



Western Region Technical Attachment
No. 91-18
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A LIGHTNING QUICK REVIEW

The NWS Western Region began generating AFOS products based on data from the Bureau of Land Management (BLM) Automatic Lightning Detection System (ALDS) in 1982. A mini-computer at WSFO Boise is connected directly to the BLM ALDS position analyzer computer at the Boise Interagency Fire Center (BIFC). The WSFO mini-computer, affectionately referred to as *the AOS computer*, since it runs on Data General's Advanced Operating System, produces a wide array of AFOS graphic and alphanumeric products. In addition, specialized products are available via dial-in.

An *ALDS User's Guide* should be available in each Western Region station library. This guide describes, in great detail, each of the products produced by the Western Region program. With the convective season upon us, we urge everyone to review this document. Offices should also review their **lightning alert box** program, and make modifications if requirements have changed since last year.

All AFOS lightning graphics except the Western Region 30-minute positive strike summary chart (**WLR**) are contoured. The national graphic (**LDS**) is contoured after strike totals are assigned to a 0.5 by 0.5 degree grid. Due to communications problems, the data from the BLM ALDS network over the western United States are **not** available on the national graphics. Western Region graphics utilize the BLM data on a 0.2 by 0.2 degree grid.

Lightning strike data is, of course, not a continuous function. Hence, contouring the data is **not** the most desirable means of display. Contouring must be used, however, due to communications loading problems on the AFOS Regional Distribution Circuits. Strike counts on 30-minute summaries can exceed *several thousand* on an active summer afternoon. If each strike were plotted, the resultant graphic would have a very large byte count.

To assist in using AFOS lightning graphics, each product carries a legend in the upper right corner. Figure 1 is an example of product WLN, the 2-hour accumulation summary chart. This chart is for the period 2215Z 24 April through 0015Z 25 April. Note the contoured lightning activity near Portland, Oregon. The 24-hour accumulation chart valid from 0015Z 24 April through 0015Z 25 April (Fig. 2) does not contain any contours over northwest Oregon!

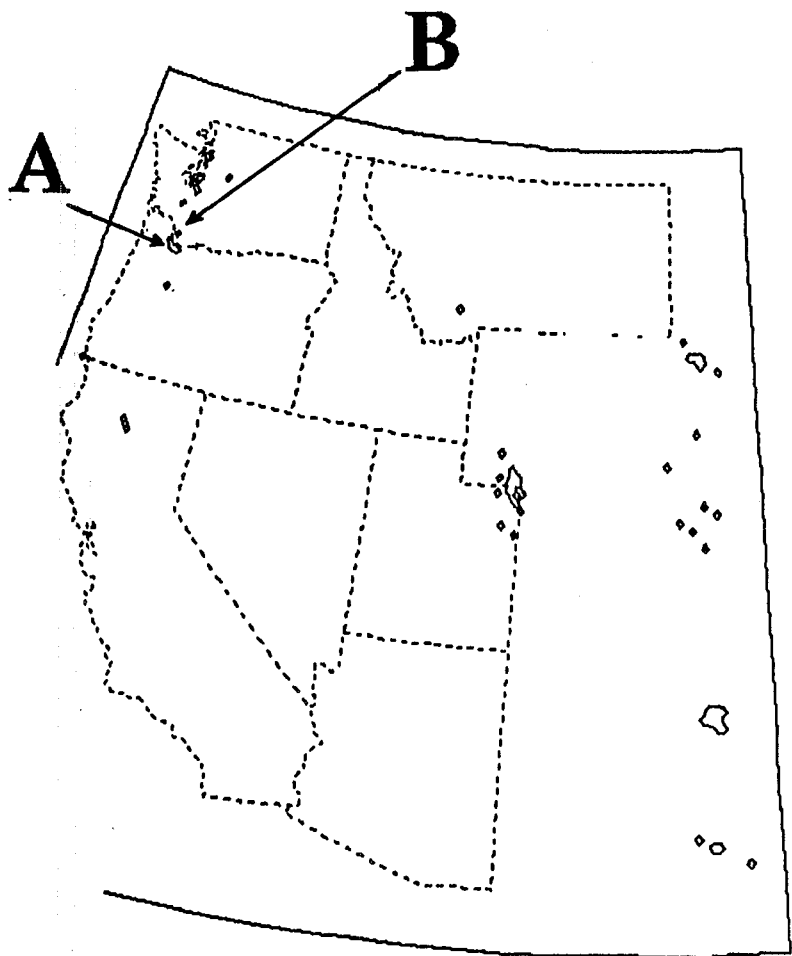
The legend in Fig. 1 indicates that the minimum contour used is **one strike**, while the legend for the 24-hour accumulation chart (Fig. 2) shows that the minimum contour used is **two strikes**. Thus, on the 24-hour chart, at least two strikes must be recorded at a grid point before a contour will be displayed. On the AFOS graphics, a contour takes on a diamond shape whenever a gridpoint reaches or exceeds the specified minimum for a contour and no nearby gridpoints reach the threshold. An example of this can be seen at "B" in Fig. 1. At "A", however, the contour does not appear to have the tell-tale diamond shape. This suggests that the minimum contour threshold was exceeded by more than one grid point near Portland. However, the *table of maximums* for the 2-hour accumulation

