ALERT Weather Stations Assist Forecasts

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Henz Meteorological Services (HMS) was the designated private meteorological service (PMS) for the District's 1991 Flash Flood Prediction Program (F2P2). HMS has pioneered the development of quantitative precipitation forecasts (QPF) for short periods of 6 to 12 hours since 1979 within the F2P2. The initial QPF's were issued for 6-hour time periods in 1979 and have evolved into basin-specific QPF's with time distributions of precipitation for 5 to 90 minute periods.

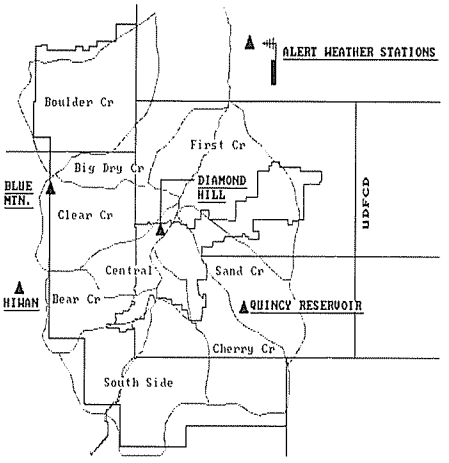
During 1991 operations, HMS integrated output from four new ALERT surface weather stations into its daily convective QPF. A major QPF task is to identify differences in the precipitation production of thunderstorms located in the western foothills and over the eastern plains of the District. HMS utilized the ALERT weather stations located at Quincy Reservoir and Diamond Hill to represent plains weather conditions while stations near Blue Mountain and at Hiwan Country Club represented the foothills environment. The location of the four stations is shown in the following figure.

The daily QPF is prepared using the HMS Convective Storm Model, a two-dimensional cloud model which inputs surface weather conditions and upper air profiles of temperature, moisture and wind. The ALERT weather stations provided direct input of surface temperature, dew point, wind direction and speed. Examples of foothills and plains QPF's are shown in the tables below for August 18 and August 27, 1991.

On August 18, the District plains were hazarded by isolated heavy thunderstorms in northeastern Douglas County and southeastern Jefferson County before 6:00 p.m. The 6:00 p.m. QPF showed temperatures at the Quincy and Diamond Hill weather stations below the 82 degrees needed to produce heavy rainfall. On the other hand, foothills temperatures were still in the 65-70 degree range needed to stoke another foothills storm capable of producing heavy rainfall. A thundershower over the southeastern Jefferson County plains briefly dropped 0.50-0.70 inches in 45 minutes and ended before 7:00 p.m. as expected. Meanwhile, a heavy thunderstorm formed in the foothills near Idaho Springs between 7:00 and 9:00 p.m. which produced heavy rainfall, flooding and landslides along Virginia Creek in Clear Creek County west of the District.

On August 27, the foothills ALERT weather stations indicated cool temperatures and low dew points supportive of only isolated 0.25-0.50"/30 min. rainfalls. Plains stations indicated support for storms producing 1.0-1.5"/30 min. rainfalls in Denver and Aurora and 0.35-0.75"/30 min. rainfall elsewhere in the District. An official 0.91 inches of rainfall fell in less than 30 minutes at Stapleton International Airport while the foothills of Jefferson County received less than 0.20 inches.

In each case, the ALERT weather stations provided key data for differentiating between foothills and plains QPF trends which would not have otherwise been possible. As more ALERT weather stations are added, further QPF refinements may be possible, such as providing basin-specific forecasts every 15 minutes for each successive 1- to 3-hour period.



AUGUST 18, 1991

OBSERVED	TEMP/DEW PT	REQ'D TEMP/DEW PT	QUANT. PRECIP FORECAST
BLUE MTN	61F/51F	62-70F/47-52F	0.70"/15MIN - 1.70"/HR
HIWAN CC	66F/49F	"	" "
FOOTHILLS FORECAST: HEAVY THUNDERSTORMS COULD REQUIRE MESSAGE 1'S			
QUINCY	73F/56F	79-84F/52-56F	1.00-1.50"/30MIN
DIA HILL	77F/46F	"	"
PLAINS FORECAST: STORMS ENDING WITH NO MESSAGE 1'S REQUIRED			

AUGUST 27, 1991

OBSERVED	TEMP/DEW PT	REQ'D TEMP/DEW PT	QUANT. PRECIP FORECAST
BLUE MTN	70F/43F	70-78F/50-55F	< 0.50"/30MIN
HIWAN CC	76F/49F	"	"
FOOTHILLS FORECAST: WINDY THUNDERSHOWERS WITH BRIEF MODERATE SHOWERS			
QUINCY	72F/57F	77-84F/50-55F	1.00-1.75"/30MIN
DIA HILL	78F/56F	"	"
PLAINS FORECAST: ISOLATED MESSAGE 1 THUNDERSTORMS IN DENVER AND AURORA			