

# Antarctic Peninsula Climate Variability: History, Causes and Impacts



*Interdisciplinary Workshop  
Cambridge, UK, September 16-18, 2004*

## 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

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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<sup>-1</sup> (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<sup>-1</sup>. 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<sup>-1</sup>, 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<sup>-1</sup>, depicts an average increase of 0.35 hPa a<sup>-1</sup> since 1986. Wind speed, at surface level, presented an increase of about 0.0426 m s<sup>-1</sup> a<sup>-1</sup> for the same period.

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**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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- Nicole P.M. van Lipzig, Robert Mulvaney and John C. King A model study on the effect of the accumulation history on chemical tracers measured in ice cores from the Antarctic Peninsula
- G.P. Milinevsky, Yu.I. Popov, V.V. Ukrainsky Interannual changeability of the ocean-atmosphere state in Argentine Island region
- Mikio Naganobu and Kunio Kutsuwada Variability of Drake Passage Oscillation Index (DPOI) from 1952 to 2003 in the Antarctic Peninsula area
- 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
- V. E. Tymofeyev Climate warming and related phenomena at the region of Antarctic Peninsula