conference summary

conference on the urban boundary layer
at California State University, San José

Robert D. Bornstein
California State University
San José, Calif. 95192

On 30 November 1972, the Department of Meteorology, California State University, San José, hosted a one day conference on the urban boundary layer. During the morning, an informal roundtable discussion of "Urban Climatology and Air Pollution Modeling—What Does the Future Hold?" brought together about 20 research scientists currently working on problems in urban climate, and urban air pollution modeling, as well as meteorologists associated with governmental air pollution control agencies. After lunch, Dr. Tim Oke of the University of British Columbia at Vancouver and Dr. Lars Olsson of Stockholm, Sweden, presented seminars to the faculty, students and guests of the Department. Dr. Olsson was enroute back to Sweden after having spent three years as a Professor of Meteorology at Oregon State University.

The roundtable discussion was meant to assist Dr. Oke in his preparation of a report on the state of research on the urban boundary layer that is going to be submitted to the World Meteorological Organization (WMO) Committee on Special Applications of Meteorology and Climatology. (The chairman of this committee, Dr. Helmut Landsberg, presented a seminar on "World Wide Climatic Change Induced by Man" at the University during the first week in December.) The roundtable discussion was chaired by Prof. R. Bornstein. Others attending the meeting included Dr. W. Dabberdt of Stanford Research Institute, Drs. L. J. Shieh, P. Halpern, and J. Dave of IBM, Palo Alto, Dr. J. Shir of IBM, San José, Drs. M. MacCracken and M. Dickerson of Lawrence Livermore Laboratories, J. Sandberg and D. Thuillier of the Bay Area Air Pollution Control District, Drs. V. Watson and A. Hsui of the NASA/Ames Research Laboratories at Moffett Field, San José, and Professors K. MacKay, A. Miller, and C. Riegel of the Department of Meteorology.

The discussion began with a summary by Dr. Oke on the latest research results in the area of urban climate. He stated that although the existence of urban climates has been well documented, not enough attention has been paid to the causes of these climates, for example, the differences between the urban and rural energy balances. In addition, he pointed out that the two scales of urban climate, that is, the meso- and microscales, are only occasionally coupled.

Concerning the meteorological information needed for urban air pollution models, the general opinion of the

conference was that it was a function of the type of prediction being made. For example, Mr. Sandberg said that the Bay Area Air Pollution Control District is capable of predicting "episode conditions" using National Weather Service data obtained from radiosonde launches at airport stations outside of cities. However, for small-scale predictions within cities, more detailed data are needed, e.g., from slow rising radiosondes now launched within cities, and from helicopters and mobile vans. Dr. Shieh pointed out that the computation of concentrations from large elevated point sources, such as power plants, is very sensitive to wind direction, while the computation of concentrations from surface area sources, such as automobiles, is more sensitive to wind speed.

Concerning the usefulness of climatological-statistical, numerical and Gaussian plume prediction models, Dr. Olsson felt that each of these models was useful for different meteorological situations, and for different time scales of prediction; for example, statistical models could be used for annual averages. Some of the problems associated with model sensitivity and model verification were summarized by Dr. Olsson. He stated that the various models are capable of predicting concentration patterns quite well, but that insufficient wind data can lead to the displacement of the location of extreme values. Thus the verification at particular stations may be poor.

Mr. Thuillier stated that the needs of the user will determine the direction of future air pollution modeling efforts. For the immediate future, the most useful application for the models seems to be for regional planning, rather than real time prediction. This situation might change with the advent of real-time meteorological prediction on the mesoscale.

Suggestions for future work included one by Dr. Oke that the atmospheric environment of a single building be studied as an aid in determining the overall energy balance of an urban area. Dr. Dabberdt suggested that urban pollution and climatic data should be systematically archived and be made readily available, as is done with synoptic data.

During an afternoon seminar, entitled "Research on the Energetic Basis of Urban Climate," Dr. Oke discussed his observations of the three-dimensional structure and energetics of the urban heat islands over Montreal and Vancouver. Dr. Olsson's seminar was

concerned with "The Problems with the Verification of Regional Dispersion Models—with Application to the Fortak Model for Stockholm Sweden."

In summary, the one day meeting at California State University, San José, on the urban boundary layer brought together urban meteorologists, air pollution

modelers, and representatives of governmental air pollution control agencies for an informal exchange of information and ideas. The hope that this meeting would lead to future such exchanges was expressed by President John Bunzel in his welcome to the group during lunch at the University's Faculty Club.

