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WXR
WHAT IS IT, AND WHAT CAN IT DO?

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Most of the hydrologic observations in the AFOS data base are now coded in the Standard Hydrometeorological Exchange Format (SHEF). SHEF was developed to provide a standard and efficient format for encoding/decoding operational hydrometeorological data. For example, the GOES platform observations (NMCRRAXX) and the SNOW-TEL data (PDXRRMXXX) are now sent in SHEF code. The influence of SHEF is beginning to spread into some meteorological products such as the state temperature and precipitation tables and also some forms of MOS guidance. One of the drawbacks of the code, as far as the forecaster is concerned, is that it is not easy to read. The software package, WXR, was developed to decode and manipulate SHEF encoded data into more useable formats.

WXR is capable of decoding any SHEF product, and then using the decoded data to create either a plain language message suitable for Weather Wire distribution, or an AFOS plotfile of that data. The running of WXR involves several steps, and each step has several options. Below is a macro now being used at WSFO SEA that demonstrates some of the options available with WXR.

RAØØ.MC

```
WXR/R/D NMCRRAWA
WXR/C/P  13/F  ØØ/O WXRØØ.TD/L/D
PMOD SEA WXP.PM/O SEANA5X.PF/T
GENUTF XPLOT T3Ø
```

This macro creates two plain language alphanumeric products and one graphic. Before getting into a more detailed explanation of the command lines, the first thing that needs to be done is to create a NET.DT file with a list of stations found in SHEF products. The creation of this file is explained in more detail in the WXR documentation [1]. Now back to the example.

LINE 1 of RRAØØ.MC

/R - The global switch R instructs WXR to retrieve the AFOS product NMCRRAWA.

/D - This global switch instructs WXR to decode the same product.

Line 2 of RRAØØ.MC

/C - the global switch C instructs WXR to load any decoded data with an observation time equal to the load hour specified by the local /O switch. In this example, WXR will be searching for ØØZ data. This switch will also allow storage of a copy of the decoded data into the RDOS disk file WXRØØ.TD (shown at the end of the line).

/P - This global switch instructs WXR to create a plotfile. The default for the plotfile is NMCPLTCIN. This file ID can be changed within the command line with a local switch or permanently in the WXR.SV file with OEDIT.SV (see Reference 1).

13/F - This local switch instructs the WXR program to put the loaded data into the plain language messages shown in Figures 1 and 2. The "13" indicates to WXR that it should use the formats in files WXR.1 and WXR.3 to create the messages. The WXR format files are created in an AFOS scratch bin, and saved to disk under the name WXR.*, where * is any ASCII character. The file WXR.1 is shown in Figure 3. The file WXR.1 was used to produce the output alphanumeric shown in Figure 1.

The WXR format files must begin with .PIL. This is followed by the AFOS header of your output key. The next thing used in this particular file is a .COMMENT. The .COMMENT is commonly used for message headers. The next part of this file is the .FORMAT. The .FORMAT determines the spacing of the parameters.

NM - NAME - 20 characters
PCIR - Total accumulated precipitation (since gauge last emptied)
- 8 characters.
PCIR/C - 24 hour change in accumulated precipitation
- 8 characters.

Following the .FORMAT is .STATION, with a list of station call letters. The list identifies all of the stations to be included in the output product SEARRMP4N. The end of each format file must have a .END.

ØØ/O - this local switch is used in combination with the global switch C. If no "/O" switch is used, WXR will only search for 12Z data. In the above example, WXR is looking for ØØZ data.

WXRØØ.TD/L/D - As mentioned before, the global switch C allows the operator to store a copy of the decoded data onto disk. The switches link WXR.TD to WXRØØ.TD. WXR.TD is a data base file that stores decoded data to be used when computing 24-hour time change values. When these links are made, the 24-hour old file is read first. The new file is then stored in its place.

