附錄A：台灣地區中尺度實驗計畫初步成果研討會簡報資料稿

TAMEX Data Current Status

R.O.C. TAMEX Data Management

June 30, 1989

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1. Overview

Depending on the TAMEX Data Management policy --- "making Tamex Data available to all participating scientists in usefull forms as soon as practical". The R.O.C. TAMEX Data Center has been established to carry out the policy. The task of TAMEX Data Mamagement was to process all the data observed during TAMEX, and was based on the principles and procedures which are outlined in the "TAMEX Operations Plan" The final goal of this project is to produce and store accurate data on media of tapes, atlas, microfilms, etc. which can be used by meteorologists and experts in their researches.

TAMEX data contain surface data, sounding data, boundary layer wind data, ship data, satellite data, conventional radar data, VHF radar wind data, doppler radar data and aircraft data. Except the doppler radar data , aircraft data, minisound data and dropwindsound data being processed by U.S. TAMEX Data Management, the other conventional data have been processed by R.O.C. TAMEX Data Center.

As mentioned in "TAMEX Preliminary Operation Plan" the management process of the conventional TAMEX data can be divided into five stages:

(1) data collection period -- to collect all real time data and non-real time data,

(2) data sorting period -- to process the real time data in order to provide the Quick Look data set,

(3) data editing, merging, and archiving period -- to edit all collected data, to merge real time and non-real data, to archive data set with reformatting and checking in WMO format, FGGE format and CWB format,

(4) data validation period -- to check the errors by manually comparation and quality control program (run repeatly),

(5) Further data validation and service period -- to collect error massages from users, to adjust and fix the parameters of quality control program, to convert the high resolution upper air CWB format data into FGGE format, to update archived data set, to distribute revised data to U.S. TDC, and users in R.O.C..

All the tasks in the first, second and third periods have been successfully completed. As to the jobs in the fourth and fifth period of the plan is supposed to finished in Sep. 1989.

The data validation in the fourth period mentioned above are carried out by different examinations which include hydrostatic check, lapse rate check, wind check, and range check, etc.. Many errors have been checked and corrected. Nevertheless, there must be some errors which remain uncorrected in the data since quantity of the data is very large (It is allmost 200 millions of records). In order to provide Level II B data with fine quality, R.O.C. TAMEX data management has collect all unsatisfactory reports from researchers and execute further data validation by re-check and re-comparision in detail

All the further validated data had been archived on magnetic tapes in WMO format, FGGE format, and CWB format.

2. Current Status of TAMEX Data Set

Follow the classification of TAMEX data management products. There are 7 kinds of data will describe as following

2.1 Data Summary

To describe the observation kinds, data scope, data time log, problems, data quality control procedures and data storage media in following data set.

* Mesonet IOP surface meteorological and rainfall data (land & shipboard)

* Mesonet IOP / SOP high resolution upper air data (sounding & pibal)

* IOP data in FGGE format within TAMEX data area (20-29 N, 114-130 E)

* Mini sonde data

* P-3 aircraft data (dropwinsonds data & meteorological data)

* Doppler radar data

* Conventional radar imagery data

* VHF radar upper air wind data

* Boundary layer (tower) wind data

* WMO code data (May 1 - June 30)

* Hourly or 3 hourly surface data of CWB stations (25 Met. stations 6 rainfall stations)

* Daily statistical values of surface data from stations in the Taiwan area

* Satellite imagery data

* Weather maps & charts

* Reference documents

2.2 TAMEX Weather Maps (PART I & PART II)

This book contains the surface weather maps and upper air charts 732 pages at 00Z, 12Z daily during TAMEX period, May 1 to June 30, 1987 (surface, 850mb, 700mb, 500mb, 300mb and 200mb)

2.3 TAMEX Meteorological Satellite Images

Published 448 GMS satellite high resolution images in 1 book (from May 1 to June 30, incloude visible infrared, and enhanced infrared). The dimension of the imageries is 0-70N; 70-140E, one quarter of the full disk.

2.4 Convential Radar Imagery Color Picture (printed from imagery color films, 11,831 pictures, mounted in 50 volumes)

2.5 Tapes (TAPE A, TAPE B, TAPE C)

See "The Documents of TAMEX Data on Archived Tapes (Draft)" or "contents of data on archived tape"

2.6 Microfilm / Micro fich

To keep all original manuscript reports, CWB operational

weather maps & charts of TAMEX period into 11 rolls of microfilm

To keep the Taiwan area surface charts (31 sheets) JMA prognostic charts (18 sheets) ECMW prognostic charts (4 sheets) Taiwan area upper air charts(11 sheets) into micro fich

2.7 Videotapes (22 tapes)

To stor the quick look data of radar imagery and satellite low resolution imagery

3. Collecting Errors and Solving Problems in Stage five

In the fifth stage we are doing the double check of surface data and high resolution upper air data. the checking procedure listed as following

(1) Re-check date / time (for missing data)

Using the original manuscript reports and the observation data time log of each station to check the sequence by manually for make sure the date & time in tape data records are corrected.

(2) Comparison (using different resources of data and recompute the geopotential height by hydrostatic equation)

(3) Re-run quality control program

Run the Quality control range check program, put the flag (see table 1) into the Q.C. position.

(4) Collecting problems, solving problems, correcting data

Send the questionnaire to Chinese participant collecting error massages of TAMEX data from users.

