Preface

This report is one of a series of operations reports of the "United States National Science Foundation Office of Polar Programs, Ultraviolet Spectral Irradiance Monitoring Network." The network is now in its 18th year of operation. This report complements Volume 14.0 network data that have been measured in 2004 and 2005. Like operations reports of Volumes 7 – 13 , this report is also made available in pdf-format on the project's website at www.biospherical.com/NSF.

The size of the Antarctic "ozone hole" in the austral spring of 2004 was considerably smaller compared to the average extent observed during the last decade. According to "ozone bulletins" published by the World Meteorology Organisation, temperatures sufficiently low for the formation of Polar Stratospheric Clouds ended about 2 to 3 weeks earlier than in most recent years. However, stable meteorological conditions, which promote the persistence and magnitude of ozone depletion, replaced the earlier less stable conditions and permitted the gradual growth of the ozone hole into mid-November. This led to above-average UV levels at McMurdo Station and the South Pole during the first two weeks of November.

In August 2004, a new network site was established at Summit, Greenland, at the top of the Greenland ice cap. This is the first location where a SUV-150B spectroradiometer has been deployed on a permanent basis. Compared to SUV-100 spectroradiometers, which are installed at all other network sites, the SUV-150B features better angular response, wavelength stability, and spectral resolution. The instrument's collector is connected to the main system with an optical fiber bundle, allowing more flexible installation and better serviceability. The monochromator's wavelength setting is aided by high-resolution optical encoders. Like the SUV-100, the SUV-150B is designed for all-weather, automatic operation. This is the first report discussing data from Summit.

Data from GUV moderate-bandwidth, multi-channel filter radiometers, which were installed next to SUV spectroradiometers at all network sites between 2001 and 2005, are also discussed in this report. These instruments provide measurements at several, approximately 10-nm wide wavelength bands in the UV. An additional channel measures Photosynthetically Active Radiation. Data from the GUV radiometers are made available in near real-time at the project's web site, and are also used for quality control of SUV measurements.

The methods used for processing of SUV-100 data were essentially identical to those implemented for Volumes 7 – 13. Processing of data from the SUV-150B is slightly different and described in Section 4 of this report. Data are provided at the project's website at www.biospherical.com/NSF and on DVD.

We want to emphasize that a new data version of the entire data set of the NSF UV Monitoring Network is currently being prepared. This new data set is named "Version 2" and will eventually replace "Version 0" data discussed in this report. Version 2 data are corrected for the instruments' cosine errors; wavelength errors, which mostly affected earlier network data; and step-changes caused by modifications to the instruments. Version 2 data have a higher accuracy than Version 0 data. They also feature a larger number of data products, such as total column ozone, effective albedo, and cloud optical depth. In addition, each measured UV spectrum is complemented with a model spectrum, which has been calculated with a radiative transfer model. These model spectra are required for the various corrections and also serve as reference clear-sky spectra during cloudy conditions. As of this writing, Version 2 data for the Antarctic Stations at McMurdo, Palmer, and South Pole, as well as for Barrow, Alaska, are available. More about the Version 2 data set can be found at the "Version 2 website" at www.biospherical.com/NSF/Version2.

We would like to express our appreciation to all researchers that have used and published data from the NSF UV Monitoring Network (see Appendix Section A2. "References"). We are always looking for publication references in which the network's data have been used. We are especially grateful to those who offered feedback on methods, algorithms, and data products. We continue to encourage this input and welcome suggestions on how we can further meet the needs of the scientific community. An easy-to-use feedback form can be found at the project's website www.biospherical.com/NSF.

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Acknowledgements

The need for the rapid establishment of the UV monitoring program was identified by Dr. Peter Wilkniss, Director, Division of Polar Programs, National Science Foundation (NSF) in 1987. Dr. Polly Penhale of NSF's Office of Polar Programs has guided this project. Recently, responsibility at NSF has spread to Dr. Roberta Marinelli, Simon Stephenson, and Brain Stone.

Gary Harris from Research Instrument Systems was commissioned by the NSF in the fall of 1987 to design and build the precursor to the SUV-100. Four instruments were manufactured between October 1987 and January 1988, and two were deployed at McMurdo Station and the South Pole in February 1988. In the original configuration no publishable data were produced by the two instruments, and both were substantially redesigned by Biospherical Instruments Inc during the following year.

Key Contributors

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Susana Díaz of the Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) oversees Ushuaia's system operation with assistance of Guillermo Deferrari. The former director of the Centro Austral de Investigaciones Científicas (CADIC), Dr. J. Rabassa, made the installation possible.

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The inaugural operation of the SUV-150B system at Summit was heroically performed by Dr. Sandy Starkweather. Geoff Phillips, Jason Seifert and Katie Hess of VECO Polar Resources (VPR) also operated the system there during this period. System installation and logistics were made possible by VPR staff Jill Ferris, Mark "Sparky" Begnaud, Robin Abbott, Diana.Garcia-Novick and the 2004 Summit construction crew.

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Personnel at Biospherical Instruments

The Principal Investigator for the project is Charles R. ("Rocky") Booth, the Chief Executive Officer and Research Director of Biospherical Instruments Inc. The Co-Principal Investigator is Dr. Germar Bernhard, an Atmospheric Physicist and UV researcher who joined Biospherical Instruments Inc from the Fraunhofer Institute for Atmospheric Environmental Research (IFU) of Garmisch-Partenkirchen, Germany. He is responsible for quality control and scientific analysis of data from the network. The Project Manager is James ("Jim") C. Ehramjian, and he is responsible for the project's operational activities. Vi Quang joined the group in 1999 as Data Analyst/Database Administrator performing data analysis, database development, programming, and website development. Additional assistance in the installation of the SUV-150B system at Summit was provided by Seth White.