Marble Point, Antarctica: A Climatological Analysis

Ethan J. Koudelka[1,2], Taylor P. Norton[1,2], Linda M. Keller[1,2], David Mikolajczyk [1,2], Matthew A. Lazzara[2,3]

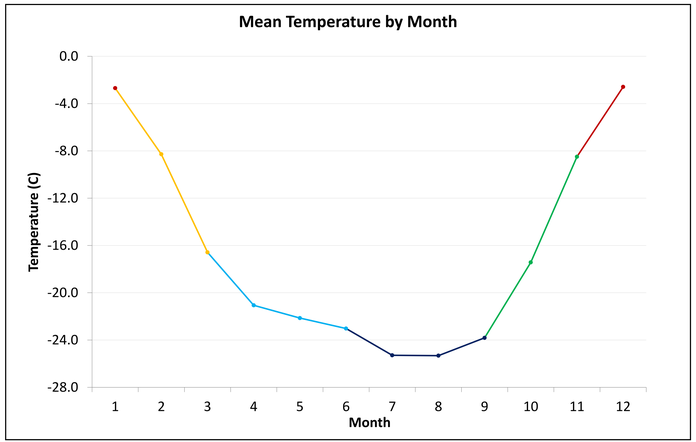
[1]Department of Atmospheric and Oceanic Sciences, University of Wisconsin-Madison, Madison, WI
[2]Antarctic Meteorological Research and Data Center, Space Science and Engineering Center, University of Wisconsin-Madison, Madison, WI
[3]Department of Physical Sciences, School of Engineering, Science and Mathematics, Madison Area Technical College, Madison, WI

Introduction

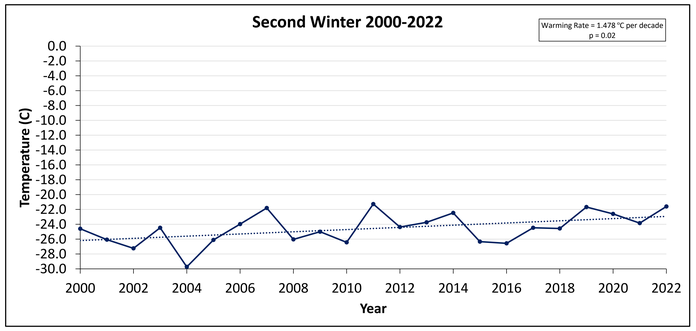
- The Antarctic Meteorological Research and Data Center is now finalizing the analysis of the collected data to produce a climatology of the Marble Point Station area in the Antarctic.
- After consideration of mean temperatures, a new classification of seasons has been adopted breaking up the traditional four seasons into five.

Statistical Findings

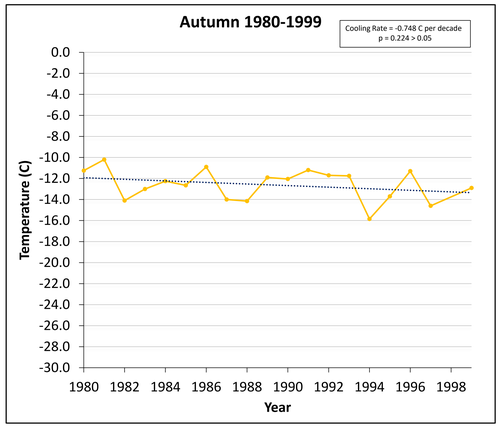
- Significance testing has shown significant warming trends from the years 1980-2022.
- The first half of the climatology (1980-1999) warmed at a rate of 0.65°C per decade, while the latter half (2000-2022) warmed at 1.033°C per decade.



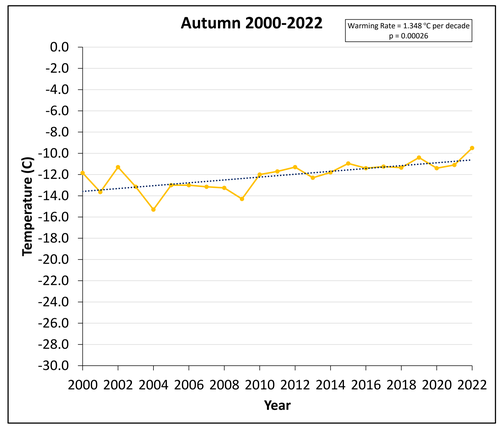
The monthly mean temperature averaged from 1980 to 2022. Each color represents a season: Autumn (Yellow), First Winter (Light Blue), Second Winter (Dark Blue), Spring (Green), Summer (Red).



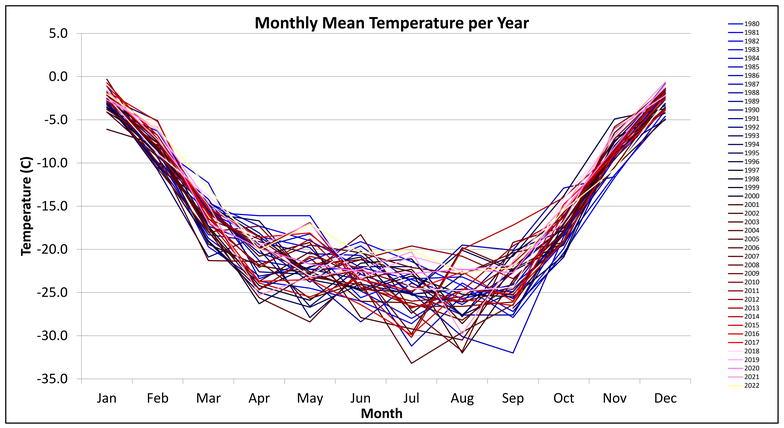
The annual mean temperature for the season of Second Winter averaged from 2000-2022.



