NOAA Technical Memorandum ERL ARL-165

ACROSS NORTH AMERICA TRACER EXPERIMENT (ANATEX) WEATHER MAPS AND TRACER CONCENTRATIONS

Roland R. Draxler

Air Resources Laboratory
Silver Spring, Maryland
July 1988

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UNITED STATES
DEPARTMENT OF COMMERCE

C.William Verity
Secretary

NATIONAL OCEANIC AND
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Environmental Research
Laboratories

Vernon E. Derr,
Director

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ACROSS NORTH AMERICA TRACER EXPERIMENT (ANATEX)

WEATHER MAPS AND TRACER CONCENTRATIONS

Roland R. Draxler

ABSTRACT. During the first three months of 1987, perfluorocarbon tracers were emitted every 2.5 days from St. Cloud, MN and Glasgow, MT. Air samples of 24 hour duration were taken at 77 sites over most of the eastern United States and southern Canada. The tracer concentration contours derived from these sampling sites are shown in this report superimposed upon the appropriate surface weather map. More complete descriptions of the experiment as well as other data measurements will be available from other reports in this series.

1. INTRODUCTION

Tracer was released for three hour durations every 60 hours starting at 1700 GMT on January 5, 1987. About 50 kg of orthoperfluorodimethylcyclohexane was used at St. Cloud for each release and approximately 83 kg of perfluorotrimethylcyclohexane was released from Glasgow at the same time. A third tracer was released from St. Cloud every 120 hours but these results will not be shown here. Tracer sampling consisted of 24-hour averages at each site. Each sample was terminated around 1400 GMT.

The concentration results are shown as a series of maps in section 2. Two maps are on each page, the upper map with contours and concentrations of the St. Cloud tracer, and the lower map of the Glasgow tracer. The concentrations and contours are shown in brown. All concentrations above 4 dfl/l (deci femto liters per liter: 10^{-16}) are printed just to the right of each sampling site.

The contours start at 5 dfl/l, then 10, 20, 50, 100, 200 to the maximum of 500 dfl/l. Below each map, near the center, a month, day, and hour identifies the sampling start time. The sampling stop time, 24 hours later, would be of course, the start time of the next map in the series. Concentration maps start on January 5, 1987 and continue through March 29, 1987. For instance on the first map (page 2-1), 10514 indicates the sampling start time of January 5 at 1400 GMT.

Each map also shows the synoptic pattern in blue. High and low pressure centers are highlighted, although the objective routine did not always identify all center contour positions. Surface pressure contours are shown at 4 mb intervals. The frontal positions, taken from other subjective analyses, were superimposed on the map. Warm and cold fronts are indicated by the conventional notation, although the indicated direction of movement may on occasion be in error. Troughs and stationary fronts are shown by a solid line. The time of the map is shown in blue below the lower left corner. The surface meteorological maps are always shown at the end of the 24-hour concentration sampling period.

2. WEATHER AND CONCENTRATION MAPS

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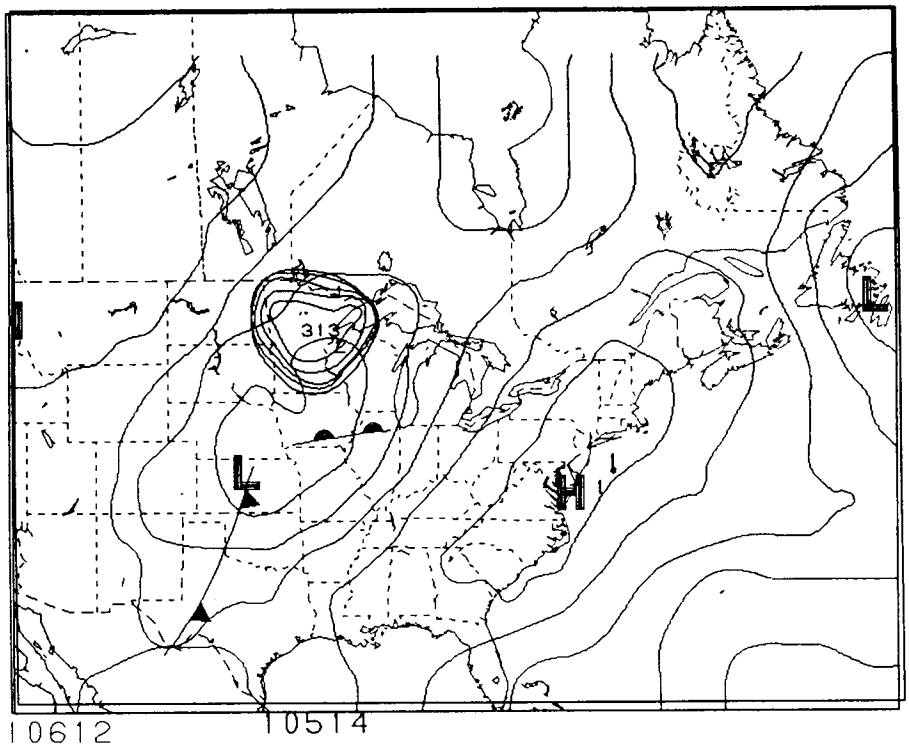

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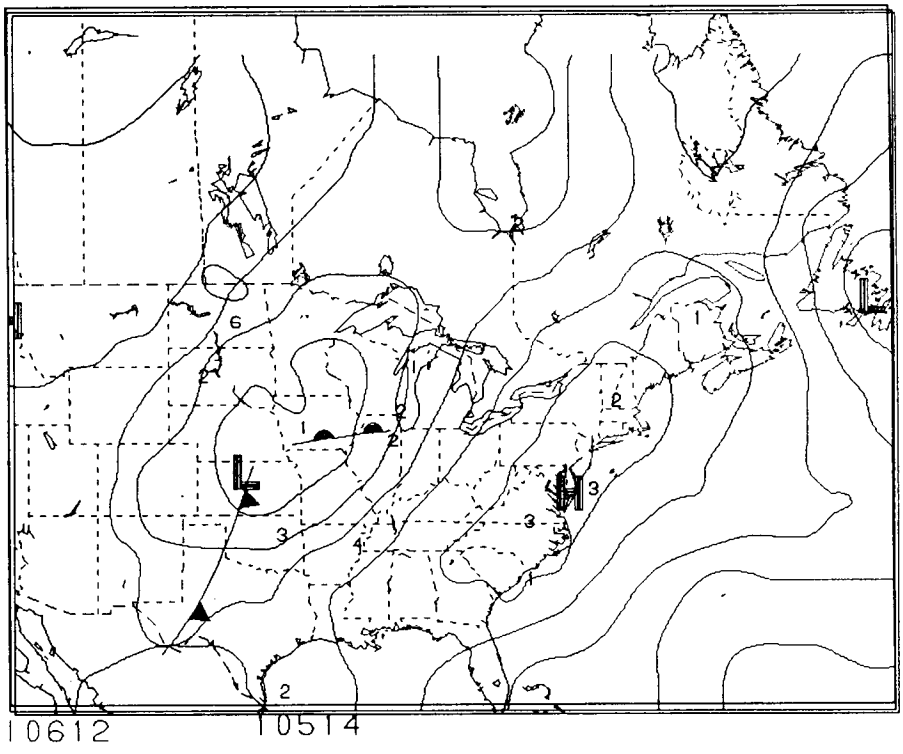

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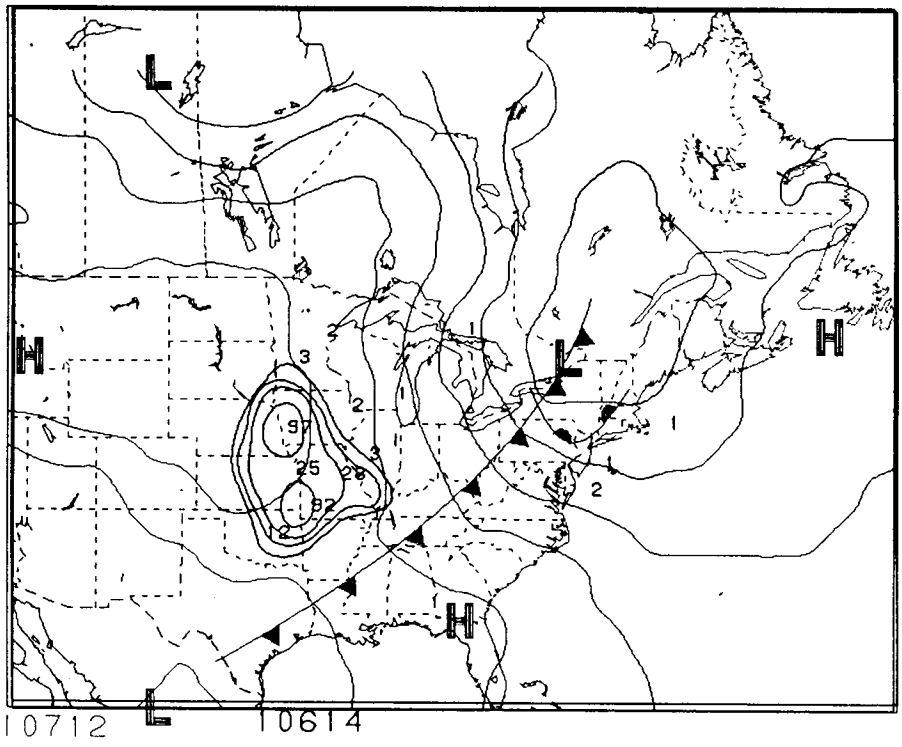

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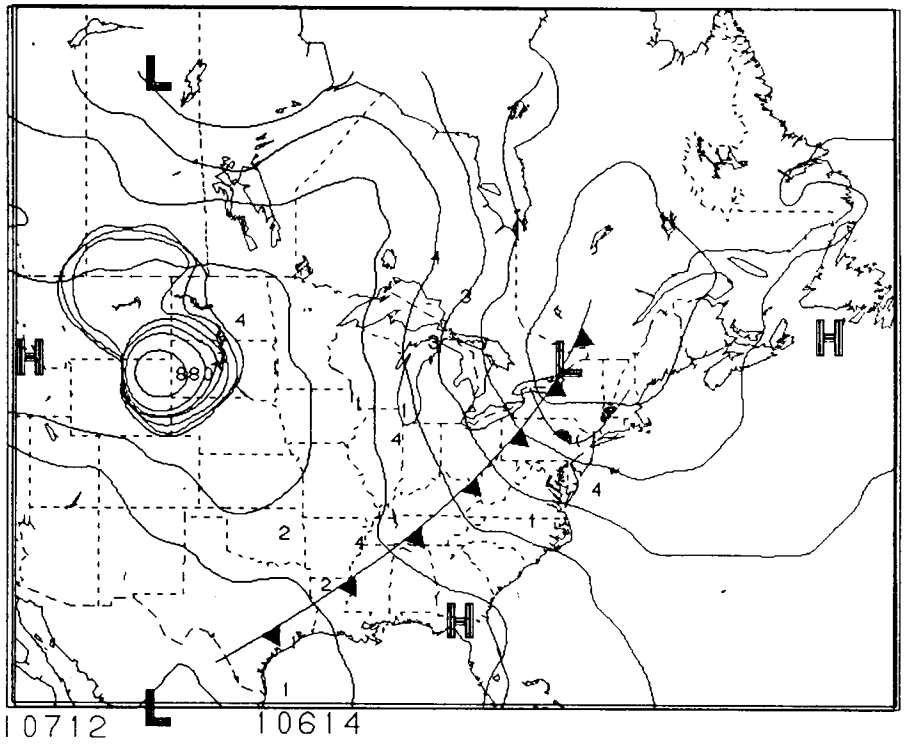

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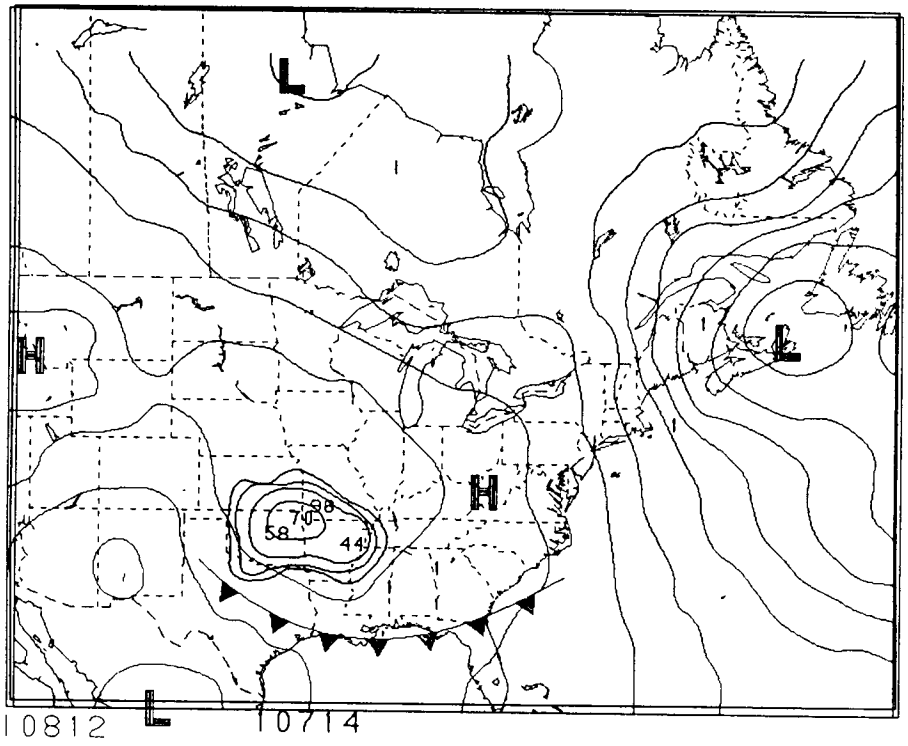

