

CRH SSD
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CENTRAL REGION TECHNICAL ATTACHMENT 92-10

AN APPLICATION OF WXR.SV

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1. Introduction

There are many types of information that need to be compiled into alphanumeric or graphical products. Hand-completed alphanumeric products are very time consuming and there are very few ways of creating graphics. Our solution to this problem was to utilize the AFOS application program named WXR.SV written by Harold Opitz of the Ohio River Forecast Center in Cincinnati. This attachment will show what we have done over the last few years in hopes that it may help others.

2. What is WXR.SV?

WXR is described by Opitz (1985) as "a hydrologic weather wire and PLT product software package which manipulates decoded SHEF hydrologic data according to runtime command line options."

This package includes a utility program for creating a dictionary/database of observation station information. This database file is called NET.DT. Another program is a S/230 version of the standard SHEF decoder which places the decoded data into a single RDOS file.

After the decoding is complete, WXR uses a master format file to output a weather wire alphanumeric product. An intermediate plot file (PLT) can also be created. The PMOD package (AOD 1983) is used to transform the PLT file into a graphic product displayable on an AFOS GDM.

3. Where to Begin.

The place to start is the dictionary/database file (NET.DT). One must compile a list of every reporting station and reference point that may be used. These data should be available from your Service Hydrologist or Cooperative Program Manager. At Topeka we have three different NET files, one for precipitation reporting stations, another for river stations, and finally one for county and forecast zones. Information needed for each point includes the station call letters, alphanumeric station name, station latitude/longitude and a zoom level for plotting purposes.

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The difference between the precipitation and river lists is that flood stage information is included in the river list. Flood stage data are placed in the last columns allowed for the alphanumeric station name. It is not a separate field in the database and looks quite out of place when used in a precipitation report. Figures 1, 2, and 3 show examples of these NET files.

NET files are easily created either by using a PC and then sending the file to AFOS or by using the AFOS ADM. The NET utility then uses the AFOS file to make the NET.DT file. There is a limit of 500 stations per list. A local switch (/L) in the WXR command line determines which Net file is to be used.

4. Data

Any data in SHEF code stored in AFOS can be used to generate a desired product. WXR has the ability to retrieve the SHEF data. The retrieval portion of WXR collects a specified number of versions and then determines what data will be used. This is a rather complex task and leads to the possible inclusion of unwanted data if one is not careful.

To get around this problem, use another AFOS application program named VERCOMP.SV, written by John Hughes of Central Region Headquarters. According to Hughes (1989), this program "retrieves one or more versions of user-specified AFOS alphanumeric products and stores them under a single AFOS key. The program will retrieve a user-specified number of versions of each product or as many versions as have been stored in the past user-specified number of hours." VERCOMP.SV has been very useful, especially when data are needed over a period of hours and the number of reports varies from day to day. VERCOMP.SV makes the collection and decoding process much faster and easier.

5. Determining the Output

Once data have been determined, an output format file is created. This file contains (1) where the output is to be stored, (2) the addressee of the product, (3) the data, (4) stations to be used, and (5) the final format of the product. An example of a format file is shown in Figure 4. These files are named WXR.# where # = A to Z or 0 to 9.

6. Now the Sky is the Limit

With the basics in place, one can start creating products. Some of the products in use at WSFO Topeka include:

A. Six-hourly compilation of precipitation and river reports.

This uses data from the Kansas WSOs, ROSA reports, and GOES platform reports. Two alphanumeric products are output, one for precipitation and the other for river stages. Two graphics display these same data.

B. Daily precipitation report.

This contains ROSA reports and reports called to the NWS offices. An alphanumeric product is sent on the NOAA Weather Wire Service and a graphic is created. The graphic is posted. Reports are no longer individually plotted by hand. This graphic can also be overlaid with other graphics such as flash flood guidance.

C. Daily river stage report.

Here WXR compiles phoned-in reports, ROSA reports, and GOES platform data. Data are arranged by individual rivers or creeks. WXR also computes a 24-hour change in the stage.

