

**FOURTH SYMPOSIUM
ON METEOROLOGICAL
OBSERVATIONS AND
INSTRUMENTATION**

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AMERICAN METEOROLOGICAL SOCIETY

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ON METEOROLOGICAL OBSERVATIONS
AND INSTRUMENTATION

of the
AMERICAN METEOROLOGICAL SOCIETY

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AMERICAN METEOROLOGICAL SOCIETY
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FOREWORD

The Symposia on Meteorological Observations and Instrumentation have come into their own as a regular event. The first symposium was held 10-14 February 1969 in Washington, D.C. Papers were invited by the program committee and were classed as either Observation or Instrumentation. Eight panel discussions were distributed throughout the week. The proceedings were published as Meteorological Monographs, Vol. 11, No. 33, in October 1970 by the American Meteorological Society.

The second symposium was held 27-30 March 1972 in San Diego, Calif.; its theme was, "Relevancy of the Present Observational Structure to Real Data Needs." Contributed papers and a preprint volume came into use at this time.

The third symposium was held 10-13 February 1975 again in Washington, D.C.; its theme was, "Observations and Instruments for Mesoscale Phenomena."

The groundwork for this fourth symposium began in 1976 when the AMS Committee on Atmospheric Measurements (CAM) concurred that improving the communication between the remote sensing specialist and the meteorological user community was a worthwhile symposium goal. Correspondence between Floyd Elder, then Chairman of CAM, and Gordon Little focussed further on the theme. With both NCAR and NOAA in Boulder heavily involved in remote sensing research as well as in new in situ instrumentation development, it seemed appropriate to share the planning and organizing function within both groups.

When we scan the papers in this volume and compare them with those in the previous three proceedings, we see that there has truly been an evolution in meteorological instrumentation. More and more devices incorporate built-in data averaging, processing, or calibrating capabilities. Digital techniques that were experimental only 10 years ago have become so commonplace and economical that there is now no choice but to employ them. Interactive experiments, long a dream of the atmospheric scientist, are now a reality. Is it possible that we are on the verge of a breakthrough in meteorology, where the new observation techniques can result in significant forecast improvements? Can our experimental community be satisfied with anything less?

Freeman F. Hall and Julian M. Pike
Program Cochairmen

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¹Conference on Atmospheric Measurements from Aircraft.

²Fifth Workshop on Atmospheric Acoustics.

*Manuscript not available.

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WELCOME TO THE FOURTH SYMPOSIUM

Walter E. Hoehne

Chairman, Committee on Atmospheric Measurements
American Meteorological Society

Advances in the science of meteorology have been accompanied by the development of instruments and data processors to supplement, complement, and replace subjective human observations. Technological subspecialties grew around individual instrumental techniques. Some Committees of the American Meteorological Society sponsor specialized conferences and symposiums to discuss and compare notes on problems and accomplishments in these subspecialties. The Committee on Atmospheric Measurements (CAM) is interested in both objective and subjective observations and the instrumentation used to make such observations.

One of the objectives in the Frame of Reference for the CAM is improving the reliability and quality of data obtained. To help in achieving this objective the CAM instituted in 1969 a series of symposiums to bring together the users of meteorological data, the providers of that data, and the developers of techniques and instrumentation for obtaining and distributing the data. As Dr. Teweles, the Program Chairman for the First Symposium, pointed out, the publication of the proceedings "serve as a professional source book to encourage and facilitate the instruction of college students and to provide general guidance to other workers in the meteorological area."¹

The First Symposium covered a wide range of interests, measurements, and observations. Precision, accuracy and representativeness of meteorological measurements along with the timeliness and distribution of the observations were among the many subjects addressed.

In the years following the First Symposium, social, economic, and political forces required new capabilities for gathering and distributing atmospheric data. Concern for the environment led to laws requiring information about natural and man-made influences on our atmosphere. Thus, the Second Symposium was directed toward micro-meteorological measurements, and the processing of data obtained from them.

While increasing population density had made micro-meteorological measurements of increased importance, it was realized that the influence

of weather on transportation, agriculture, lives, and property in general, required a continual interest in meso-scale meteorological phenomena. Thus, the Third Symposium was designed specifically to address meso-scale problems and the impact of increased requirements for short-term forecasts and warnings.

Since the Third Symposium, meteorologists have continued efforts to improve the precision, accuracy and distribution of meteorological observations while the technology explosion in the fields of acoustics, electromagnetics and micro-circuitry have greatly increased the amount of information that can be gathered, processed, and recorded. In spite of warnings from Jim Giraytys and others, it seems as if we may be trying to "measure everything, everywhere, all the time."²

Our Fourth Symposium is very much technology oriented, but the state-of-the art in sensing and measuring by remote and indirect means has an ever-broadening scope as that technology is applied to meteorological measurements. Satellites, certainly remote platforms, use passive and active indirect probing by electromagnetic radiation to measure a wide range of meteorological and environmental phenomena. Automatic meteorological observing systems provide not only measurements traditionally made by instrumentation such as wind velocity, temperature and humidity, but also provide measurements of visibility and cloud height for operational use by the aviation industry. The traditional subjective human observation is more and more being supplemented and replaced by measurements from instruments that automatically sense with data automatically processed and transmitted.

Because it has in its Frame of Reference specific mention of standards for instruments and data acquisition systems, the CAM is particularly concerned with the subtle and/or gross differences there may be between measurements made by direct, manual means and measurements of the same parameters by indirect, remote, and/or automatic methods. Some of these differences arise from the derived, quantitative, numerical relationships between the subjective report of the observer and the objective output of an instrument. A familiar example is the relationship between the subjective Beaufort Scale

¹Teweles, Sidney, "Purpose," Meteorological Observations & Instrumentation, American Meteorological Society, Vol. 11, No. 33, Oct. 1970.

²Giraytys, James, "Forward," Proceedings of the Third Symposium on Meteorological Observations and Instrumentations, Feb. 10 - 13, 1975, Washington, D. C.