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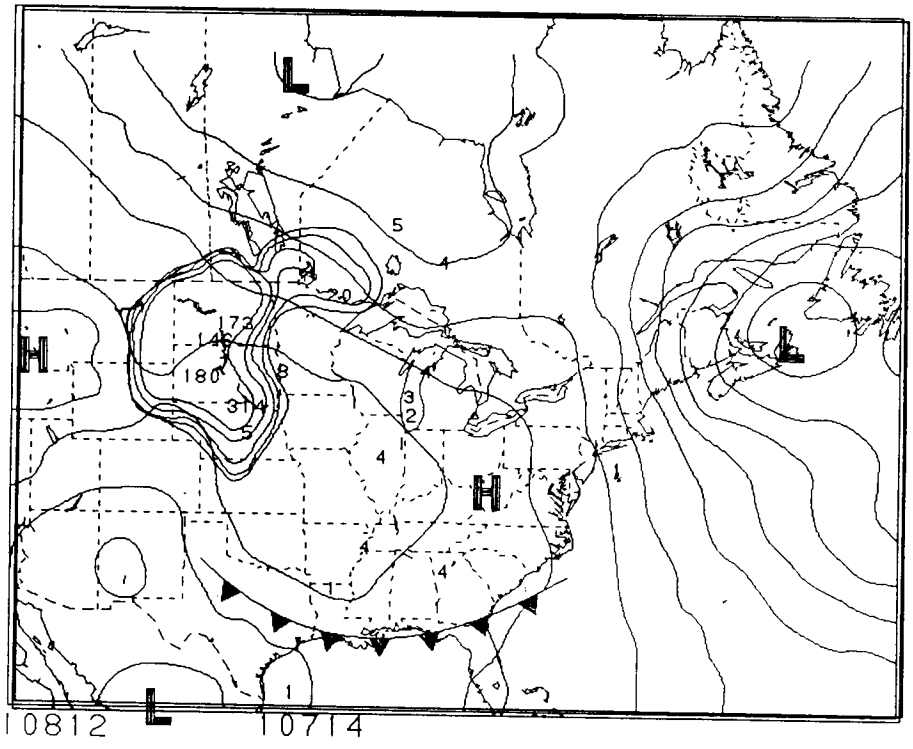

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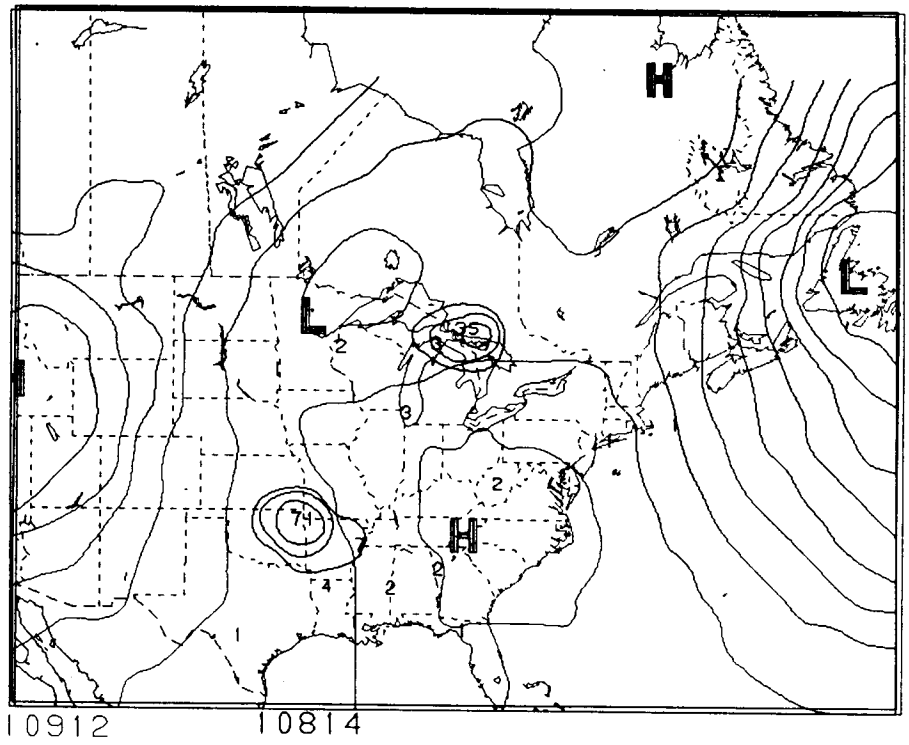

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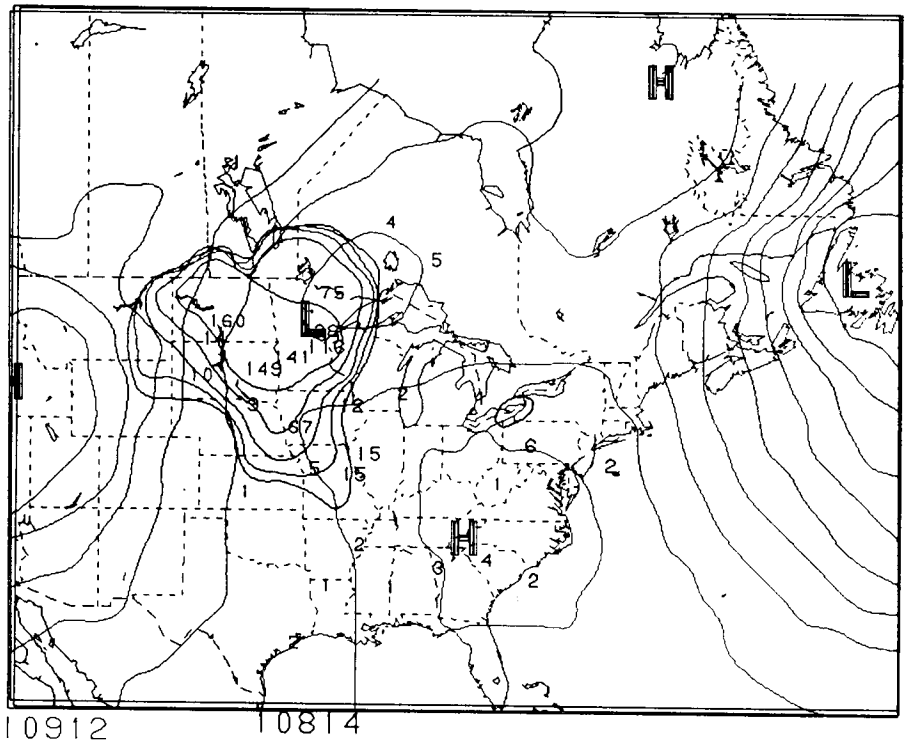

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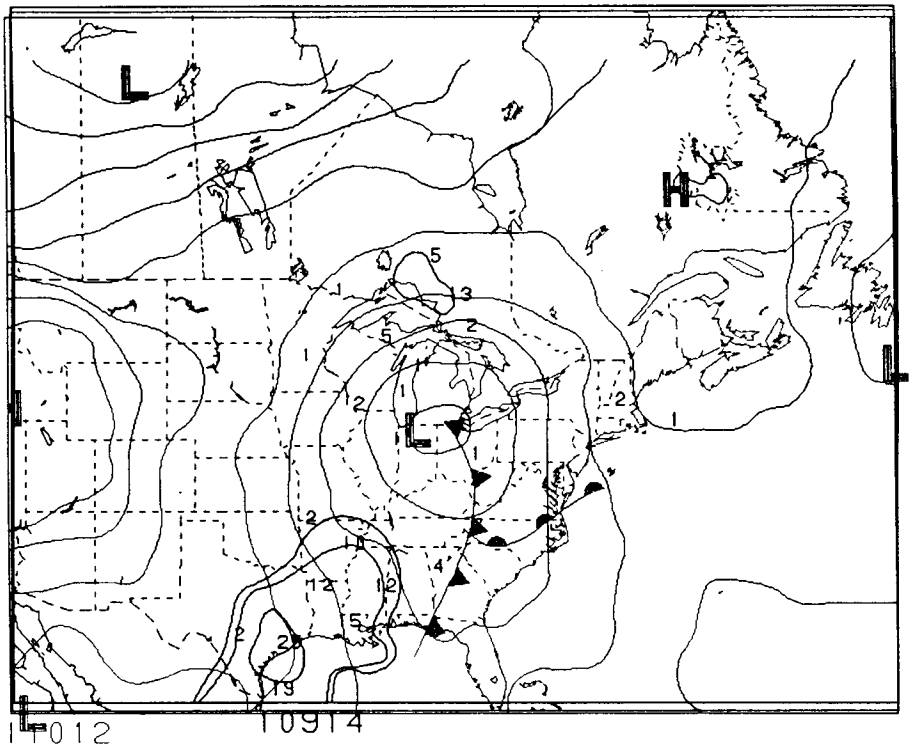

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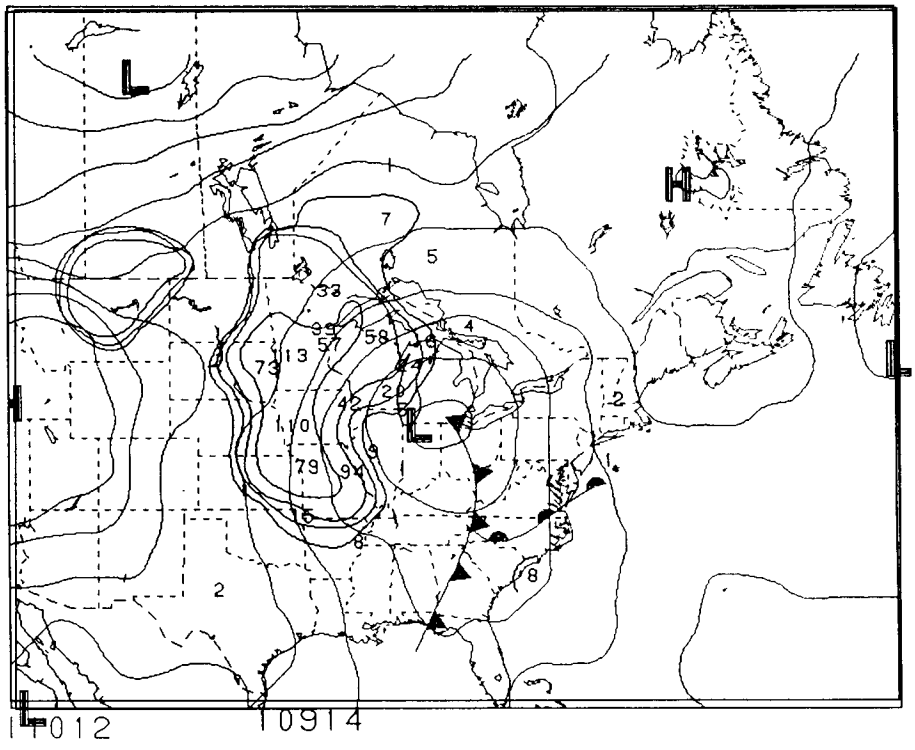

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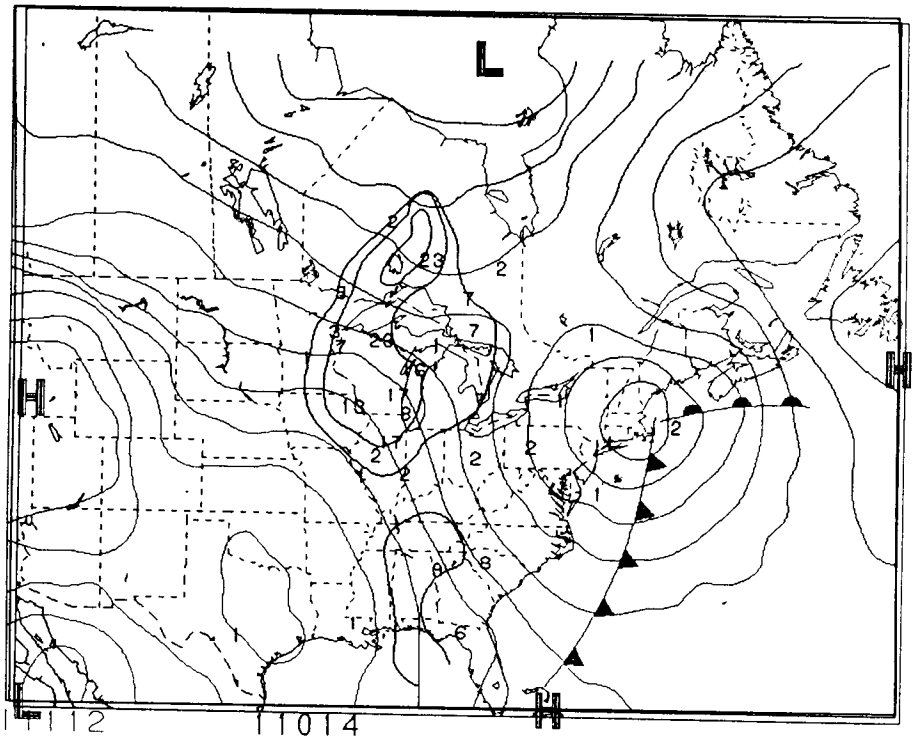