(just below the legend in Fig. 1) does not list any grid point(s) near Portland (45.51 N /122.51 W) as receiving two or more strikes. Thus, the 2-hour and 24-hour charts are not inconsistent.

A further check can be made by dialing into the Boise AOS computer and executing the **PROXIMITY** program. Instructions on how to run **PROXIMITY**, **STRIKE COUNT HISTORY**, **GRIDDED DATA**, and other custom programs are contained in the *ALDS User's Guide*.

Figure 3 is the output from the **PROXIMITY** program. Portland was chosen as the center-point, and it was requested that all strikes within 30 miles of Portland, and 60 minutes either side of 2315Z 24 April be reported. In Fig. 4, each of the strikes listed by the **PROXIMITY** program is plotted as an "X". Note that each of the four strikes was assigned to a *different* grid point. This confirms that no inconsistency existed between the 2-hour and 24-hour accumulation charts.

In summary, check the legends on Western Region ALDS graphics. Occasionally, during extremely active lightning periods, we must change the contour interval to prevent the charts from becoming "too busy". Consult your station *ALDS User's Guide* for details on the available AFOS products, dial-in products, and alert box program.

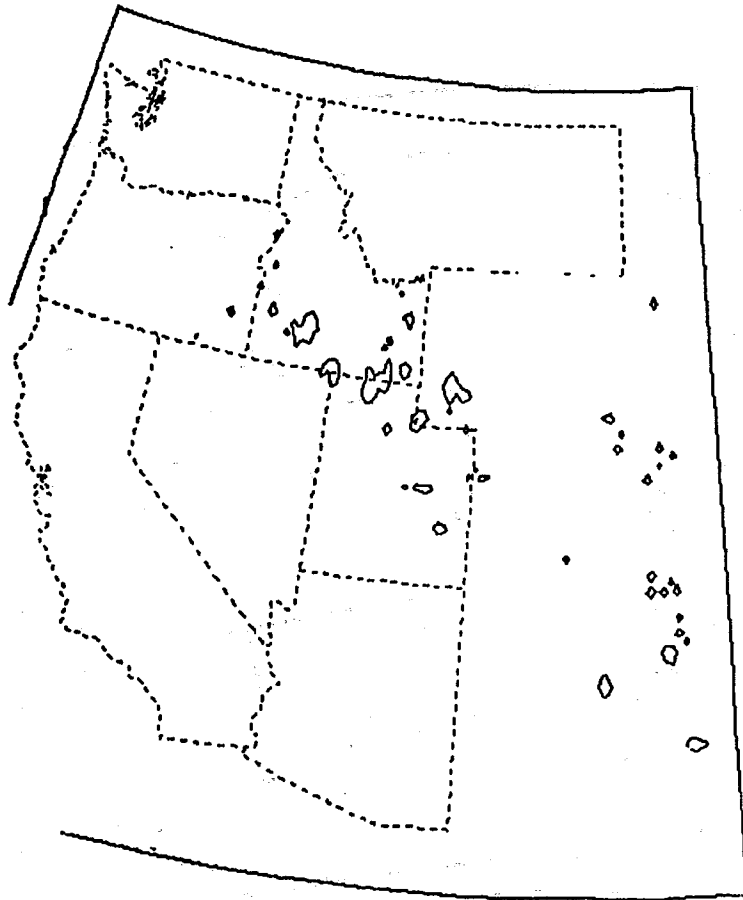


ENDING: APR 25 0015Z
 PERIOD: 2.0 HR.
 STRIKES: 65
 GRD SPC: 0.20
 MAXPLT: 20
 MIN CNTR: 1
 CNTR INT: 40
 STRIKE TYPE: NEG POS

