

OFFICIAL USE ONLY



U.S. DEPARTMENT OF COMMERCE
Environmental Science Services Administration
RESEARCH LABORATORIES

Idaho Falls, Idaho 83401

Date: July 23, 1970

Reply to
Attn of: RF323x1

727047

Subject: ARLFRO Monthly Activity Report, June 21 - July 20, 1970

To: Chief, Environmental Branch
AEC Health Services Laboratory

BEST COPY AVAILABLE

Mesoscale Wind Studies: The first ten months of wind data for the meso-grid stations has been edited and corrected for orientation errors as well as some flagrant copying and keypunch errors. The editing and correction techniques are now operational and should be applicable in checking tele-metered data. The wind data for the months of November and December 1969 has been keypunched, transferred to tape and is ready for editing and correcting. When this is finished the data set for 1969 will be complete.

Work has begun on program modification which will produce an animated version of the wind field plots. The main effort here is to devise ways to cut costs. Simple conversion of the scheme for plotting the individual plots would result in movies which cost twenty times as much as the movies of particle advection.

Experimentation with scaling and resolution of the CRT photographs of the wind field and trajectory plots is in progress. It has been found that miniaturization of the wind field plots greatly aids the visual observation of pattern changes and eddy structure.

Since the corrections have been made in the data series, a time series analysis of the wind data from individual stations in the meso network has resumed. Spectral analyses of the upvalley and crossvalley components of the wind are being made.

CERT: A report of the significant findings related to the meteorological aspects of the CERT project since its inception in 1963 has been drafted. This report covers the theoretical and empirical approaches which have led to a better understanding of the processes involved in the sorption and resuspension of effluent gases to and from natural surfaces. This report will be submitted for publication as a Technical Memorandum of ESSA Research Laboratories.

Surface Boundary Layer Turbulence: Hourly spectral estimates of wind velocity turbulence by components from a bivane and cup anemometer located at the 16 m level of the Grid III tower were computed for 84 hours of record. These estimates will be stratified into four atmospheric stability classes and averaged. These class averaged spectra will then be compared against data on the time variation of turbulence by wind components to see whether spectra can be used to estimate the variation of eddy kinetic energy with sampling interval.

REPOSITORY INE

COLLECTION Res. Files of Doug Carlson ^{Direct}

BOX No. RESL C-7A 690 Rm #191

SUBS: 6/21 - 7/20/70
FOLDER ARLFRO Monthly Activity Rpt

FILE: Environmental Science Branch
Monthly Reports for yrs. 1966-1970

1187765

OFFICIAL USE ONLY

~~OFFICIAL USE ONLY~~

Chief, Environmental Branch

- 2 -

July 23, 1970

Building Wake Diffusion Tests: The meteorological and air sampling equipment installation was completed during the reporting period. Four attempts were made to gather diffusion and turbulence data simultaneously. Unfavorable wind conditions cancelled each test because the high volume air samplers had to be set up for one of the prevailing wind directions. Expected wind directions are very difficult to predict during stable conditions. After these unsuccessful attempts to conduct the experiment, the samplers were re-distributed so that a wind from either prevailing direction could be sampled at any time. Several smoke releases from various positions around the haystack have provided a visual idea of the diffusion during stable, low wind conditions.

Computer Programs: A line contouring analysis program was obtained from the Idaho Nuclear Corporation Computing Center. Extensive modifications have been made to the routine that will present the data in a more desirable format. Controlling contour levels, plotting in first quadrant, and a better control of the length of the axis are a few of the features added to the routine. Methods of smoothing data are currently under investigation. The small amount of computer time involved in this routine for plotting contours was encouraging, therefore a line contour plot is being considered for data from the building wake studies.

The spectral analysis program has been modified to average spectra and plot unsmoothed individual spectra or averaged spectra on a linear scale. This enables turbulence data to be analyzed over a longer period of time at shorter time steps in sampling data.

Final processing of the Los Angeles tetron trajectories has been completed for microfilm plots of the x, y and z planes. Several other methods of presentation will be attempted pending the arrival of surface wind observations for the Los Angeles Basin. Reading magnetic tapes by remote terminal has been successful and will be used for short runs such as instrumentation checkout where the results are needed urgently. Preliminary processing of NAFEC data is being continued. Some program modifications have been required to determine the best method of analysis.

Operations and Maintenance: Majority of the period was used to get ready for the building wake study. The profile system and data acquisition system were moved to the test trailer. Repairs were made on the Cordin wind translator and digital clock. A Climet wind system was installed on the test grid with a readout in the test trailer.

Repairs and calibration were performed at the following telemetry stations: IET 20', EBR II, Tabor, Grid III, NRF, Sand Dunes. Calibration was performed on the Cordin translator and profile system. A new recorder and a telephone was installed at Goldberg.

1187766

~~OFFICIAL USE ONLY~~

~~OFFICIAL USE ONLY~~

Chief, Environmental Branch

- 3 -

July 23, 1970

Weather Summary: The mean temperature was 1.0° above normal. The low temperature for the period was 35°, which occurred on June 30 and July 1. On June 29 and 30 maximum temperatures 20° below normal were recorded at 63 and 65 degrees respectively. There were 15 days with temperatures of 90 degrees or more. Precipitation for the period was 0.60 inches, which occurred during thundershower activity the last four days of June and July 10 through July 13.

Papers and Lectures: A paper entitled "Thirty Hour Surface Wind Prediction by Regression Models" has been drafted for internal review. This paper compares two regression models; the prediction of U and V wind components by Multiple Linear Regression (MLR), and direction and speed by Regression Estimation of Event Probabilities (REEP) and MLR respectively. The root mean square vector error (RMSVE) in the U-V form was found to be slightly better than the RMSVE in the direction-speed form and the risk of very large errors was much less.

A presentation by staff members of some of the work carried out by the ARLFRO was given to a group of graduate students from Colorado State University.

Visitors: Dr. Fred Horning of the Deseret Test Center, Utah, visited on June 25 to discuss meteorological research at NRTS.

On June 25 and 26 Dr. Isaac Van der Hoven, Chief, AREL, Silver Spring, Maryland visited to discuss research plans for FY 71.

Mr. William Hass and Mr. Martin Proedehl of ESSA, Silver Spring, were here on June 25 and 26 to coordinate FAA-ESSA sonic boom study.

Mr. Leo Garodz of FAA, NAFEC, New Jersey visited June 29 through July 1 to discuss data obtained from the FAA wake vortex studies.

Two meteorological field aides from the Weather Bureau, Boise, were at this station on June 29 to calibrate and check out chronological rain gauges.

On July 14 and 15 Dr. Robert N. Meroney, Colorado State University, visited here to observe building wake diffusion tests in the field and to present preliminary results of building wake diffusion studies in the wind tunnel.

Earl H. Markee, Jr.
Earl H. Markee, Jr.
Acting Chief, ARLFRO

cc: I. Van der Hoven, AREL
Chief, ARL, Las Vegas
Director, DOM, Raleigh, N. C.
Director, APATDL, Oak Ridge, Tenn.
Director, WRSPO, INC

1187767

~~OFFICIAL USE ONLY~~