysis span of 56 years shows a gradient decrease of -0.0974 hPa a⁻¹, depicts an average increase of 0.35 hPa a⁻¹ since 1986. Wind speed, at surface level, presented an increase of about 0.0426 m s⁻¹ a⁻¹ for the same period.

Correspondence to:

Francisco E. Aquino
Núcleo de Pesquisas Antárticas e Climáticas - NUPAC
Departamento de Geografia, Instituto de Geociências
Universidade Federal do Rio Grande do Sul
Av. Bento Gonçalves 9500 - CEP
91501-970 - Porto Alegre, RS
Brazil

phone: +55 51 3316 6351 / 6341
Fax: +55 51 3316 7324
E-mail: francisco.aquino@ufrgs.br

Climate Variability, Bio-optical Properties and Phytoplankton

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- Christopher Karmosky and Adam Burnett The Role of Zonal and Meridional Atmospheric Circulation in Winter Antarctic Peninsula Warming
- H. W. Ducklow, PI; K. S. Baker, A. C. Clarke, W. R. Fraser, D. M. Karl, D. G. Martinson, L. B. Quetin, R. M. Ross, R. C. Smith and M. Vernet Palmer, Antarctica long-term ecological research project: "Long-Term Ecological Research on the Antarctic marine ecosystem: Climate migration, ecosystem response and teleconnections in an ice-dominated environment"
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- Steve Harangozo What controls the winter ice extent in the Bellingshausen Sea?
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- Marilyn Raphael Influence of zonal wave 3 in the Southern Hemisphere atmospheric circulation on Antarctic sea-ice concentration
- David B. Reusch, Richard B. Alley and Bruce C. Hewitson Nonlinear Paleoclimatology: Reconstructions in West Antarctica
- Francisco E. Aquino, Jefferson C. Simões, Alberto W. Setzer and Francisco A. Ferron Climatology and atmospheric temperature warming trend for King George Island, Antarctica
- R.C. Smith, K. Ireson & M. Vernet Climate Variability, Bio-optical Properties and Phytoplankton Productivity in the WAP region
- Andy M. Smith and David G. Vaughan Updated assessment of surface lowering of the ice ramp at Rothera Point, Antarctic Peninsula
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