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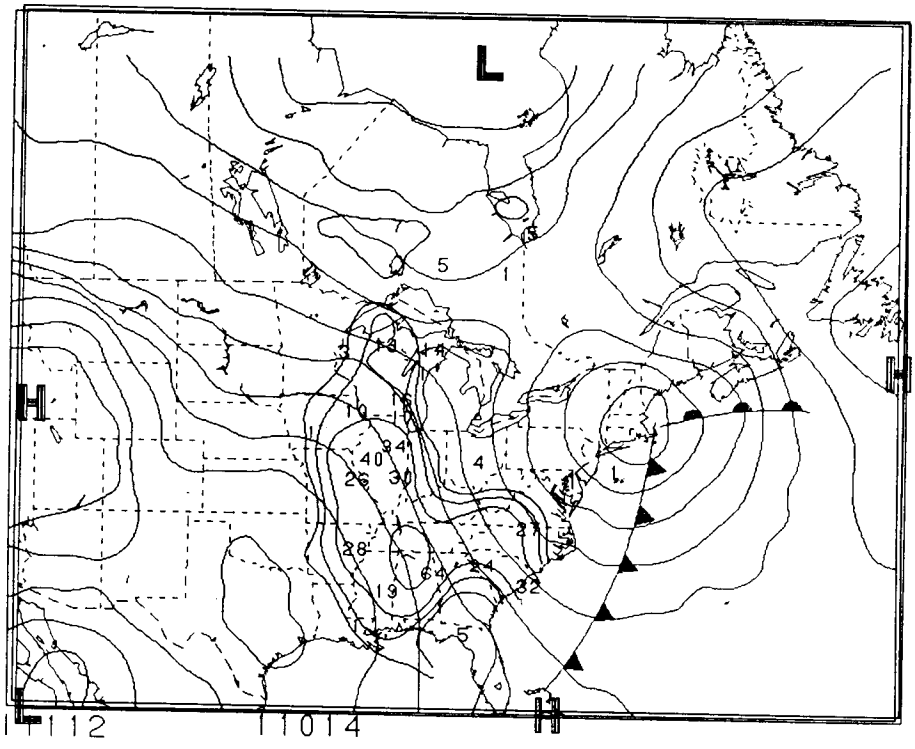

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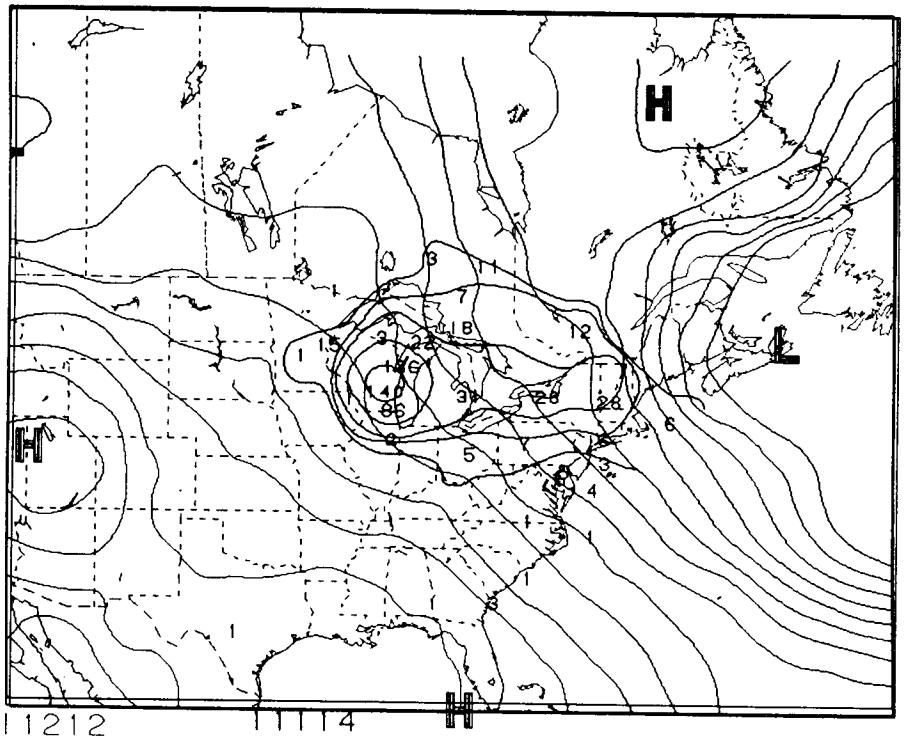

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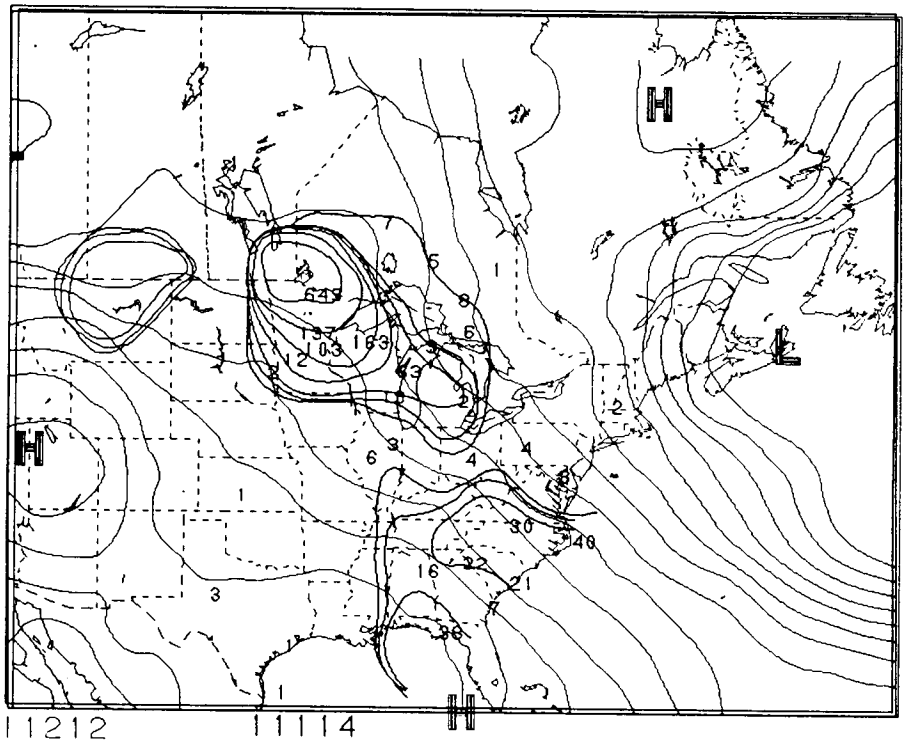

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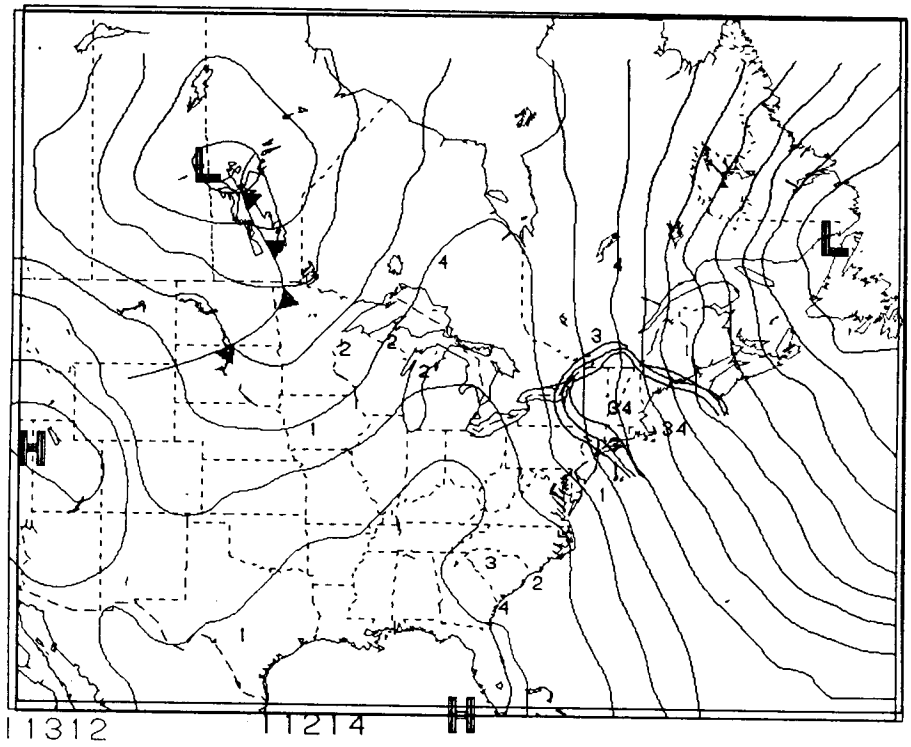

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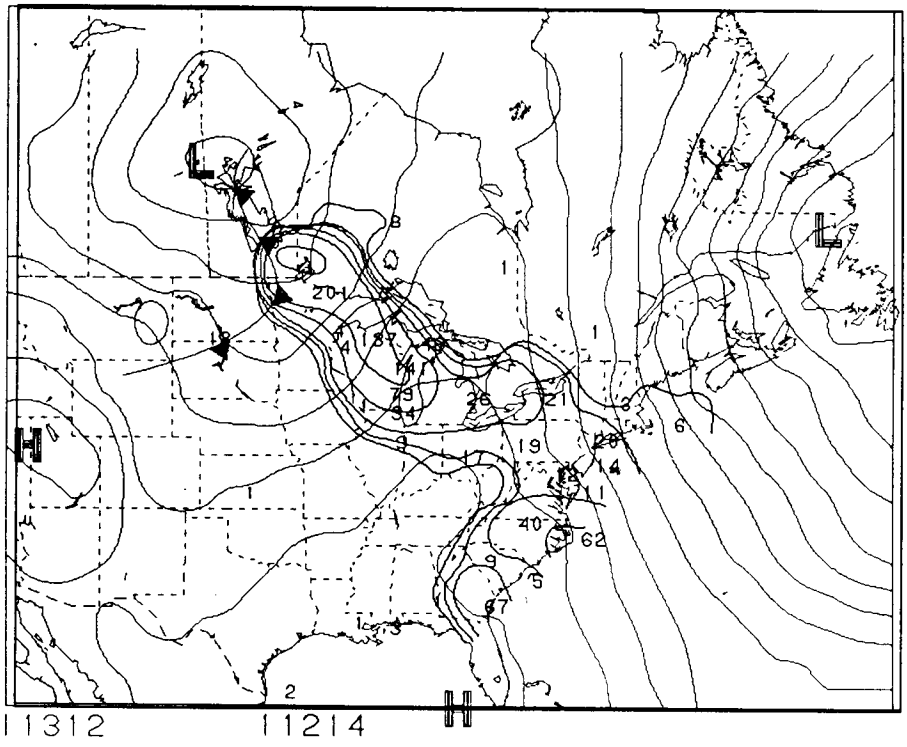