D. Flash flood guidance graphics.

With two RFCs serving the state of Kansas and 105 counties in the state, manual plotting would be very time consuming. WXR does it very quickly and easily. The RFCs provide guidance in SHEF format by county and forecast zone. Once the data are received, graphics can be generated. Application programs such as Watchdog or AEX allow the product to be updated as soon as new data are available.

E. Kansas Temperature and Precipitation Table.

In the past, this has always been a time consuming task. With many stations now reporting through the ROSA system, WXR makes the job much easier. Data received via surface observations are manually coded in SHEF and stored in AFOS. This also helps the RFCs to access the information. Once data are available, both the STP table and an STP graphic are generated. This has reduced the time to generate these products by 20 to 30 minutes.

F. Snow data.

Graphic and alphanumeric reports are generated using snowfall and snow depth information that is stored in AFOS in many different locations. This has proven to be a very useful product, especially in post-storm write-ups.

7. Summary

The use of the WXR program has been very beneficial at WSFO Topeka. We are now able to produce useful and high quality products for ourselves and external users. These products are created in a timely, efficient manner without manual intervention.

8. References

- Opitz, Harold, 1985: **WXR.SV Version 3.00**, Eastern Region Computer Programs and Problems, NWS ERCP-No. 24 (Revised)
- Hughes, J. R., 1989: **VERCOMP.SV Version 2.00**, Central Region Program Note No. 43 (Unpublished).
- AFOS Operations Division (AOD), 1983: **PMOD Plotting System for AFOS**, NWS AOD CP83-1, Section 3.3 pgs 3-10 to 3-15.

ID	STATION NAME	LAT LONG Z	ID	COUNTY/ZONE NAME	LATLONG Z
ACAK1	ATTICA 6 WNW	3716 98191	KSC153	RAWLINS COUNTY	3943100450
AGAK1	AUGUSTA	3740 96590	KSC155	RENO COUNTY	3752 97460
AGNK1	AGENDA	3943 97263	KSC157	REPUBLIC COUNTY	3943 97230
AGTK1	AUGUSTA	3740 96573	KSC159	RICE COUNTY	3815 97500
AKCK1	ARKANSAS CITY	3704 97023	KSC161	RILEY COUNTY	3913 96300
ALBK1	ALBERT	3827 99011	KSC165	RUSH COUNTY	3822 99030
ALTK1	ALTAMONT	3711 95172	KSC167	RUSSELL COUNTY	3850 98300
ALVK1	ALTA VISTA	3852 96291	KSC169	SALINE COUNTY	3839 97230
ALXK1	ALEXANDER	3828 99332	KSC171	SCOTT COUNTY	3822100350
ANYK1	ANTHONY	3709 98050	KSC173	SEDGWICK COUNTY	3733 97120
ARCK1	ARKANSAS CITY	3703 97040	KSC175	SEWARD COUNTY	3707100340
ARGK1	ARGONIA	3716 97461	KSC177	SHAWNEE COUNTY	3855 95280
ARLK1	ARLINGTON	3754 98111	KSC179	SHERIDAN COUNTY	3918100100
ARNK1	ARNOLD 12 N	3849100010	KSC181	SHERMAN COUNTY	3918101250
ASHK1	ASHLAND	3712 99460	KSC183	SMITH COUNTY	3943 98300
ATDK1	ATWOOD 2 SW	3947101040	KSC185	STAFFORD COUNTY	3755 98250
ATHK1	ATCHISON	3934 95071	KSC187	STANTON COUNTY	3731101350
ATLK1	ATLANTA	3726 96461	KSC189	STEVENS COUNTY	3707101000
ATNK1	ALTON 6ESE	3926 98510	KSC191	SUMNER COUNTY	3707 97120
ATOK1	ALTOONA	3731 95400	KSC193	THOMAS COUNTY	3918100430
ATSK1	ATCHISON KDOT	3934 95070	KSC195	TREGO COUNTY	3850 99400
			KSC197	WABAUNSEE COUNTY	3850 95550
			KSC199	WALLACE COUNTY	3850101300
			KSC201	WASHINGTON COUNTY	3943 96450
			KSC203	WICHITA COUNTY	3822101000
			KSC205	WILSON COUNTY	3728 95250
			KSC207	WOODSON COUNTY	3745 95250
			KSC209	WYANDOTTE COUNTY	3902 94250
			KSZ001	KANSAS ZONE 1	3924101000
			KSZ002	KANSAS ZONE 2	3829100580
			KSZ003	KANSAS ZONE 3	3720101000
			KSZ004	KANSAS ZONE 4	3924 99500
			KSZ005	KANSAS ZONE 5	3829 99520
			KSZ006	KANSAS ZONE 6	3720 99300
			KSZ007	KANSAS ZONE 7	3924 98420
			KSZ008	KANSAS ZONE 8	3829 98460
			KSZ009	KANSAS ZONE 9	3720 98000