The next two lines are the PMOD command lines. The graphic produced is shown in Figure 4. This graphic is a plot of gauge heights When plotting SHEF data, the WXR program looks for certain default elements. They are as follows:

PPPR - Precipitation as of 7am local time
HGIR - Gauge height - instantaneous report
SDIR - Snow depth - instantaneous report
SWIR - Snow water equivalent - instantaneous report
TAIR - Air temperature - instantaneous report

These default values can, and must be changed in order to plot different elements. For example, if NMCRRAWA had 6 hour precipitation, line 2 of the above macro would be as follows:

WXR/C/P 13/F ØØ/O WXRØØ.TD/L/D PPQR/P
PPQR - 6 hour precipitation would plot instead of PPPR.

WXR CAUTIONS

1. Time change data cannot be plotted. Time change data can only be shown in plain language messages.

2. If you plot any element that is not a default element, you must include all elements to be plotted in the run line, even if the other elements are defaults.

3. WXR can only compute 24-hour changes.

4. Be very specific with SHEF element names. Partial names will not work.

5. Forecast data, beyond the current day, cannot be included in either plots or plain language messages

NOTE: The programmer is working on a new version of WXR that will handle the problems listed above. It will be availabe this spring.

Figures 5-7 show other applications of WXR produced at WSFO SEA. The reader should consult the reference below for more detailed information.

REFERENCE:

[1] Opitz, Harold, 1985: "WXR", Eastern Region Computer Programs and Problems, No. 24 (Revised), 40 pp.

```
SEARRMP4N
TTAA00 KSEA 062207
WASHINGTON STATE PRECIPITATION DATA
SEATTLE WASHINGTON

                        TOTAL    24 HR
STATION                 PRECIP   PRECIP

DENNIE AUL              98.00
JEFFERSON CREEK         78.51
COUGAR MT               16.72
NF SKOKOMISH NR HDPT    85.92
NF SNOQUALMIE NR SQF     2.62
MF SNOQUALMIE NR TAN     0.25
SF SNOQUAL NR GRCIA      0.50
NISQUALLY NR NATL        0.31
QUINALT NR SATSOP       96.72
HUMPTULIPS                M
COWLITZ AT PACKWOOD      2.93
CISPUS NR RANDLE          M
WOODWARD RIDGE            M
TILTON NR CINEBAR        4.70
COLD WATER LAKE         10.06
SOUTH CASTLE LAKE       13.46
GREEN NR KID VAL         6.95
SF TOUTLE NR SPT BCK     8.23
TOUTLE AT TOWER ROAD     8.64
COWLITZ AT CSTL ROCK     9.29
RED MOUNTAIN              M
CLEARWATER CK           50.65
MUDDY RIVER             12.12
TACOMA CREEK            12.11
LANE CREEK              18.13
DEER MTN                12.06
OWL MOUNTAIN            11.94
IRON MOUNTAIN            7.56
LOST LAKE                9.87
WASHINGTON PASS         21.70
FIRST BUTTE              5.46
SIMILKAMEEN NE NIGHT      M
MAZAMA                   7.50
SNOQUALMIE NR SNOULM     3.00
UPPER BAKER DAM          2.50
TOMS CREEK              93.02
CEDAR FLATS               M
CASTLE CK NR TOPPENI    27.28
```

