

**Edited NSSL Meso - Scale Upper Air Network  
Data in Southwestern Oklahoma  
1966 and 1967**

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**Atmospheric General Circulation  
Technical Document No. 1**

**SR 108 1969  
AGRICULTURAL EXPERIMENT STATION  
UNIVERSITY OF MISSOURI - COLUMBIA**

The original soundings were supplied by the National Severe Storms Laboratory, ESSA.

The work documented in this report has been supported by the Atmospheric Science Division, National Science Foundation under NSF Grant GA-1287.

A contribution from the Missouri Agricultural Experiment Station. Special Report Series Number SR 108.

## GENERAL REMARKS

A systematic observational study of the atmospheric energy balance is in progress with the support of the National Science Foundation. As our major objective of the research project is the large-scale energy diagnosis, one phase of our study concerns the energy relationship between large-scale and small-scale processes. Thus, the meso-scale energy analysis emerges as a highly desirable step, especially when we contemplate the problem of the energy cascade from macro- to micro-scale. It is also recognized that the study of the meso-scale energy budget is one of the much-needed links in bridging the existing gap between the macro- and micro-scale meteorological studies.

The National Severe Storms Laboratory (NSSL) of ESSA at Norman, Oklahoma, has conducted a series of atmospheric soundings over a network of 10-11 stations located principally in southwestern Oklahoma. The network was not in continuous operation, but was activated prior to expected stormy weather. Although the data collected were intended for research in the meteorology of severe local storms, to the best of our knowledge this is one of the very few data sources of the desired type mentioned above. Proper spacing of the network stations, more than enough vertical and time resolutions, and the proper documentation of the balloon position during ascent should be particularly mentioned.

From the records of individual soundings supplied by the NSSL, we extracted and edited portions of the data which are relevant to our study. They were then listed on a magnetic tape in a format suitable for use as a direct digital input for general purposes. The pilot study on the meso-scale energy budget using these edited data is in progress now. The data we edited are very limited in size since they are only a part of the NSSL soundings. However, the existence and availability of meso-scale network data in this format may provoke the general interest of meteorologists. It is hoped that in the future we can compile a more extensive amount of the data of the same series as our study in this phase progresses.

We are very grateful for the courtesy of Dr. E. Kessler, Director of the NSSL for making the soundings available to us. We are also indebted to Mrs. K. Gray of NSSL for her kind and able assistance during our data compilation.

D. H. McInnis, an Assistant Professor of Mathematics at Southwest Missouri State College, Springfield, is currently in our doctoral program. The major task of editing the soundings and generating the data tape was assigned to him. Thus, the subsequent documentation of the data in this note is by him.

Ernest C. Kung  
Principal Investigator

## NSSL SOUNDINGS

The NSSL soundings are physically contained in seven magnetic tapes. These data consist of processed soundings taken during the periods from May, 1966, to June, 1966, and from May, 1967, to June, 1967. In addition to the usual meteorological parameters, these tapes contain a large quantity of special analyses which were omitted in our data editing.

A few remarks concerning the nature of the data are in order. The time and space resolutions of this series of soundings have a unique value. The eleven sounding stations can be enclosed by a circle of radius equal to 160 km. There exist sequences of soundings taken as close together as one hour by a single sounding station. The number of levels in the soundings is high, up to about 118 from the surface to 100 mb., for example. Reported intervals range from around 15 mb. near the surface to less than 5 mb. at levels near 100 mb. The position of released balloons during ascent was properly recorded. It should not be forgotten that these soundings are statistically heavily weighted toward stormy conditions.

## EDITED DATA TAPE

The data we have extracted from the NSSL tapes occupy one reel of magnetic tape. We have attempted to list all of the basic meteorological and geographical parameters for all available soundings having no processing irregularities. This effort has involved a number of data processing programs which have searched the NSSL tapes for thermodynamic and wind parameters which were not recorded together. We built separate thermodynamic and wind tapes, and then merged them together into the final tape. Soundings with missing levels, with mismatched thermodynamic-wind sequences, with misplaced data positions, or with improper data characters were automatically rejected and listed separately. These error listings are on file awaiting analysis. Since in many cases these errors are only minor misalignments, a number of soundings will be corrected and added to the final tape sometime in the future.

The tape consists of a list of levels, each sounding being followed immediately by its chronological successor. Each level record contains the same sequence of parameters, and these parameters are sufficient for their self-identification. In total the tape contains 546 edited soundings consisting of information secured at a total of 55,044 levels (records).

The parameters in the final tape are listed below in the order in which they occur in each record:

1. "STA": (STATION) A two-digit number. For identification, see Appendix I.
2. "DATE": The launching date (Greenwich time), given as a five-digit number: month-day-year. (Thus 52266 indicates May 22, 1966.)
3. "TIME": The launching time (Greenwich time), given as a four-digit number: hour (00-23) and minute.
4. "S.N.": (SERIAL NUMBER) NSSL's sounding identification number, listed here for purposes of checking with the original NSSL tapes.
5. "M": An integer designating the position of each level within a sounding. It starts with 1 and ends with the total number of levels in a particular sounding.
6. "TI": Time from release in minutes.
7. "P": Pressure of the level in milibars.
8. "HT": Geopotential height of the level above MSL in meters.
9. "TC": Temperature in degrees C.
10. "DPD": Dew-point depression ( $DPD = TC - TD$ ) in degrees C.
11. "RH": Relative humidity in percent.
12. "AM": Actual mixing ratio in grams per kilogram.
13. "TV": Virtual temperature in degrees K.
14. "DIM": (A smoothed value of DIR.)
15. "SPM": (A smoothed value of SPD.)
16. "DIR": The direction from which the wind is blowing in degrees clockwise from North.
17. "SPD": Wind speed in meters per second.
18. "DISP": Balloon displacement in kilometers from the point of release.
19. "AZM": Azimuth in degrees from balloon to site.