FIGURE 1 - NET.PC
THE PRECIPITATION STATION DIRECTORY

ID	STATION NAME	FS LATLONG Z
ACHK1	ACHILLES	83941100433
ADAK1	ADA 3 ESE	183908 97503
AGAK1	AUGUSTA	233740 96590
AGSK1	AUGUSTA 1 WNW	213741 97003
ALBK1	ALBERT	243828 99013
ALEK1	ABILENE 1 NW	73856 97143
ALNK1	ABILENE 8 S	153848 97112
AMCK1	AMERICUS 2 S	263828 96150
ARCK1	ARKANSAS CITY	173703 97040
ARKK1	ARKANSAS CITY 1SE	183704 97022
ARNK1	ARNOLD 12 N	73849100010
ATOK1	ALTOONA 2 SW	233729 95410
BARK1	BARNES 5 N	163947 96510
BIGK1	BIG HILL LAKE	3716 95291
BLRK1	BLUE RAPIDS 1 E	263941 96382
BLTK1	BELOIT	203927 98071
BOYK1	BOYD	103832 98523
BRLK1	BURLINGTON	273812 95440
BRNK1	BARNARD	213912 98023
BUNK1	BUNKER HILL 7 SW	203848 98470
BURK1	BURR OAK ND	3954 98151

FIGURE 2 - NET.RV
THE RIVER STATION DIRECTORY

FIGURE 3 - NET.ZN
THE COUNTY AND ZONE DIRECTORY

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KANSAS PRECIPITATION SUMMARY
NATIONAL WEATHER SERVICE TOPEKA KS
T2:T3 T4 D2 M2 D1 Y1

THE FOLLOWING IS A SUMMARY OF PRECIPITATIONS REPORTS FOR THE
24 HOUR PERIOD ENDING AT 7 AM THIS D3 MORNING.

STATION ID	PCPN	STATION ID	PCPN
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.FORMAT

NM 20 PPP 11

.COMMENT

...NORTHWEST KANSAS...

.STATION

ATDK1	ATWK1	BDCK1	BRWK1	CBKK1	DNSK1	DRSK1	GLD	HLCK1
HLLK1	HOXK1	LNRK1	MCDK1	MNGK1	MRLK1	NTDK1	NRCK1	NRTK1
OBRK1	RXFK1	SFCK1	STFK1	STDK1	STPK1	WAKK1		

.COMMENT

...CENTRAL KANSAS...

.STATION

ABLK1	ALXK1	BKVK1	BNSK1	BRNK1	BSNK1	BUNK1	CATK1	CHPK1
CHSK1	CLFK1	CPMK1	DURK1	ELLK1	ELMK1	ELWK1	ENTK1	FLOK1
FLRK1	GENK1	GOEK1	GTAK1	GTBK1	HASK1	HAYK1	HBRK1	HERK1
HLBK1	INMK1	KANK1	LINK1	LNCK1	LNSK1	LTTK1	NURK1	LYNK1
MABK1	MARK1	MCCK1	MCPK1	MLBK1	MPSK1	MTRK1	PEAK1	RSL
SLN	SRLK1	WLSK1	WNDK1					

.COMMENT

...SOUTH-CENTRAL KANSAS...