MAXIMUMS		
CNT	LAT	LONG
4	35.60	103.00
3	44.20	103.00
2	35.40	103.00
2	48.00	122.40
2	35.60	102.80



Fig 1. 2-hour lightning strike accumulations for the period
 2215Z 24 APR 91 through 0015z 25 APR 91



ENDING: APR 25 0015Z
 PERIOD: 24.0 HR.
 STRIKES: 601.
 GRD SPC: 0.20
 MAXPLT: 20
 MIN CNTR: 2
 CNTR INT: 30
 STRIKE TYPE: NEG POS

CNT	MAXIMUMS	
	LAT	LONG
19	42.00	110.00
17	41.60	112.80
9	41.00	111.00
9	42.80	115.40
9	43.20	115.00



Fig 2. 24-hour lightning strike accumulations for the period 0015Z 24 APR 91 through 0015Z 25 APR 91

*** ALDS PROXIMITY PROGRAM ***

• ENTER THE STRIKE LOCATION:

LATITUDE OF POINT ? 45.51
 LONGITUDE OF POINT ? 122.51

• ENTER STRIKE TIME:

MONTH [1-12] ? 4
 DAY [1-31] ? 24
 YEAR [80-99]? 91
 HOUR [0-23] ? 23
 MINUTE [0-59] ? 15

• ENTER THE WINDOW PARAMETERS

LAT/LON WINDOW (MILES) ? 30
 TIME WINDOW (MINUTES) ? 60

DATE	TIME	LAT	LON	DTIME	DIST	RS	SIGSTR	RESPD
APR 24 91	23:57:48	45.43	122.36	42.8	9.	2	-119.8	29 18
APR 24 91	23:57:49	45.88	122.61	42.8	25.	5	-72.4	26 31
APR 24 91	23:57:49	45.46	122.57	42.8	4.	2	-39.6	29 18
APR 24 91	23:57:50	45.70	122.72	42.8	16.	1	-28.4	31 20

Fig 3. Output from the Western Region Proximity Program

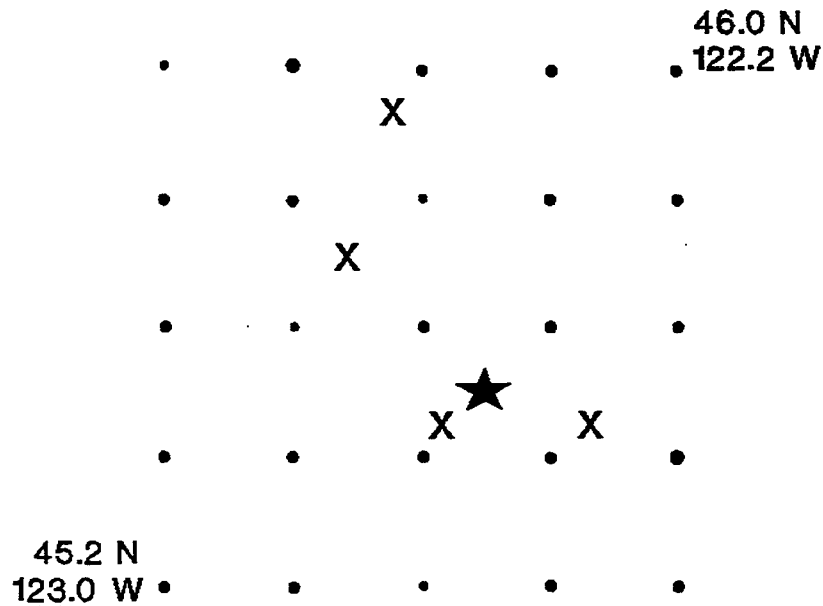


Fig 4. Individual lightning strikes on 0.2 x 0.2 degree grid around Portland (denoted by star)