Two appendices follow. Appendix I lists the names and exact locations of all stations. Stations 1-11 were used in 1966; stations 1-10 were used in 1967. A map showing the locations of these stations is also attached.

Appendix II gives the tape location and format of each of the parameters listed above.

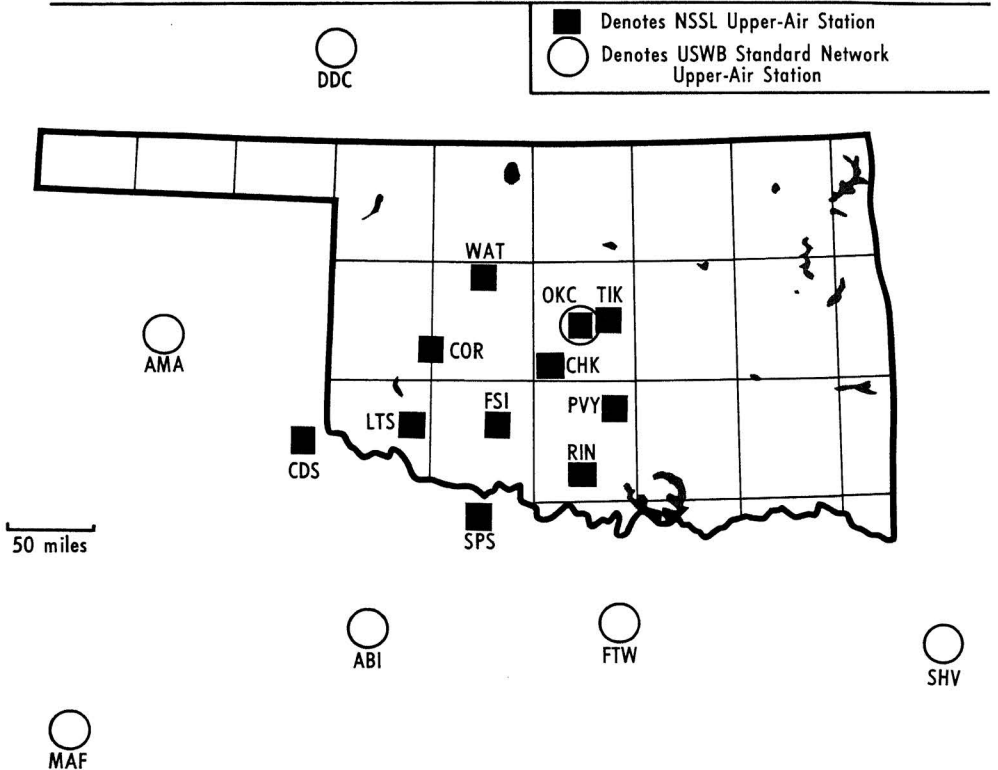
APPENDIX I  
STATION LOCATIONS

The accompanying map gives the locations of the NSSL stations with nearby USWB standard upper-air stations (○) shown for comparative purposes.

The table below gives the latitude, longitude, and height above mean sea level for the eleven stations.

STATION	NO.	CODE	LAT.	LONG.	HEIGHT
Wichita Falls, Texas	1.	SPS	33.97° N	98.48° W	311m
Fort Sill, Okla.	2.	FSI	34.65	98.40	361
Altus AFB, Okla.	3.	LTS	34.70	99.33	436
Ringling, Okla.	4.	RIN	34.17	97.58	276
Chickasha, Okla.	5.	CHK	35.10	97.97	350
Tinker AFB, Okla.	6.	TIK	35.42	97.38	388
Pauls Valley, Okla.	7.	PVY	34.70	97.22	296
Cordell, Okla.	8.	COR	35.30	98.97	483
Watonga, Okla.	9.	WAT	35.85	98.42	473
Oklahoma City, Okla.	10.	OKC	35.40	97.60	393
Childress AFB, Texas	11.	CDS	34.43	100.30	595

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APPENDIX II  
TAPE FORMAT

All soundings are in chronological order, sorted as follows: first by date, then by launch time, and finally, numerically by station. (The stations are identified by integers 1-11.)

The data for each sounding level constitutes a record, and there are ten records to a block. The entire data tape constitutes a single file.

The last level of a given sounding is followed immediately by the first level of the next sounding. There are no record marks at the end of the records.

Each record is 90 characters long, divided as follows:

POSITION	PARAMETER	FORMAT
1 - 3	STA	I3
4 - 8	DATE	I5
9 - 12	TIME	I4
13 - 18	S. N.	I6
19 - 21	M	I3
22 - 26	TI	F5.2
27 - 32	P	F6.1
33 - 38	HT	F6.0
39 - 43	TC	F5.1
44 - 47	DPD	F4.1
48 - 52	RH	F5.1
53 - 57	AM	F5.2
58 - 62	TV	F5.1
63 - 66	DIM	F4.0
67 - 70	SPM	F4.1
71 - 74	DIR	F4.0
75 - 78	SPD	F4.1
79 - 84	DISP	F6.3
85 - 90	AZM	F6.2