.STATION

ANYK1	ARGK1	ARLK1	ATLK1	BFCK1	BRDK1	CDWK1	CHNK1	CNSK1
COLK1	DERK1	DRBK1	GEEK1	HAVK1	HDSK1	HESK1	HINK1	HRPK1
HSSK1	HUTK1	HVLK1	KNGK1	KNSK1	KWAK1	LRNK1	MDKK1	P28
MEDK1	MTHK1	NORK1	OFFK1	OXFK1	PECK1	PRTK1	PTTK1	PYPK1
RAGK1	RNYK1	SANK1	STJK1	SUNK1	SWKK1	TRNK1	TRUK1	VACK1
WELK1	WLDK1	WLMK1	WCTK1	WJBK1	ICT			

.COMMENT

...NORTHEAST KANSAS...

.STATION

ATHK1	AXTK1	BEAK1	BLNK1	BLRK1	BLYK1	BNRK1	BRMK1	CENK1
CRLK1	EFFK1	EMMK1	ESTK1	FKFK1	FRAK1	FSTK1	GOFK1	HIAK1
HLTK1	HOYK1	HRTK1	LLLK1	LOUK1	LVNK1	MHTK1	MRYK1	MSCK1
MTNK1	MTTK1	ONAK1	ONGK1	OSKK1	POWK1	PRCK1	PRRK1	RDPK1
SABK1	TNGK1	TRYK1	VLYK1	WDLK1	WETK1	WMGK1		

.COMMENT

FIGURE 4 - WXR.P
A WXR FORMAT FILE

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KANSAS PRECIPITATION SUMMARY
NATIONAL WEATHER SERVICE TOPEKA KS
10:11 AM MON MAR 30 1992

THE FOLLOWING IS A SUMMARY OF PRECIPITATIONS REPORTS FOR THE
24 HOUR PERIOD ENDING AT 7 AM THIS MONDAY MORNING.

STATION ID	PCPN	STATION ID	PCPN
...NORTHWEST KANSAS...			
NO DATA RECEIVED			
...CENTRAL KANSAS...			
ABILENE 2 W	0.01	HERINGTON	0.48
DURHAM 3 N	0.35	LINCOLNVILLE	0.50
ELMO 1 SW	0.17	PEABODY	0.11
FLORENCE	0.35	RUSSELL	0.05
GALATIA 1 NW	0.02	SALINA	0.13
...SOUTH-CENTRAL KANSAS...			
CALDWELL	0.01	PECK 3 WSW	0.10
HUTCHINSON	0.00	SEDGWICK 1 W	0.20
KINGMAN	0.16	WICHITA	0.20
LARNED	0.09		
...NORTHEAST KANSAS...			
CENTRALIA	0.01	MANHATTAN KSU	0.00
EFFINGHAM 1 N	0.12	PERRY 3 NW	0.07
HIAWATHA	0.01	TONGANOXIE 4 ENE	0.21
HOLTON 1 S	T	TROY 2E	0.20
HORTON	0.01		
...EAST-CENTRAL KANSAS...			
AUBURN 1 N	0.11	LEBO	0.13
BLUE MOUND	0.67	LYNDON 3 ENE	0.28
COUNCIL GROVE	0.72	MOUND CITY	1.08
CHALK	0.33	MATFIELD GREEN 2 N	0.71
DIAMOND SPRINGS	0.46	OSAGE CITY	0.19
DUNLAP 2 N	0.25	OSAWATOMIE	1.22
ELMDALE 1 NW	0.30	PAOLA	0.63
EMPORIA 3 NW	0.23	READING 2 N	0.10
ESKRIDGE 1 SE	0.13	SAFFORDVILLE	0.17
GARNETT 1 E	0.32	TOPEKA	0.17
GRIDLEY	0.12	WAVERLY	0.15
HARRIS 3 ENE	0.19	WILSEY 1 NNE	0.90
HARVEYVILLE	0.06	WONSEVU	0.36
LAWRENCE KU	0.01		

FIGURE 5 - TOPLCOTOP
NWWS OUTPUT FROM WXR