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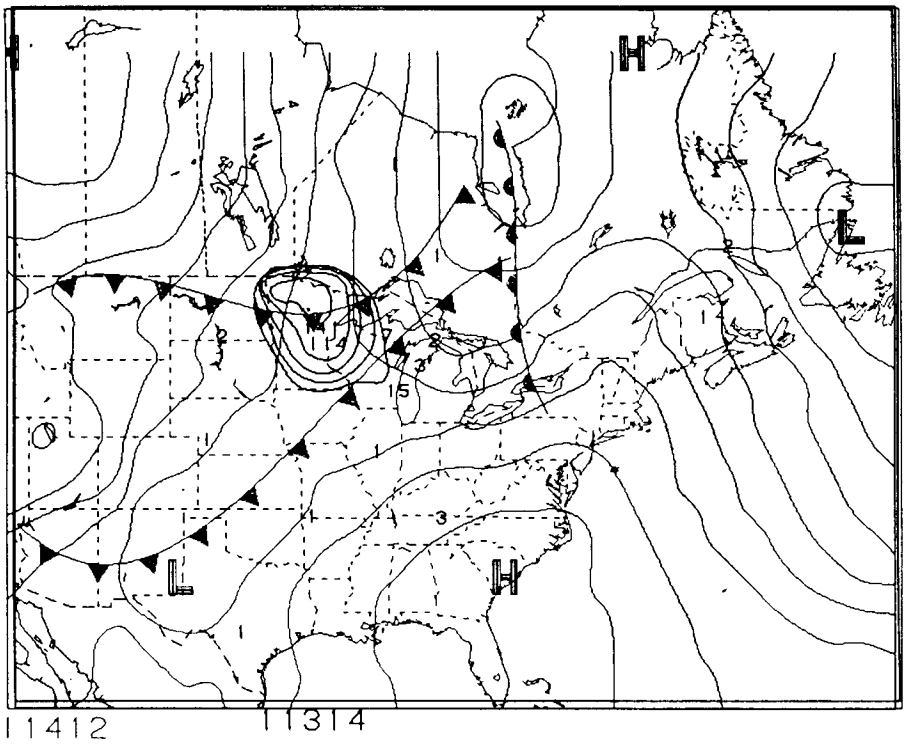

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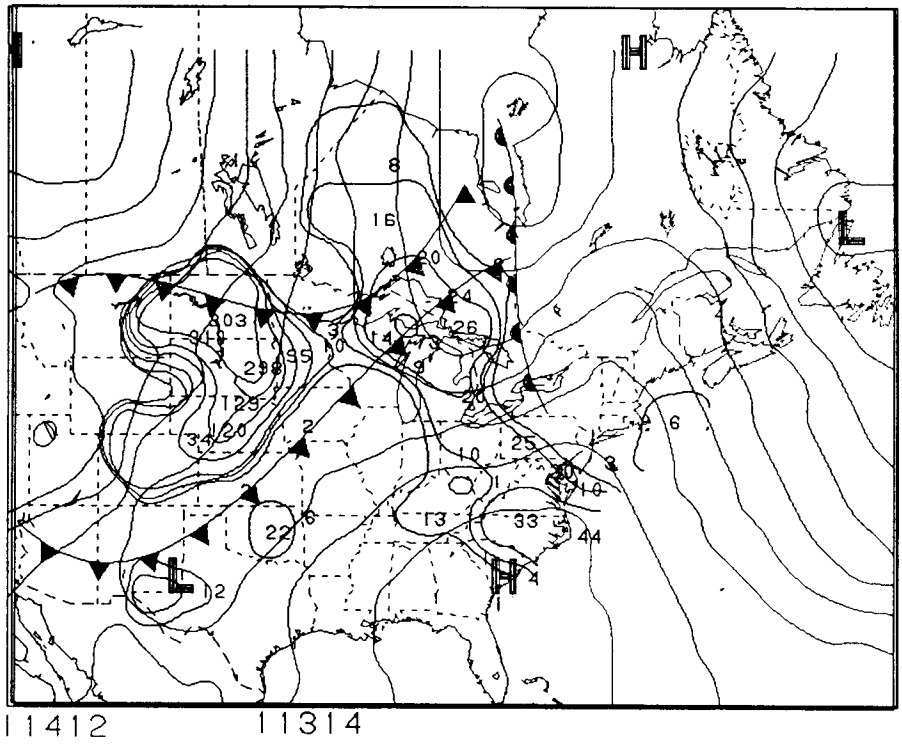

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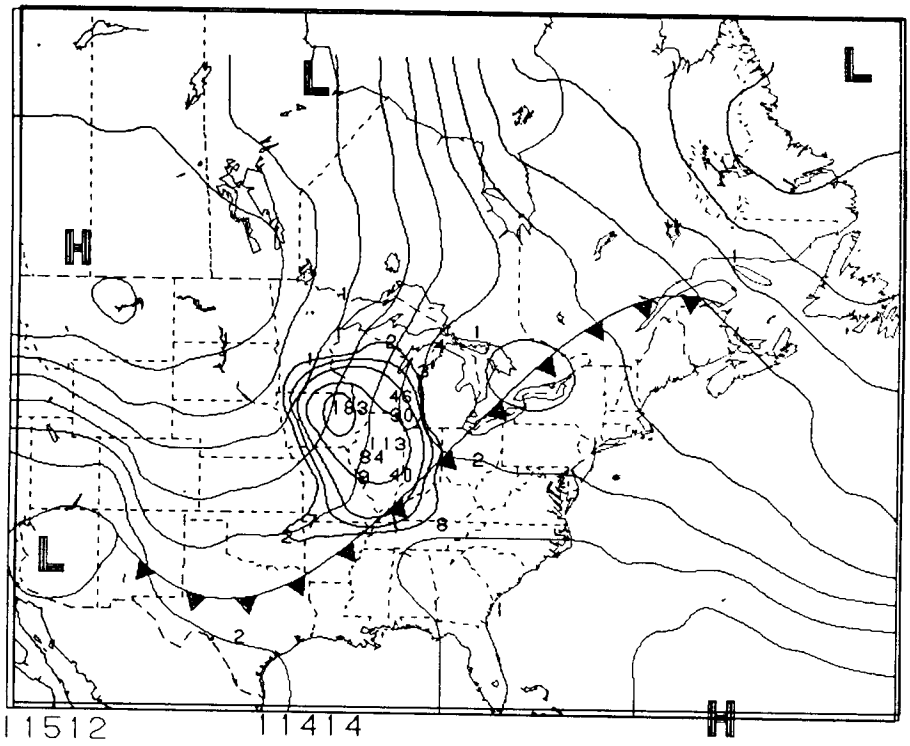

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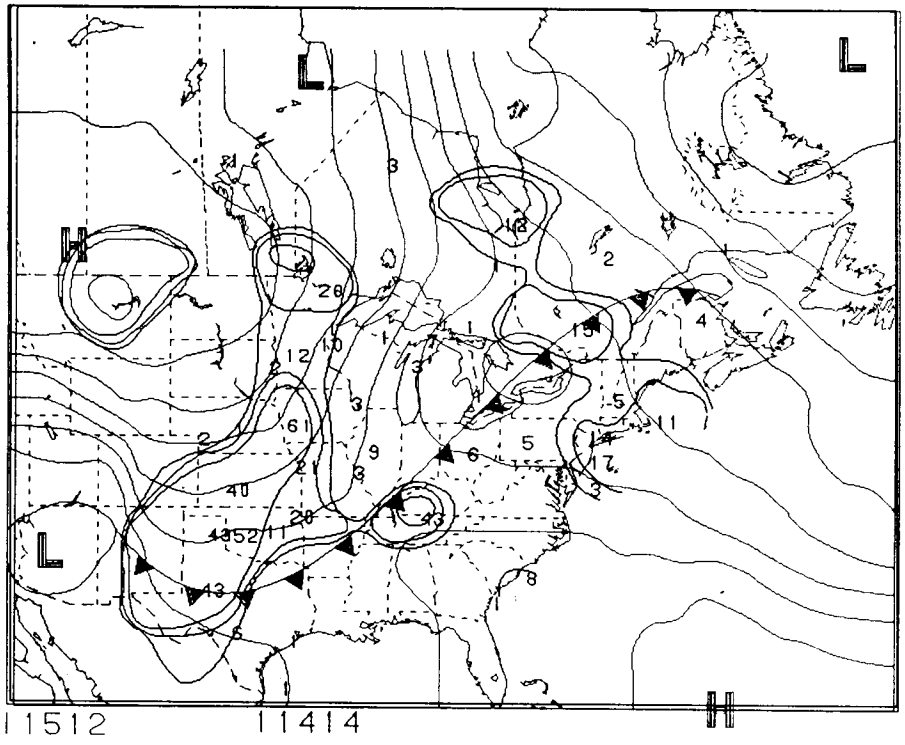

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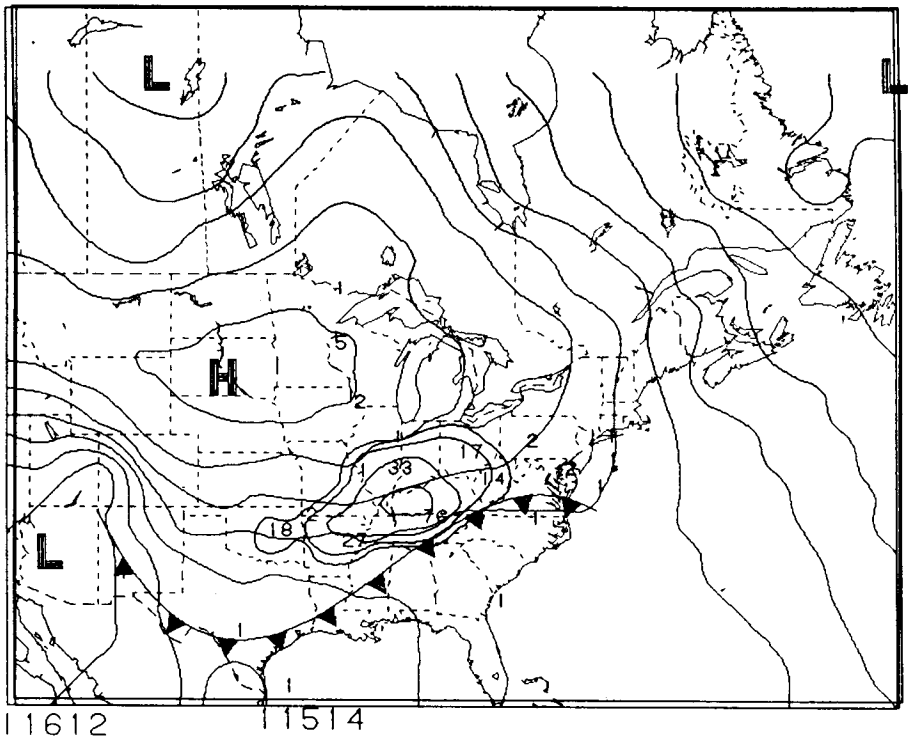

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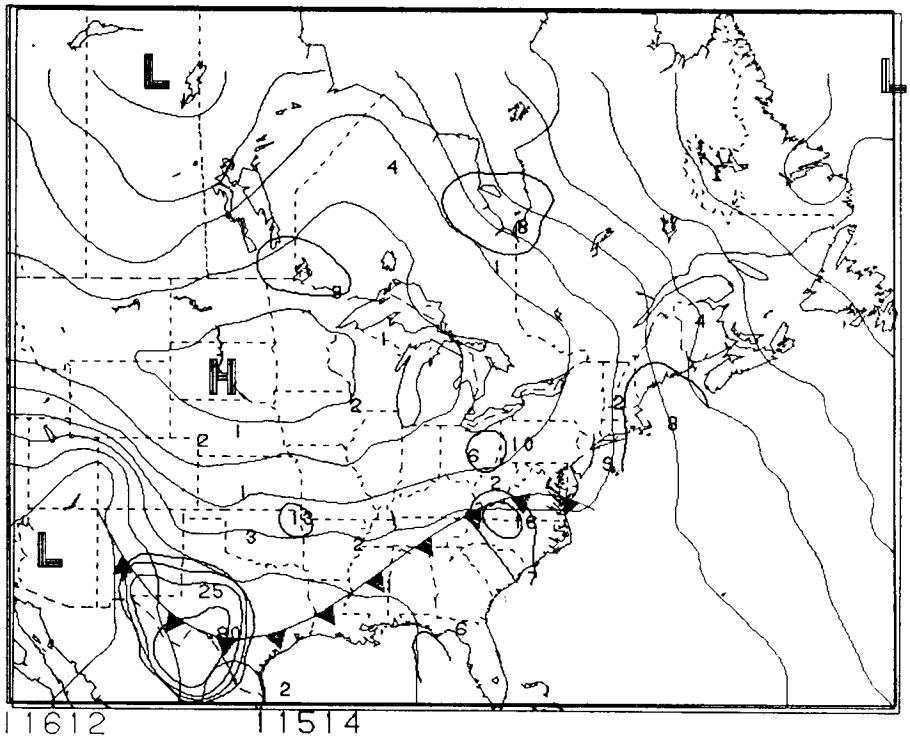

