

N87-10525

D106-32 497

9.2.2 MST DATA EXCHANGE THROUGH THE NCAR INCOHERENT-SCATTER RADAR DATA BASE

A. D. Richmond

HAO/NCAR
P.O. Box 3000
Boulder, CO 80307

One means of making MST data more easily accessible for scientific research by the general scientific community is through a centralized data base. Such a data base can be designed to readily provide information on data availability and quality, and to provide copies of data from any radar in a common format to the user.

The ionospheric incoherent-scatter radar community has established a centralized data base at NCAR that may serve not only as a model for a possible MST data base, but also as a catalyst for getting an MST data base started. Some key elements of the NCAR data base are:

- Data are processed to yield geophysical parameters (e.g., velocities instead of Doppler shifts) by the radar organizations before being sent to NCAR;
- Emphasis is on data for which measurement and analysis techniques have become well-understood and relatively routine;
- All radar organizations use a common format for sending data;
- NCAR catalogues the data and prepares summary information files;
- NCAR provides data copies to users upon request;
- NCAR assists users when possible with documentation and software, and helps place users in contact with appropriate persons at radar organizations for further information;
- Users are required to offer co-authorship on publications to data providers;
- Costs are largely borne by each respective institution with minimum transfers of funds. (NSF-supported radars are supposed to have funds included in their contracts to cover costs of participation in the data base).

The NCAR data base can include MST data in this same framework with relatively little extra effort. We are willing to handle MST data on a limited basis in order to permit assessment of community interest and in order to provide some experience with a centralized data base for MST data. If sufficient interest develops, NSF support could be sought for a full-scale MST data base, either at NCAR or elsewhere. Data from the Poker Flat radar are already under consideration for inclusion in the NCAR data base.

One important requirement is a common data format. The format currently used for incoherent-scatter data is quite flexible, and in fact was designed with the thought in mind of having it usable for data from other types of instruments. A brief description of this format is appended. The MST community may find this format acceptable, or may wish to design a more specialized format.

NCAR's data base tape format

All words are 16-bit, 2's complement integers.

Physical Record

Last word: checksum

	Logical record	Logical Record	Logical Record	
--	----------------	----------------	----------------	--

First word: total number of words in this physical record, including this word and checksum.

Each physical record contains an integral number of logical records.

Logical Record (Data Record)

Prologue	1-D codes	1-D values	2-D codes	2-D values	2-D values	...
----------	-----------	------------	-----------	------------	------------	-----

Or:	Prologue	Length LPROL
	1-D codes	JPAR
	1-D values	JPAR
	2-D codes	MPAR
NROW rows	2-D values	MPAR
	2-D values	MPAR
	.	.
	.	.

PROLOGUE

WORD NUMBER	NAME	DESCRIPTION
1	LTOT	Number of 16-bit words in this record, including this one
2	KREC	Kind of record (1002 for data record in this format)
3	KINST	Instrument code
4	KINDAT	Kind-of-data code, pointing to documentation on analysis procedure used
5	IBYR	Beginning year for data in this record
6	IBDT	Beginning month/day (MMDD)
7	IBHM	Beginning hour/min (HHMM)
8	IBCS	Beginning centisecond
9	IEYR	Ending year
10	IEDT	Ending date
11	IEHM	Ending hour/min
12	IECS	Ending centisecond
13	LPROL	Length of this prologue (at least 16)
14	JPAR	Number of single-valued parameters (0 permissible)
15	MPAR	Number of multiple-valued parameters (0 permissible)
16	NROW	Number of entries for each multiple-valued parameters (0 permissible)

SAMPLE PARAMETER CODES

Code	Description	Designator		Units
10	YEAR (UNIVERSAL TIME)	YEAR	1.	UT
20	MONTH/DAY (UNIVERSAL TIME)	MMDD	1.	UT
21	DAY NUMBER OF YEAR (UNIVERSAL TIME)	DAY #	1.	UT
30	HOUR/MIN (UNIVERSAL TIME)	HHMM	1.	UT
34	TIME PAST 0000 UT	HR > 0000UT	1.E-03	HOUR
60	INTEGRATION TIME FOR THESE DATA	INTEGRATN T	1.	S
70	SAMPLING INTERVAL (TIME BETWEEN SAMPLS)	SAMPL NTRVL	1.	S
110	ALTITUDE (HEIGHT)	ALTITUDE	1.	KM
111	ADDITIONAL INCREMENT TO ALTITUDE	ADDITNL HT	1.E-01	M
115	ALTITUDE AVERAGING INTERVAL	AVGNG DEL H	1.	KM
116	ADDITIONAL INCREMENT TO HT AVGNG INTRVL	ADDITNL D H	1.E-01	M
120	RANGE	RANGE	1.	KM
121	ADDITIONAL INCREMENT TO RANGE	ADDITNL RNG	1.E-01	M
125	WIDTH OF RANGE GATE	RANGE GATE	1.	KM
126	ADDITIONAL INCREMENT TO RNGE GATE WIDTH	ADDITNL R G	1.E-01	M
130	MEAN AZIMUTH ANGLE (0 = GEOG N, 90 = EAST)	AZ ANGLE	1.E-02	DEG
140	ELEVATION ANGLE (0 = HORIZONTAL, 90 = VERT)	EL ANGLE	1.E-02	DEG
402	PULSE LENGTH	PULSE LEN	1.E-06	SEC
412	LOG10 SIGNAL TO NOISE RATIO	LG10(SNR)	1.E-03	
486	PEAK POWER	PEAK POWER	1.	KW
490	TRANSMITTED FREQUENCY	XMITTED FRQ	1.E+05	HZ
492	RECEIVED DOPPLER FREQUENCY OFFSET	R DPLR OFST	1.	HZ
494	RECEIVER BANDWIDTH	RCVR BANDWD	1.	KHZ
496	RECEIVER DELAY TIME	RCVR DLAY T	1.E-06	SEC
830	LOG10 (NUTRL ATM MASS DENSITY IN KG/M3)	LG10(M DEN)	1.E-03	
910	NEUTRAL ATMOSPHER LOG10(PRESSURE IN PA)	LG10(PRES)	1.E-03	
920	PRESSURE SCALE HEIGHT	PRES SCL HT	1.E+01	M
1010	SKEW ANGLE DEFININ GEOG UNIT VECTRS:1-3	ROT ANGL-GG	1.E-02	DEG
1410	NEUTRAL WIND IN DIRECTION 1	VN1	1.	M/S
1420	NEUTRAL WIND IN DIRECTION 2	VN2	1.	M/S
1430	NEUTRAL WIND IN DIRECTION 3	VN3	1.	M/S

Codes for error values are the negative of the corresponding parameter code, e.g. -1410 is the code for the error in the measured neutral wind in direction 1.

Missing data values are entered as -32767.

The angle given under code 1010 gives the rotation of direction 1 from eastward and of direction 2 from northward. Direction 3 is upward.

9.2.3 SUMMARY

A. D. Richmond

HAO/NCAR
P.O. Box 3000
Boulder, CO 80307

The first three papers presented information on some data management procedures used at different radars. An issue was brought up in the last two talks concerning data exchange. The MSTRAC chairman, Dr. P. K. Rastogi, noted that several impediments exist to data exchange, notably the lack of time and resources needed to prepare and transfer data. Although Richmond noted that NCAR could handle archiving and sending data copies to interested users, it was not clear that this alone would be sufficient to provide for an active data exchange.