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Earth circling scientific balloon package recovered

At sunrise on 24 January 1973 a team of scientific ballooning specialists from the National Center for Atmospheric Research, Boulder, Colo., launched a 65-ft-diameter plastic balloon from an airfield at Oakey, Australia. The balloon carried a payload of cosmic-ray detectors and biological specimens. Just before sunset on 28 February the payload was recovered 9 miles west of the launch site. During the time between launch and recovery, the balloon circled the earth twice, covering 46,000 miles at an altitude of 80,000 ft.

The long-term flight and recovery of the balloon and package mark a milestone in the use of balloons for studies of the stratosphere and space. Experiments for Prof. Victor Hopper of the University of Melbourne were carried by the balloon, which was launched from the Australian Army Air Base at Oakey, Queensland, Australia by a crew from the National Scientific Balloon Facility in Palestine, Tex., which is operated by NCAR under sponsorship of the National Science Foundation.

First in a series known as Project Boomerang, the joint U.S./Australian project was designed to demonstrate the feasibility of using balloons for long-duration scientific missions in the stratosphere. Project Boomerang, a National Aeronautics and Space Administration project, is being conducted under the direction of Alfred Shipley, manager of the National Scientific Balloon Facility. It uses superpressure Mylar balloons that are king-sized versions of the GHOST (Global Horizontal Sounding Techniques) balloons developed by an NCAR group headed by Vincent E. Lally. GHOST balloons have made flights lasting over a year, but they carry simple, lightweight instrument packages that are not recovered.

Long-duration, Southern Hemisphere flights terminating near the launch site can be made only during the summer months according to Lally, when the easterly circulation in the stratosphere follows a zonal flow pattern. Using a simple navigation system to track the balloon by telemetering the angle at which sunlight is falling on the instrument, the researchers can send an aircraft to the estimated balloon position, verify its location, and cut the balloon down by a radio command.

Lally points out that the success of this long-duration scientific balloon flight opens up a whole range of scientific investigations that may be performed at comparatively low cost using balloons. They include: monitoring atmospheric gases and contaminants over the Southern Hemisphere; collecting samples of meteoritic dust over extended periods of time; monitoring rare astronomical events by continuous surveillance; and detection of high-energy particles from space.

According to Shipley, future plans call for testing larger balloons with heavier payloads. A long-range goal, scheduled

for 1975, is to make a flight of several months in duration with a payload of 500 lb at 120,000 ft.

Swedish weathermen in U.S.

Brig. Gen. Bengt A. Bengtsson, Commander of the Royal Swedish Air Force's Military Weather Service, recently completed a 10-day visit to U.S. Air Weather Service units. Accompanying Gen. Bengtsson on the 2-12 April visit were two military weather service staff officers: Lt. Col. Arne E. Jonason, Director of Administration and Training, and Lt. Col. Bengt O. Soderberg, Director of Research and Development.

Gen. Bengtsson's visit was hosted by Brig. Gen. William H. Best, Jr., Commander of the Air Weather Service, headquartered at Scott AFB, Ill. Gen. Best made a similar visit to Swedish weather installations in August 1972. The purpose behind the visits was to foster Swedish-United States cooperation and understanding in the field of meteorology and military weather support. Accompanying Gen. Best on his Swedish visit were Col. Leonard E. Zapinski, Deputy Chief of Staff for Operations and Col. Herbert Million, Deputy Chief of Staff for Systems.

During the visit to Scott AFB, the guests received a series of briefings on AWS activities, a tour of the Military Air-lift Command's Command Post, and called on MAC Commander, Gen. P. K. Carlton. Also included in the itinerary were tours of the Weather Training Department at Chanhute AFB, Ill.; Air Force Cambridge Research Laboratories, Hanscom Field, Mass.; Air Force Global Weather Central, Offutt AFB, Neb.; 9th Weather Reconnaissance Wing, McClellan AFB, Calif.; and the Fleet Numerical Weather Central, Monterey, Calif.

During his visit to the United States Gen. Bengtsson (l) presented Gen. Best with a model of the SAAB 37 Viggen, Sweden's newest jet fighter. The presentation was made in recognition of the meteorological cooperation between the two weather services and friendship created during the exchange visits.

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