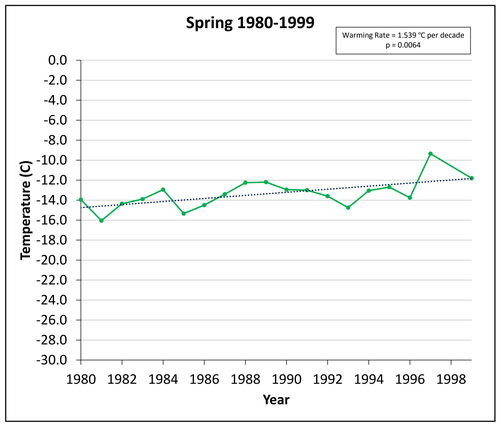
The annual mean temperature for the season of Autumn averaged from 1980 to 1999.



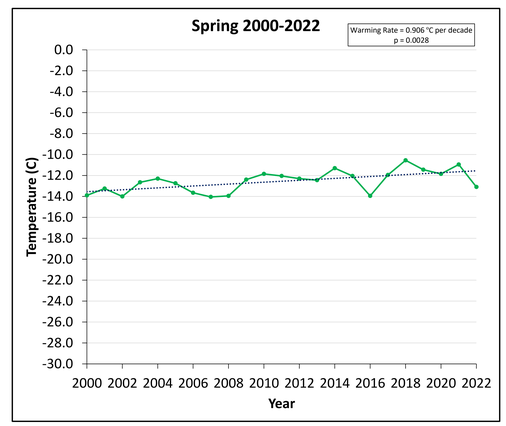
The annual mean temperature for the season of Autumn averaged from 2000 to 2022.



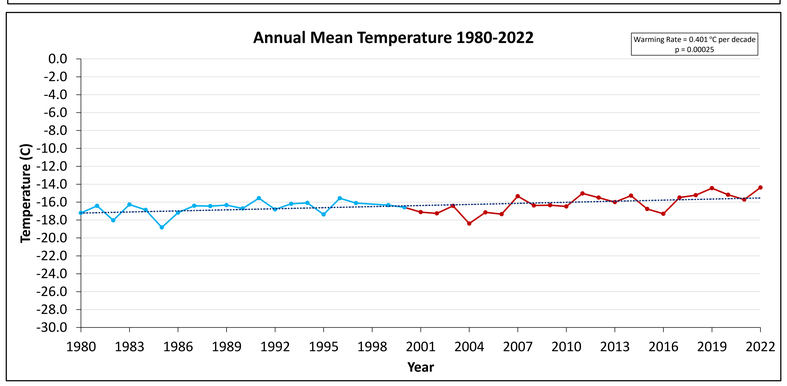
The monthly mean temperature for each year from 1980 (Blue) to 2022 (Red).



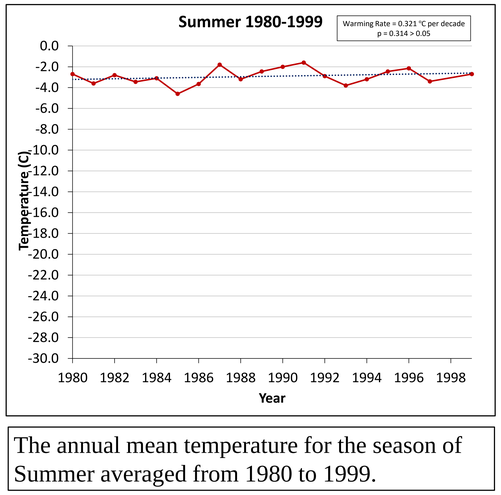
The annual mean temperature for the season of Spring averaged from 1980 to 1999.



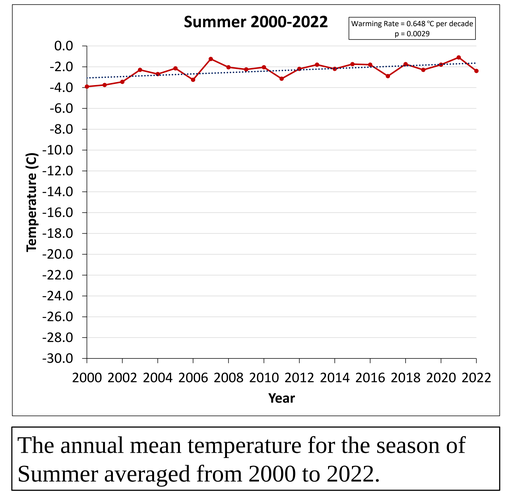
The annual mean temperature for the season of Spring averaged from 2000 to 2022.



The annual mean temperature from 1980 to 2022. Light blue represents the first half of the climatology (1980-1999), light red represents the second half (2000-2022).



The annual mean temperature for the season of Summer averaged from 1980 to 1999.



The annual mean temperature for the season of Summer averaged from 2000 to 2022.

Methodology

- Using data from 1980-2022, linear trendlines were constructed to describe the slope of the data. Then, a regression analysis was done on each period to determine significance values. Due to lack of data, the year of 1998 was omitted.

Impacts

- A climatology for Marble Point Station is important as it will be used by multiple organizations to support research within the McMurdo Sound region including United States Antarctic Program forecasters, helicopter pilots, US Support Forces personnel, research scientists, etc.

Future Work

- We plan to study the effects of the Southern Annual Mode (SAM) and the El Niño-Southern Oscillation (ENSO) on Marble Point.

References

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Costanza, C.A., Lazzara, M.A., Keller, L.M., & Cassano, J.J. (2016). The surface climatology of the Ross Ice Shelf Antarctica. International Journal of Climatology, 36, 4929 - 4941.

Acknowledgements

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