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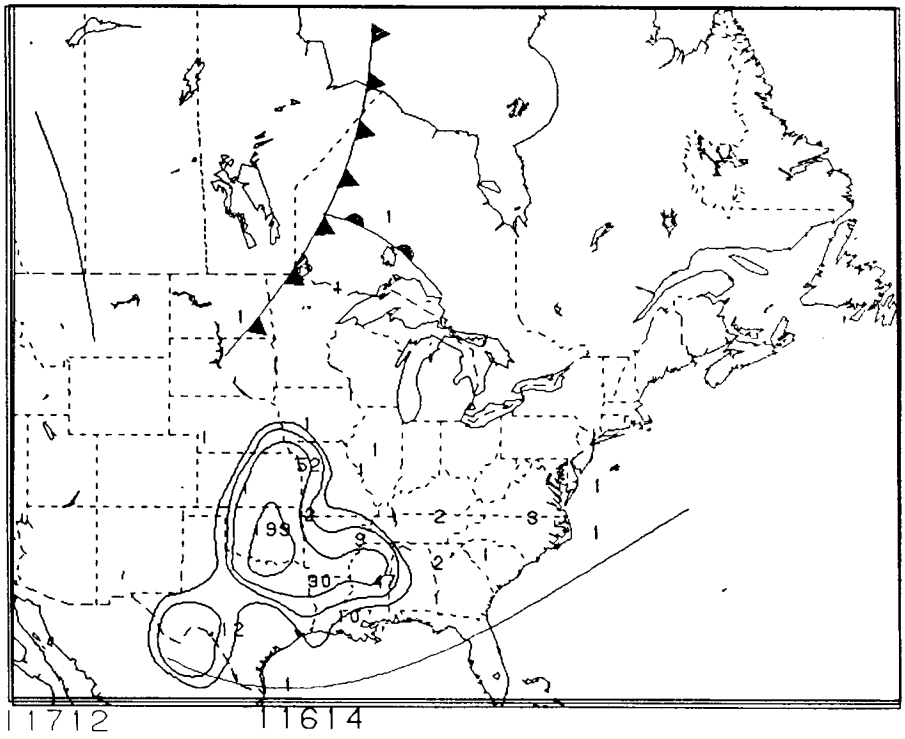

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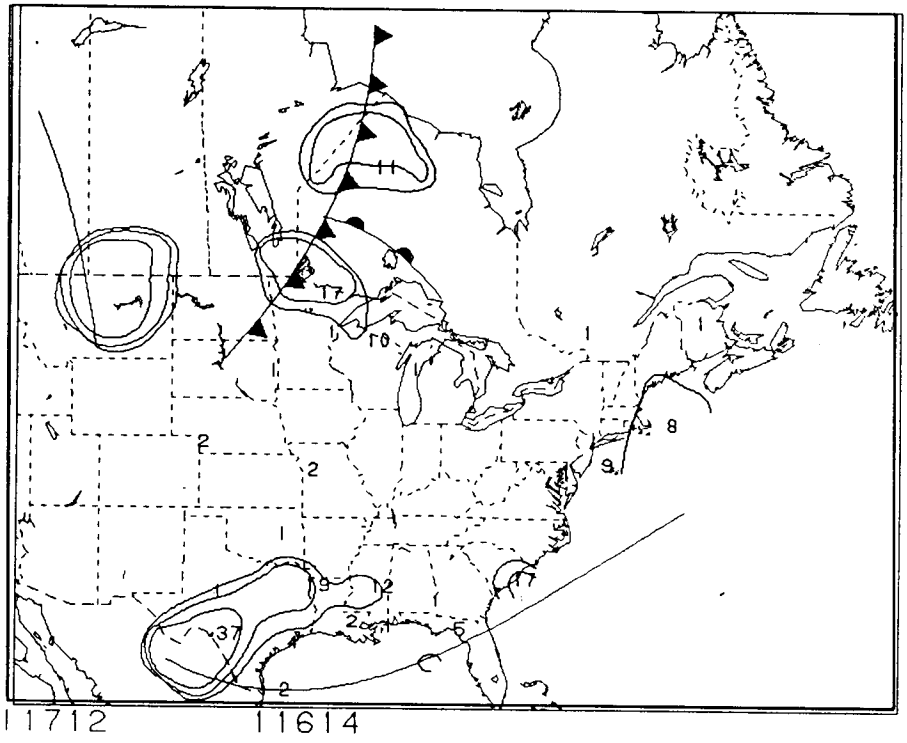

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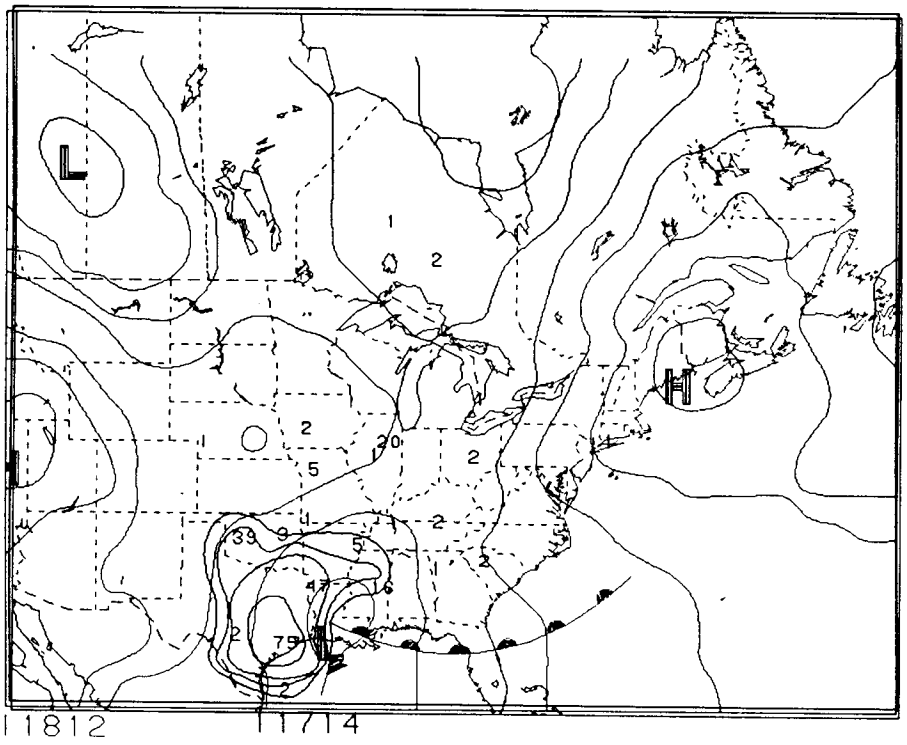

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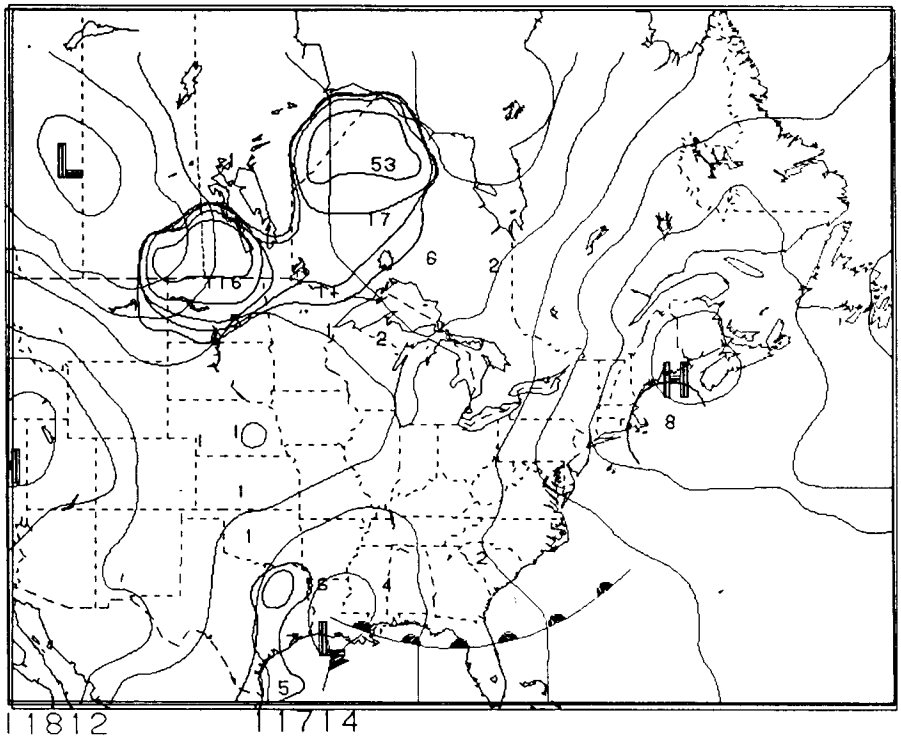

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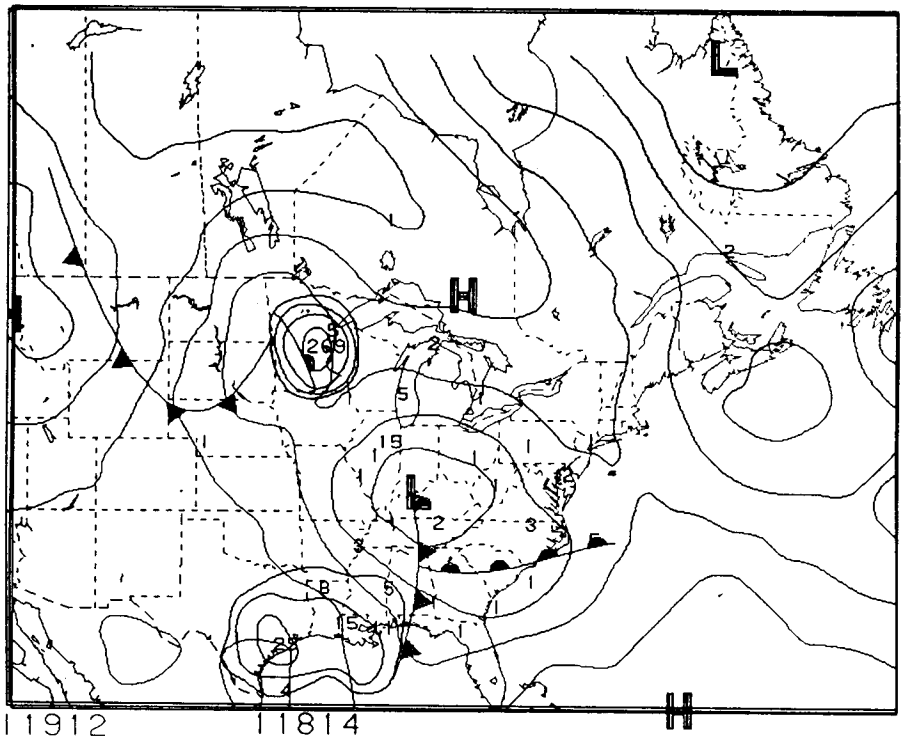

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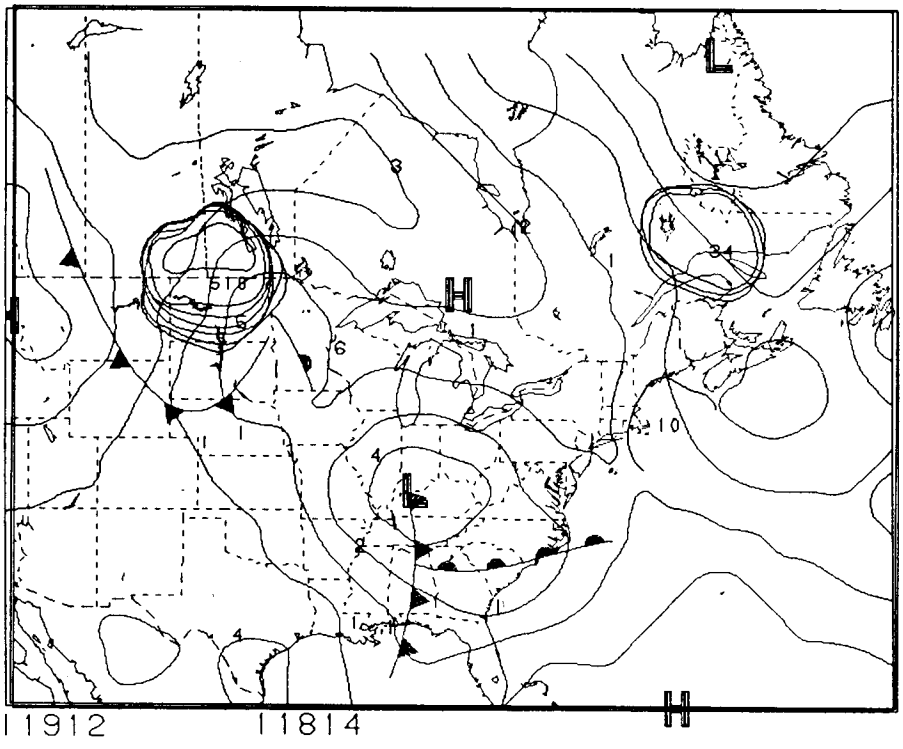