****** questionnaire ******

To check the original data, resonable solving problems

****** error list ******

3.1 Mesonet IOP surface meteorological and rainfall data (land & shipboard)

This data set contains all surface data which were collected

from 75 land weather stations, 3 ship weather stations, and 125 rainfall stations. These stations made observ half-hourly during IOPs.

* Data quality control procedures

All kinds of surface data during IOPs were merged into one tape file using CWB format #9062. This data tape was used as the input data file for the data quality control programs, and they were printed out. Error data were corrected if possible, otherwise, error codes were flaged. The general editing rules and quality control criteria of surface data are shown in Table 2

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table 2

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* problems

All errors are made by persons.

3.2 Mesonet IOP / SOP high resolution upper air data (sounding & pibal)

The upper air observation network consisted rawinsonde stations and 10 pibal stations 9 of 12 rawinsonde sites were land stations, and rest of 3 were on ships.

Sounding data consist of standard layer data, significant level data, tropopause data and terminal layer data.

* Data quality control procedures

All upper-air data during IOP / SOP times were merged into one tape file. This data tape was used as the input data file for the data quality control programs, error data were corrected if possible, otherwise, error codes were flaged. The general editing rules and quality control criteria of upper air data are shown in Table 3

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table 3

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compared with recomputed geopotential height

station name	station Index	over range Rec..%	over range No.	total records 10**2
Pan-chiao	46685	0.02	9	527
Peng-chia-yu	46695	9.00	283	301
Hua-lien	46699	0.21	106	505

Ma-kung	46734	2.13	848	397
Tung-kang	46747	0.33	156	467
Shui-nan	46751	11.76	2760	235
Lu-tao	46780	10.80	3345	309
Tung-sha-tao	46810	3.44	1100	320
Kung-kuan	A0A01	19.49	191	9
Ocean researcher	RCHY	0.74	291	395
Navy ship	RCJH	0.33	85	259
Fishing-trainer	RCYS	6.27	1341	214

(the virtual temperature always very close dry ball temperature)

CHLL=287.04/(2.*9.8) HH=CHLL*(TK1+273.16+TK+273.16)*ALOG(PK/PK1)

height = < 3000 gpm, range = 40 gpm
> 3000 gpm, range =120 gpm

compared with quality control (range check)

(all QC code & old temperature range) S = suspect, E = erroneous

station name	index	P or H S	P or H E	Temperature S	Temperature E	dew point S	dew point E	wind S	wind E
Pan-chiao	46692	.02%	.01	1.05	.05	1.04	.09	.05	.00
(records)		(13	3	556	27	547	45	24	0)
Peng-chia-yu	46695	.22	.00	1.75	.14	1.17	.12	.03	.00
		(67	1	517	41	502	36	10	1)
Ma-kung	46734	.16	.01	1.08	.02	1.35	.08	.00	.00
		(64	2	428	6	537	31	3	1)
Shui-nan	46751	1.07	.15	1.02	.08	1.05	.12	.01	.00
		(501	68	476	37	492	56	4	1)

(computer QC code & new temperature range) S=suspect, E=erroneous
(400-500mb max1=-4)

station name	index	P or H S	P or H E	Temperature S	Temperature E	dew point S	dew point E	wind S (60deg-90deg)	wind E (60deg-90deg)
Pan-chiao	46692								
(records)		(5	1	187	27	0	0	48	19)
Peng-chia-yu	46695								
		(36	1	170	40	3	0	26	80)
Ma-kung	46734								
		(6	2	121	6	120	24	23	43)
Shui-nan	46751								
		(21	9	188	35	37	16	93	136)

* problems

The wrong data almost made by manualy operation and data entry operation

3.3 IOP data in FGGE format within TAMEX data area (20-29 N, 114-130 E)

This data set contains all the data in TAMEx data area, except the high resolution upper air data during IOPs.

All data are subject to the validation of icing check, lapse rate check, hydrostatic check, wind check, date check, and range check.

* The result of comparison (between WMO/FGGE and CWB format)

(H > 40 gpm, T / Td > 0.5C, wind dir. > 10deg, sp. > 1.0m/s)

station name	index	numbers of record in May	June	P	T	Td	WD	WS	total	
Pan-chiao	46685	17	19	2	0	20	6	11	7089	0%
peng-chia-yu	46695	46	69	62	19	30	5	11	1859	6%
Hua-lien	46699	28	36	6	5	29	13	27	7624	1%
Ma-kung	46734	58	82	22	41	104	27	35	2715	5%
Tung-kang	46747	4	7	0	3	6	4	2	3074	0%
Shui-nan	46751	201	399	141	64	220	30	453	2026	29%
Lu-tao	46780	30	63	13	7	61	6	17	2083	4%
Tung-sha-tao	46810	201	116	13	72	289	2	11	1751	20%

average rate = 1376 / 28221 = 4 %

* proglems

coding error, write down the wrong date & time on report header

4. Data Services

All level II B data tapes and all original surface, upper air manuscript repports, conventional radar films, satellite cloud imageries, documents, maps, charts and their microfilms or microfiches are stored at R.O.C TTDC. After the project of "TAMEX Data Management" is finished, all of these data will be stored in the Data Processing Section of CWB. The data services will be followed the service system of CWB.

5. Conclusions

From this experiment, we found to prepare the accurate

equpment, the training program of operaters, & observers and the standardized definition of each item name with rigorous enforcement of each procedure are very important to keep the data in good quality.

New we are continuing to do the detail data check, the revised data will distribute to U.S. TDC and users in R.O.C. at Sep. 1989. Before that time any suggestion and information about TAMEX data error checking are welcome to us.