FIGURE 1. Output File SEARRMP4N, Based on Format shown in Figure 3.

```
SEARRMWAG
TTAA00 KSEA 061327
WASHINGTON STATE GAGE READINGS
SEATTLE WASHINGTON

STATION                 GAGE HEIGHTS

SKAGIT AT NEWHALEM          82.69
SKAGIT AT MARBLEMONT         3.80
NF SKOKOMISH NR HDPT         3.29
NF SNOQUALMIE NR SQF         3.36
MF SNOQUALMIE NR TAN         3.05
SF SNOQUAL NR GRCIA          1.03
SF TOLT NR CARNATION         2.28
TOLT NR CARNATION            5.38
CHESTER MORSE LAKE          45.97
CEDAR NR LANDSBURG           1.62
NISQUALLY NR NATL            4.86
MINERAL CK NR MINERL         4.90
NISQUALLY BLO LAGRND         4.33
NISQUALLY AT MCKENNA         3.05
CENTRALIA POWER CNL          6.70
CHEHALIS NR GRND MND         6.76
COWLITZ AT PACKWOOD          4.31
CISPUS NR RANDLE              M
COWLITZ NR RANDLE            9.25
COWLITZ BLO MAYFIELD        11.54
TILTON NR CINEBAR            4.35
COLD WATER LAKE             31.34
COLDWATER LK EXIT           28.30
SOUTH CASTLE LAKE           81.35
GREEN NR KID VAL             5.62
SF TOUTLE NR SPT BCK        13.82
SF TOUTLE NR TOUTLE         12.83
TOUTLE AT TOWER ROAD        14.49
COWLITZ AT CSTL ROCK        14.49
CLEARWATER CK               14.43
MUDDY RIVER                 19.22
PINE CREEK                    M
KETTLE NEAR LAURIER          3.44
COLVILLE/KETTLEFALLS         5.93
PLOUSE AT COLFAX             5.96
PALUSE AT HOOPER             9.86
SOUTH CASTLE LAKE             M
SAUK ABV WHITE CHUCK         3.47
SATSOP AT SATSOP            25.02
SPIRIT LAKE WEST            39.91
GREEN R AT TUKWILA           6.85
```

FIGURE 2. Output File, SEARRMWAG, Based on Format WXR.3 (not shown).

```
TTAA00 KWRH 071826

.PIL
SEARRMP4N 000 TTAA00 KSEA

.COMMENT
WASHINGTON STATE PRECIPITATION DATA
SEATTLE WASHINGTON

                        TOTAL    24 HR
STATION                 PRECIP   PRECIP

.FORMAT
NM 20 PCIR 8 PCIR/C 8

.STATION
DAFW1 JEFW1 CGFW1 GORW1 SRMW1 SKOW1 GLBW1 SNQW1 TANW1 GARW1 STOW1 TOLW1
MORW1 LNDW1 NISW1 MCMW1 LGRW1 MKNW1 CPCW1 CGMW1 SAFW1 HUFW1 PACW1 CISW1
WRFW1 CORW1 MAYW1 TILW1 SPHW1 CLDW1 CLXW1 SCKW1 GREW1 SBSW1 TOSW1 TOTW1
CASW1 REFW1 CLRW1 MUDW1 PNKW1 BDYW1 TCFW1 LCFW1 DMFW1 OMFW1 LAUW1 KTFW1
IMFW1 LLFW1 WPFW1 FBFW1 COLW1 HOPW1 NITW1 MZAW1 SQUW1 UBKW1 SCLW1 WCHW1
TOFW1 CEFW1 SATW1 SPWW1 TUKW1 CLSW1

.END
```