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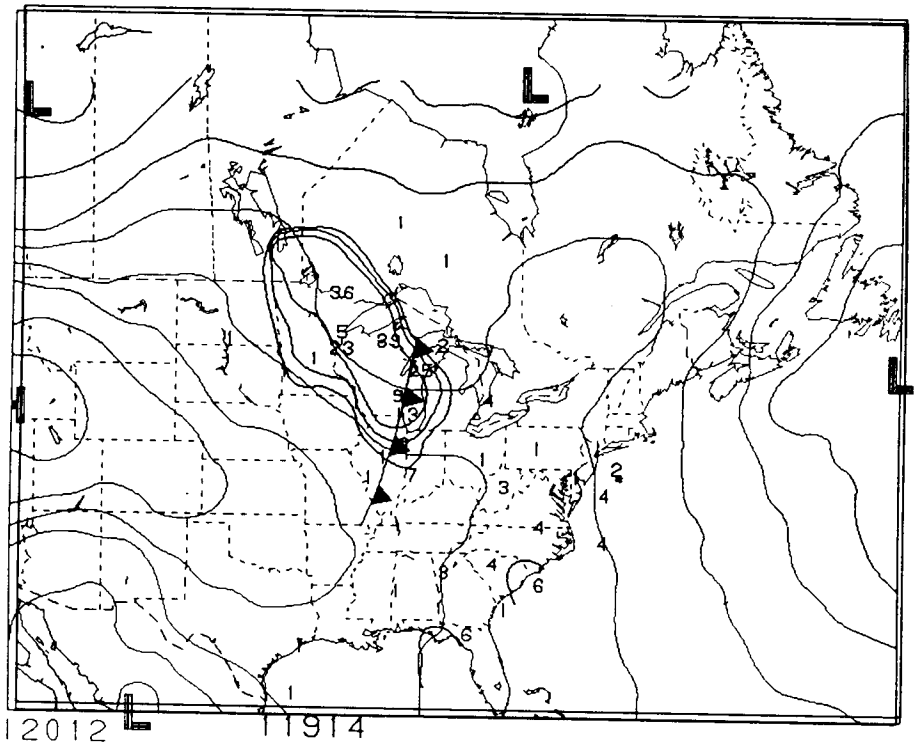

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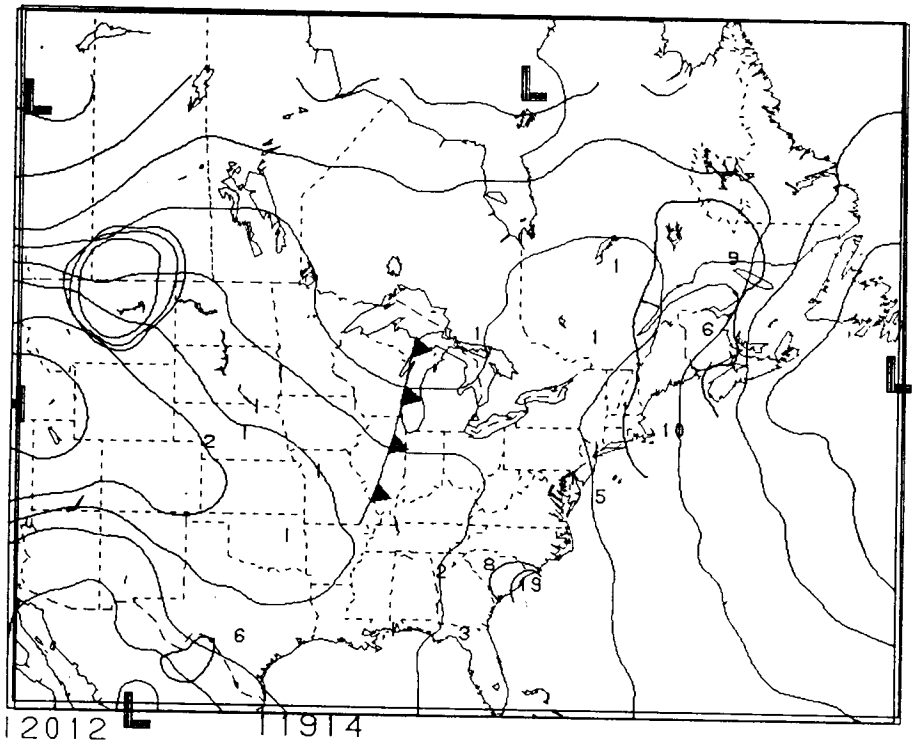

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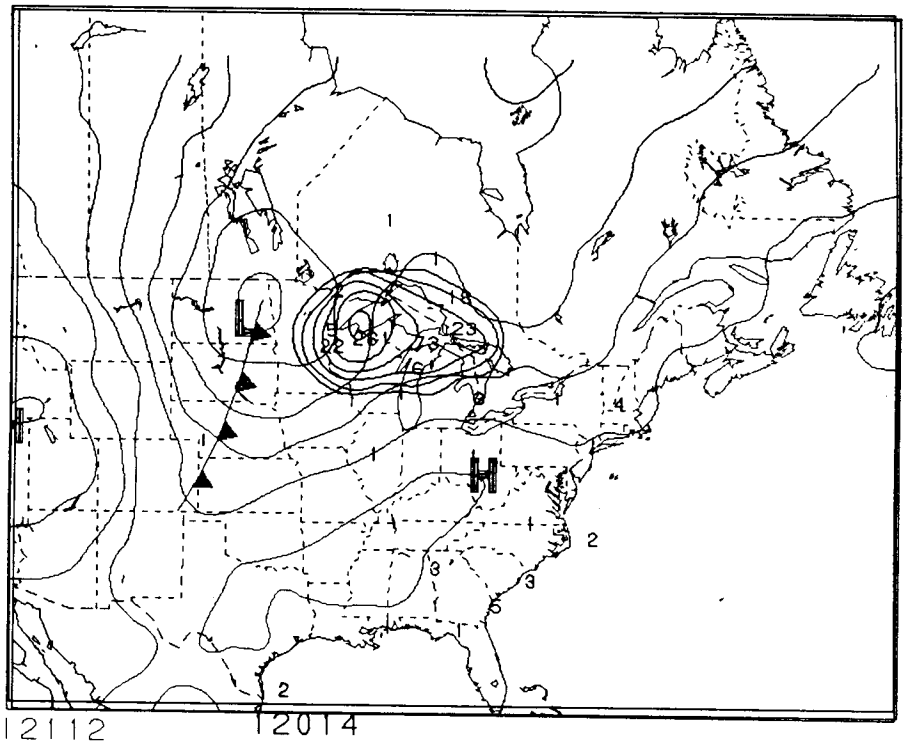

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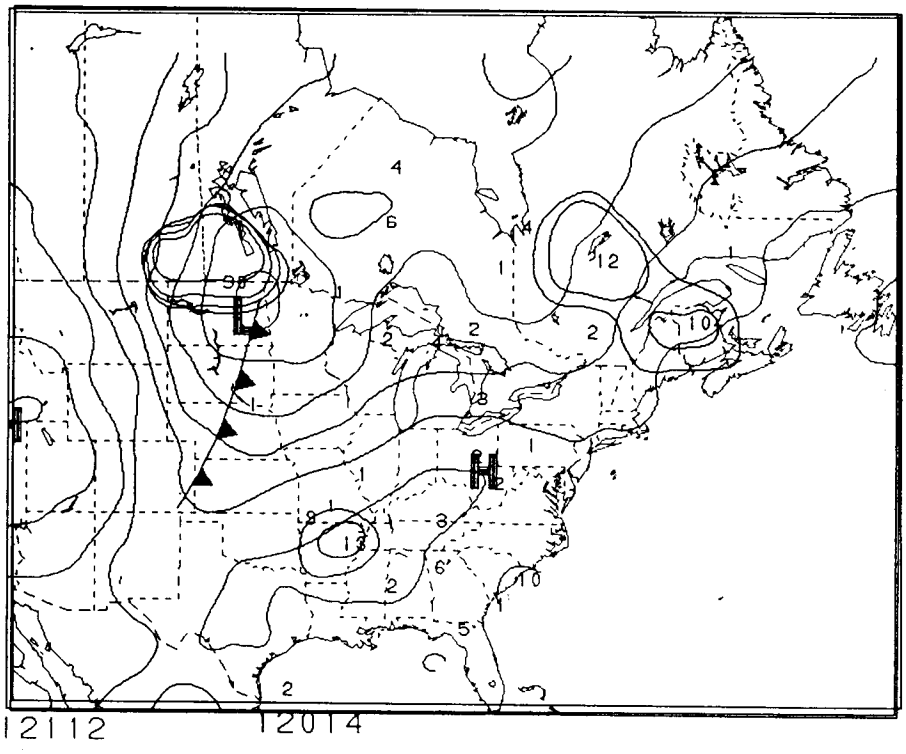

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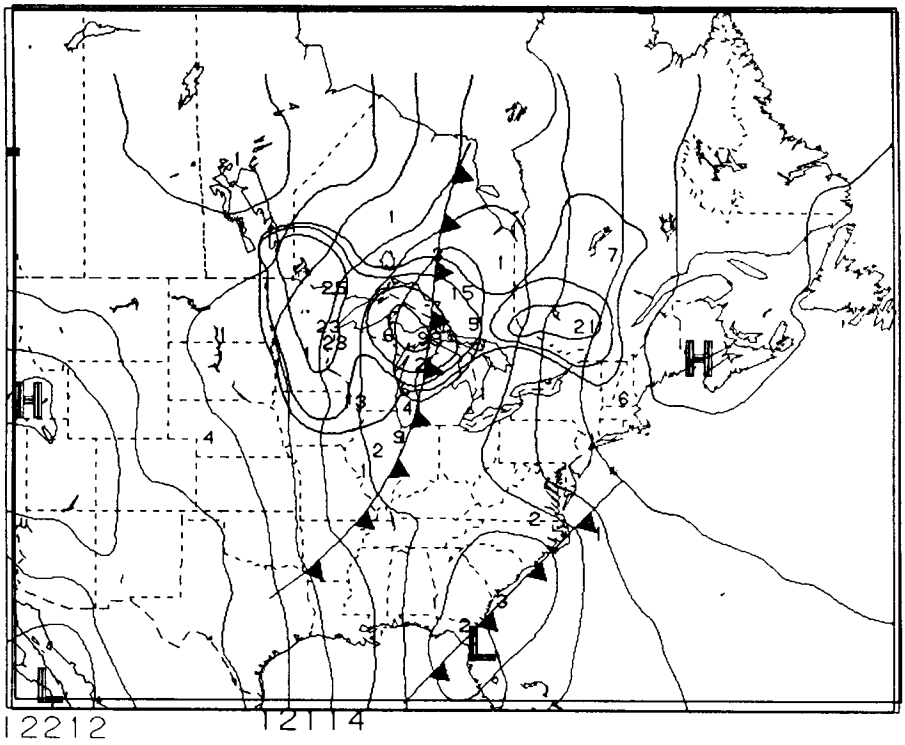

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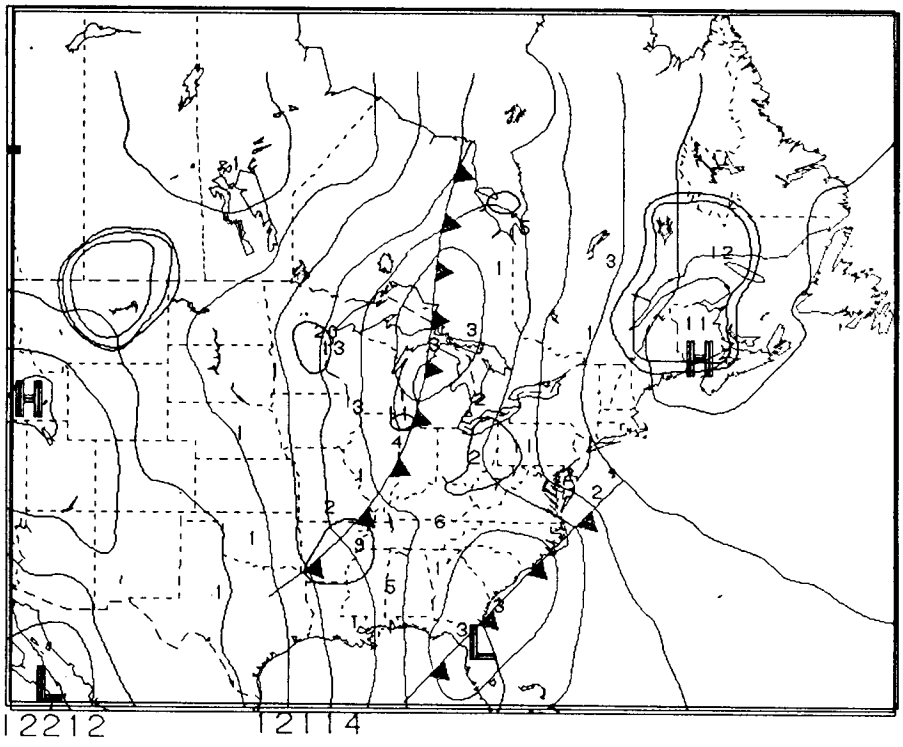