FIGURE 3. WXR.1

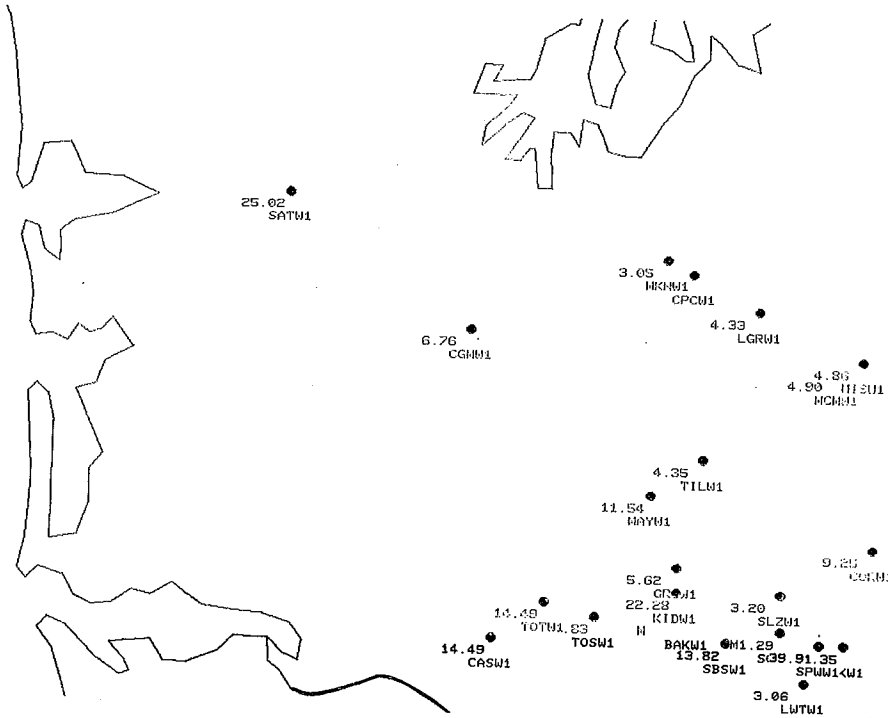

FIGURE 4. River Gauge Heights
Produced from Macro, RRAØØ.MC.

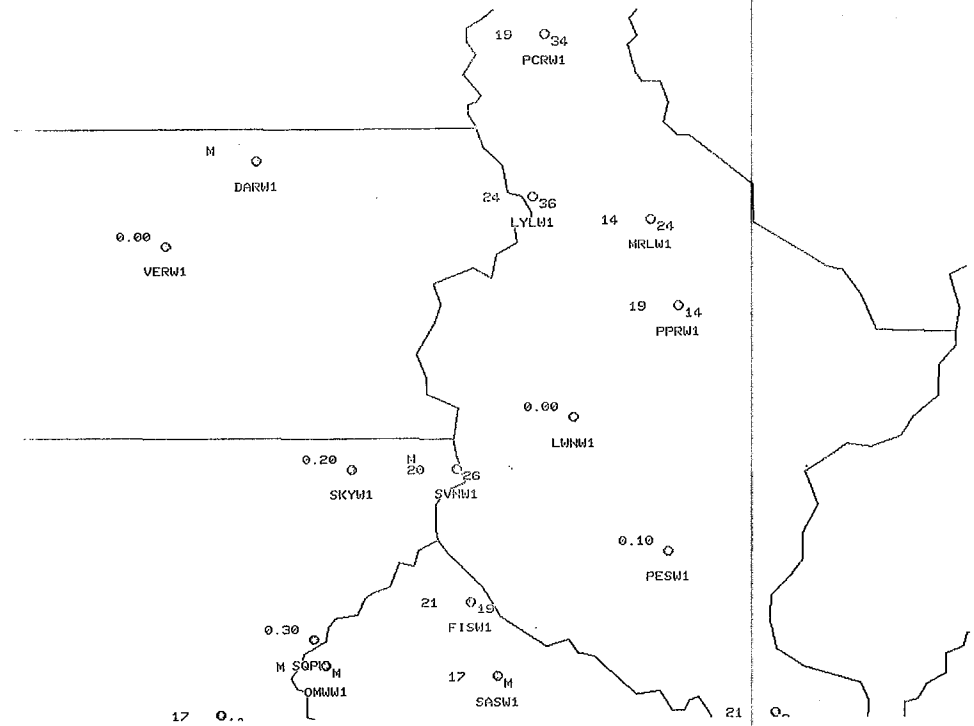

FIGURE 5. SNOTEL-DATA. Snow Water Equivalent and Temperature.

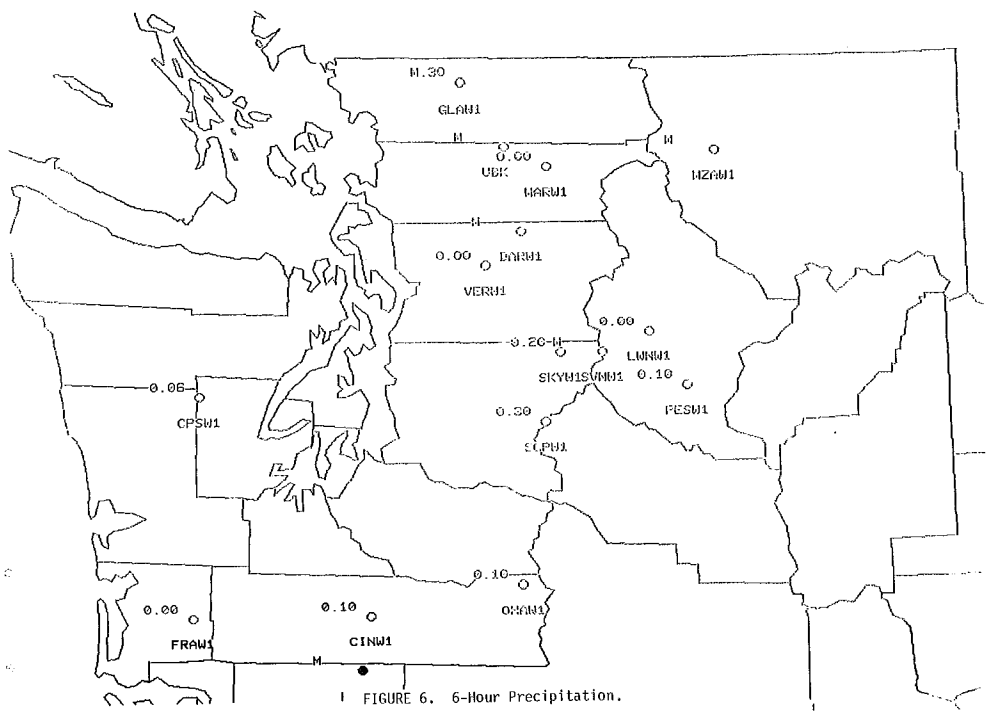

FIGURE 6. 6-Hour Precipitation.

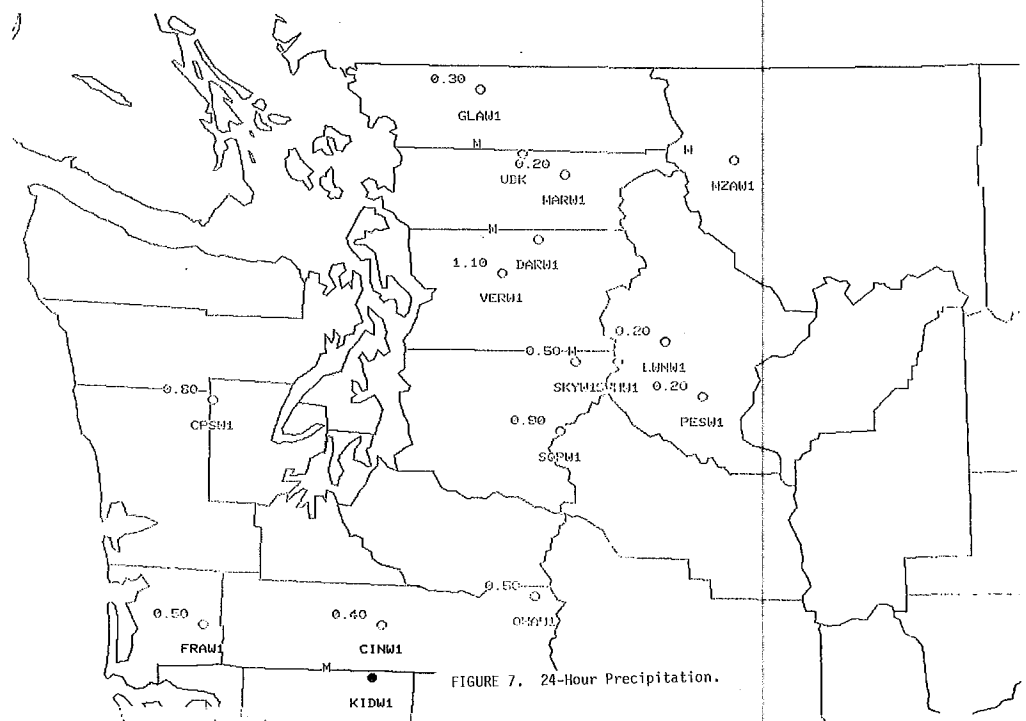

FIGURE 7. 24-Hour Precipitation.