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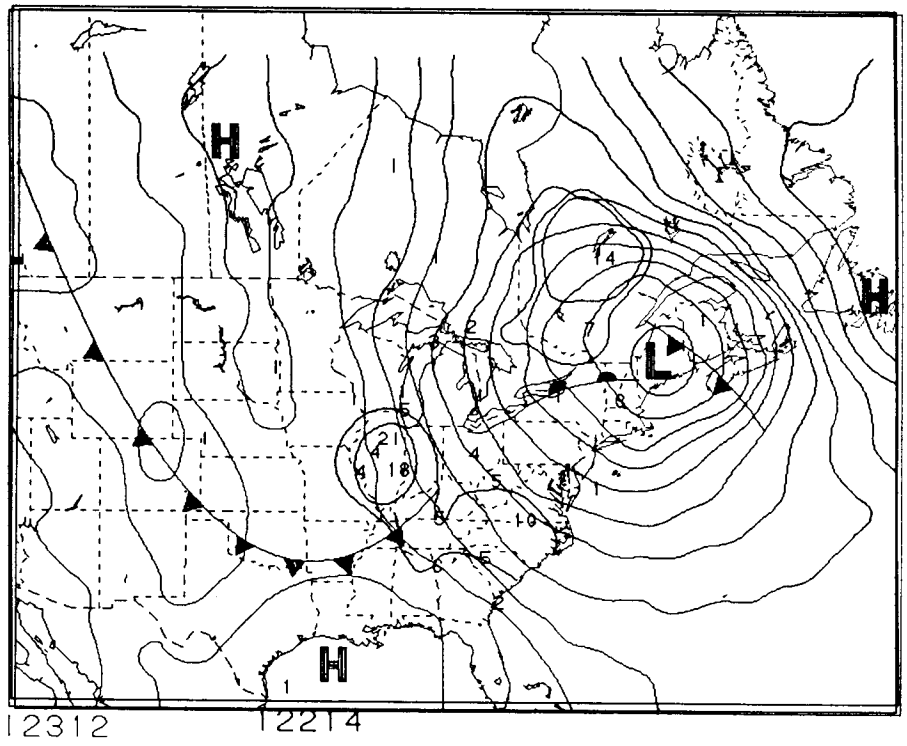

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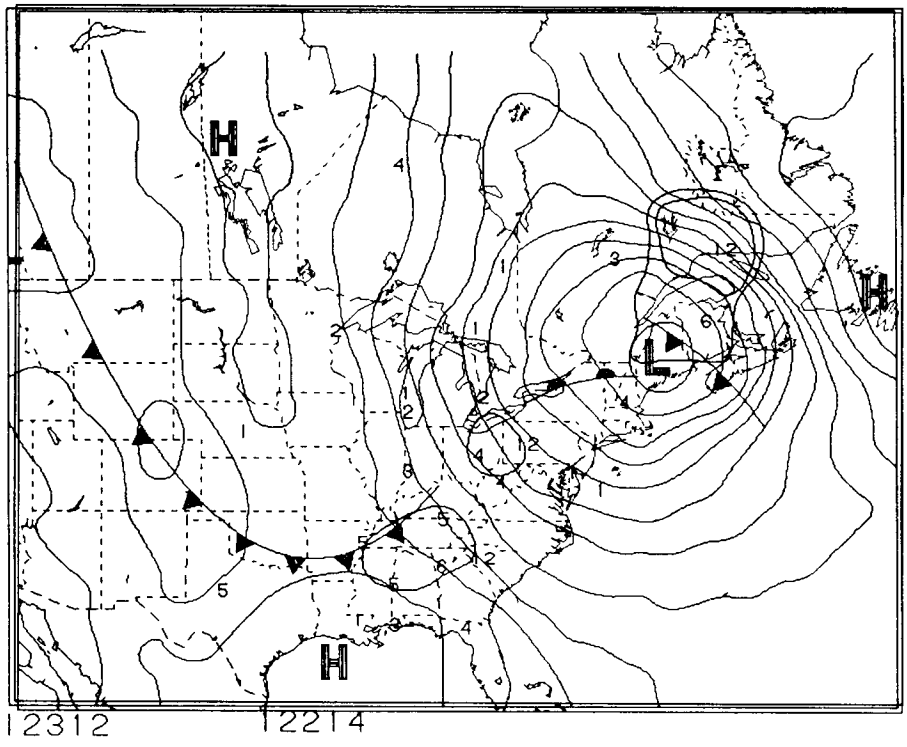

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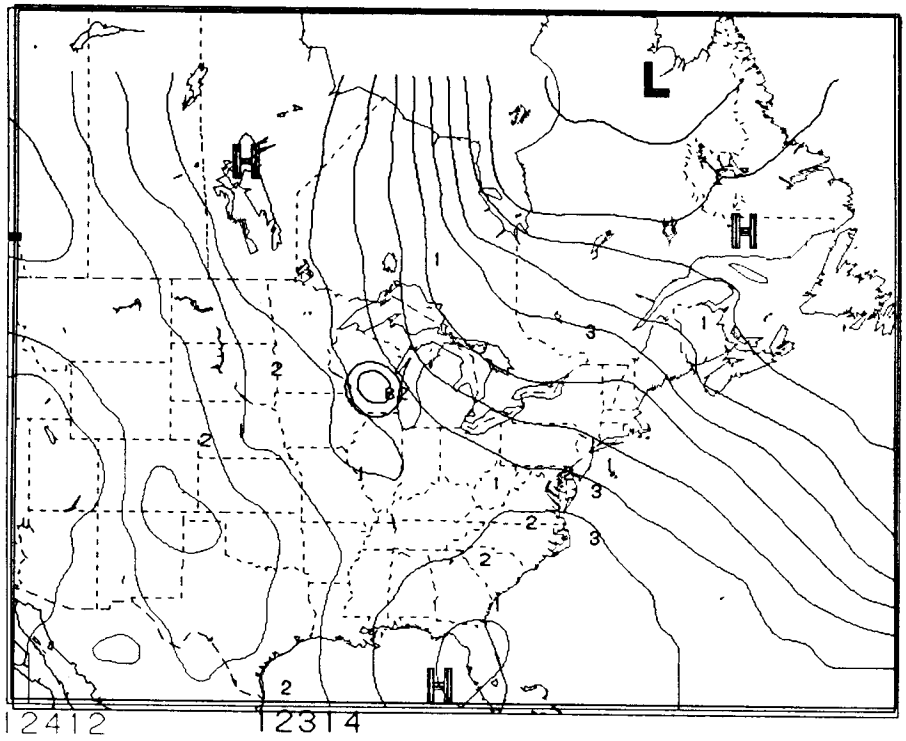

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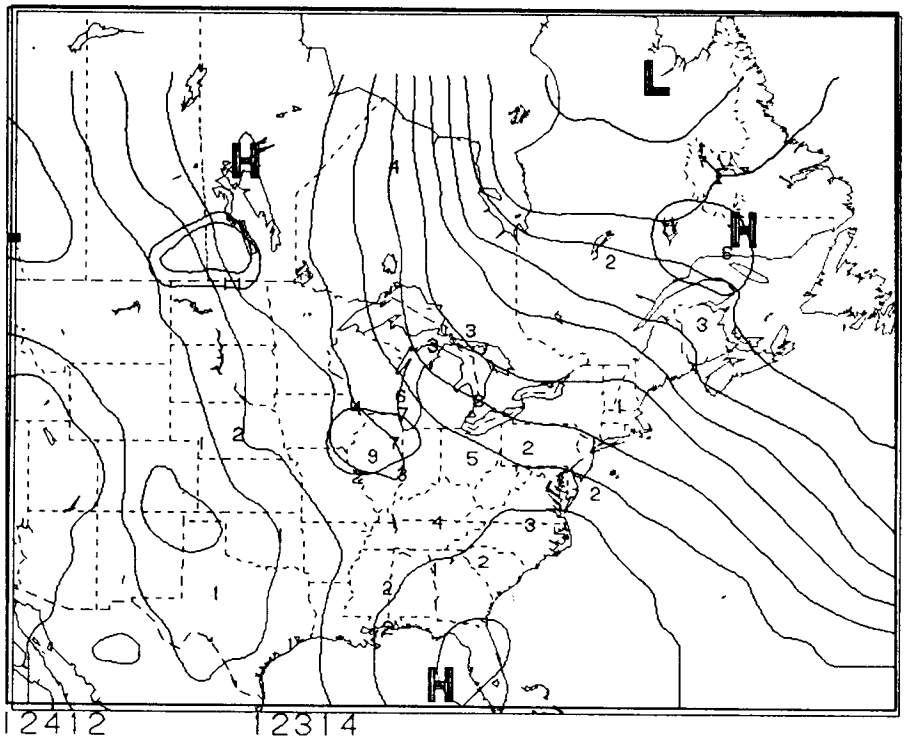

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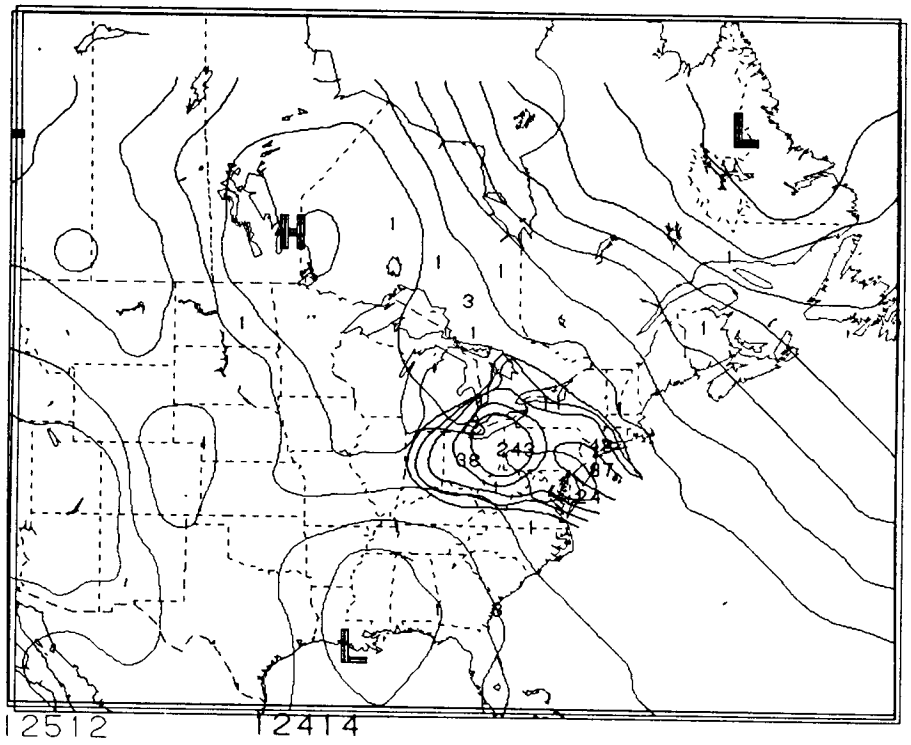

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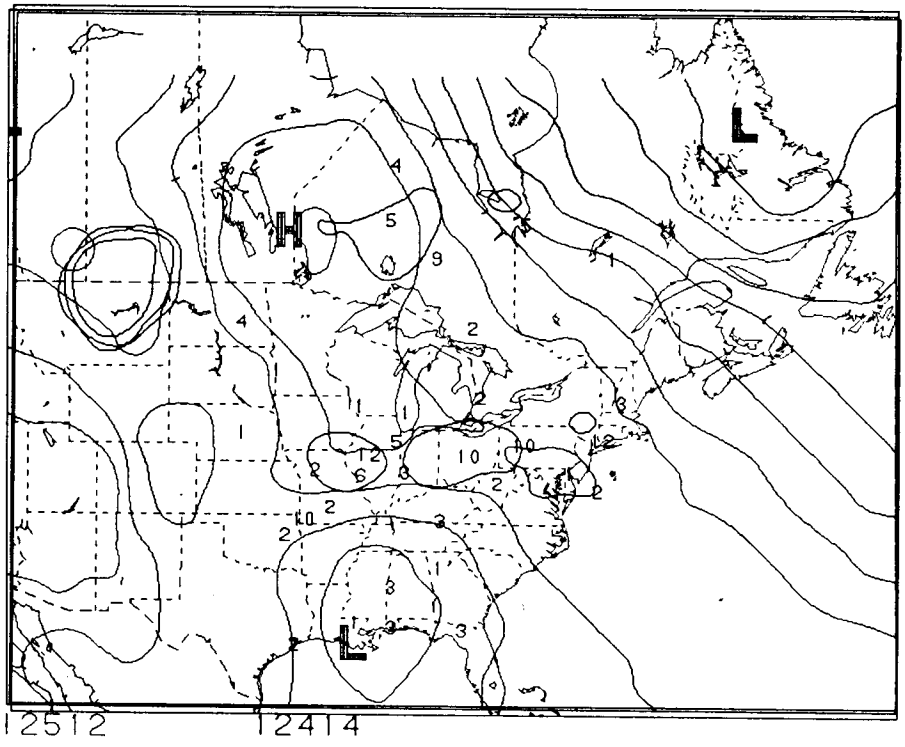

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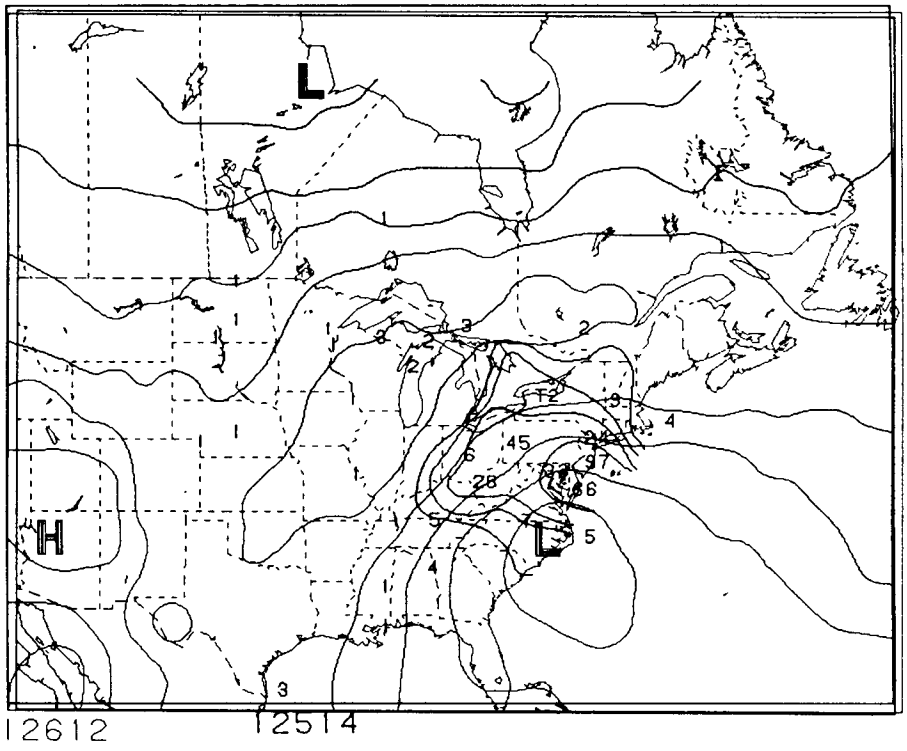

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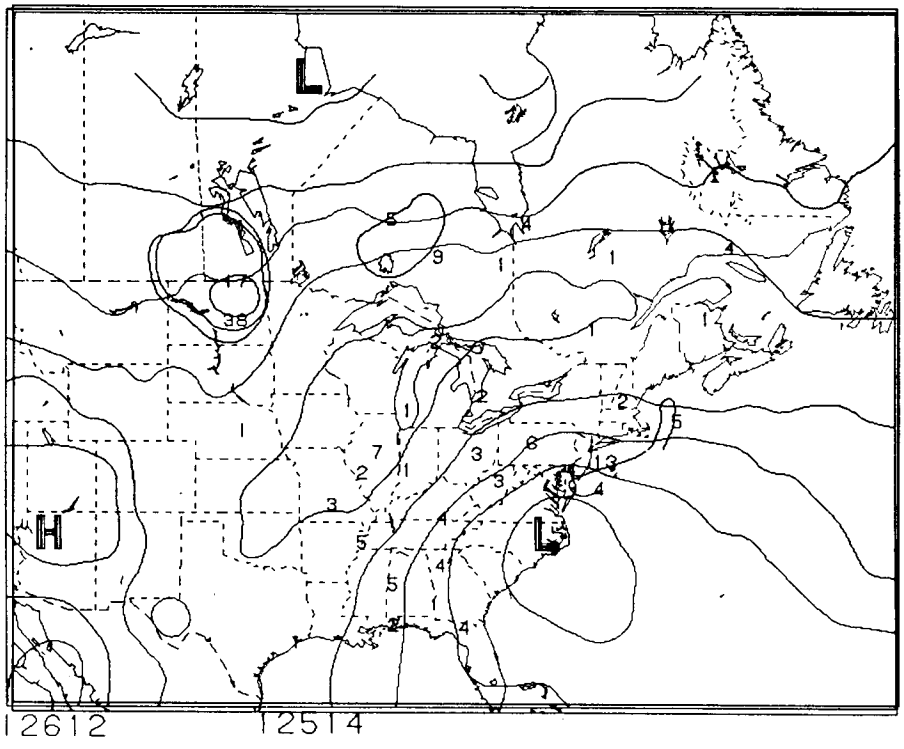

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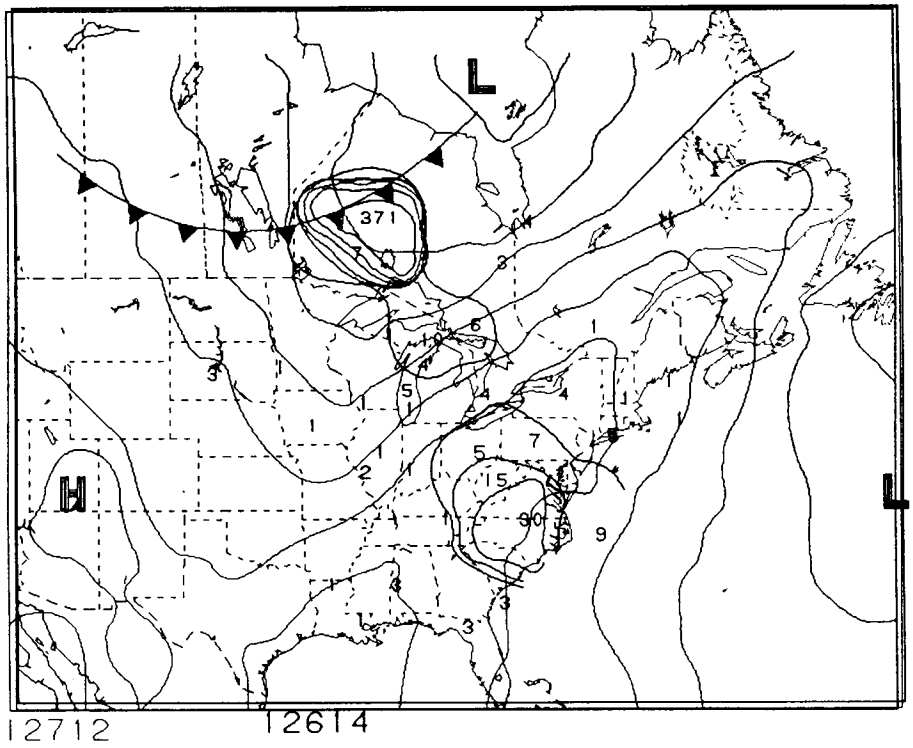

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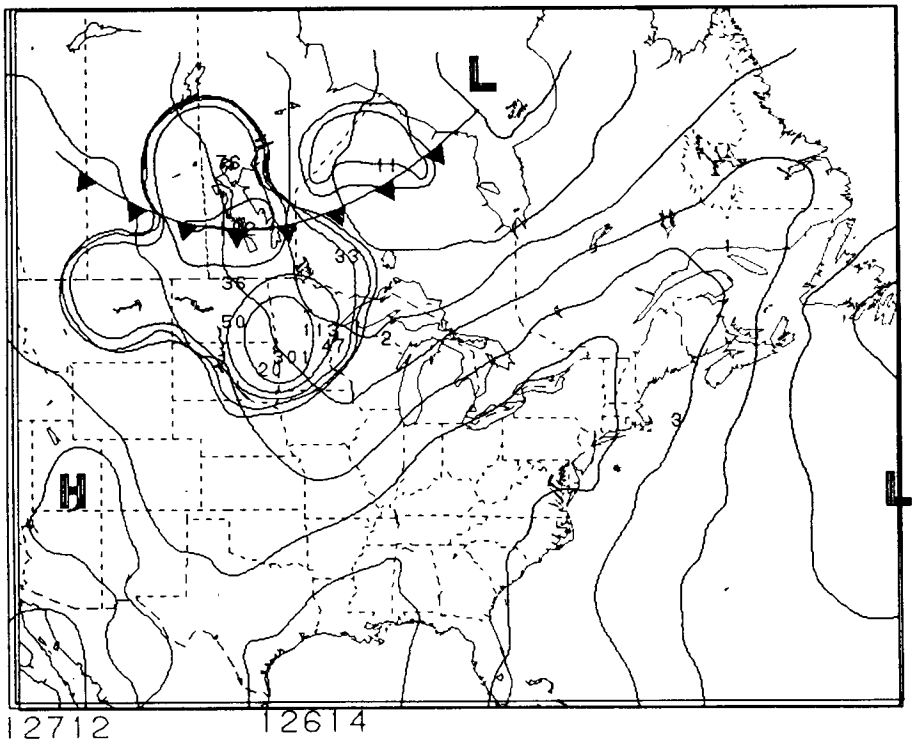

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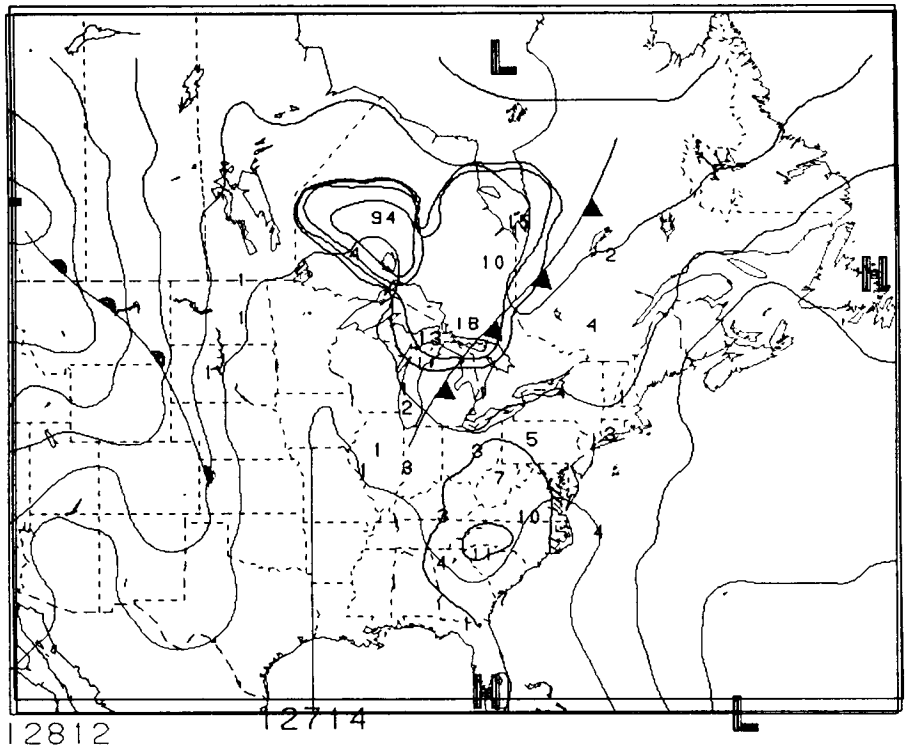

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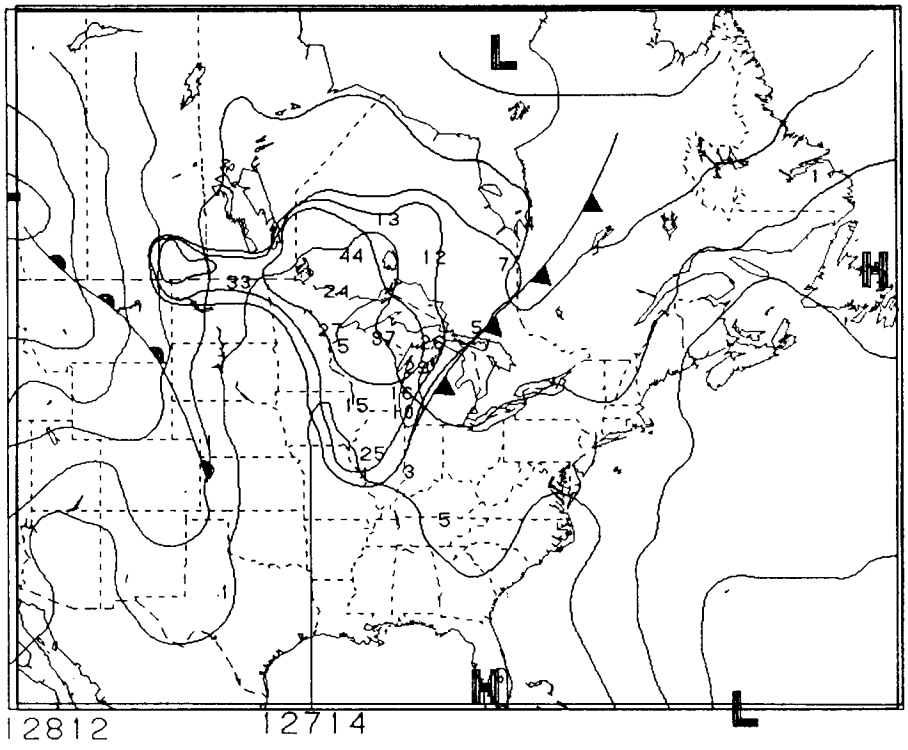

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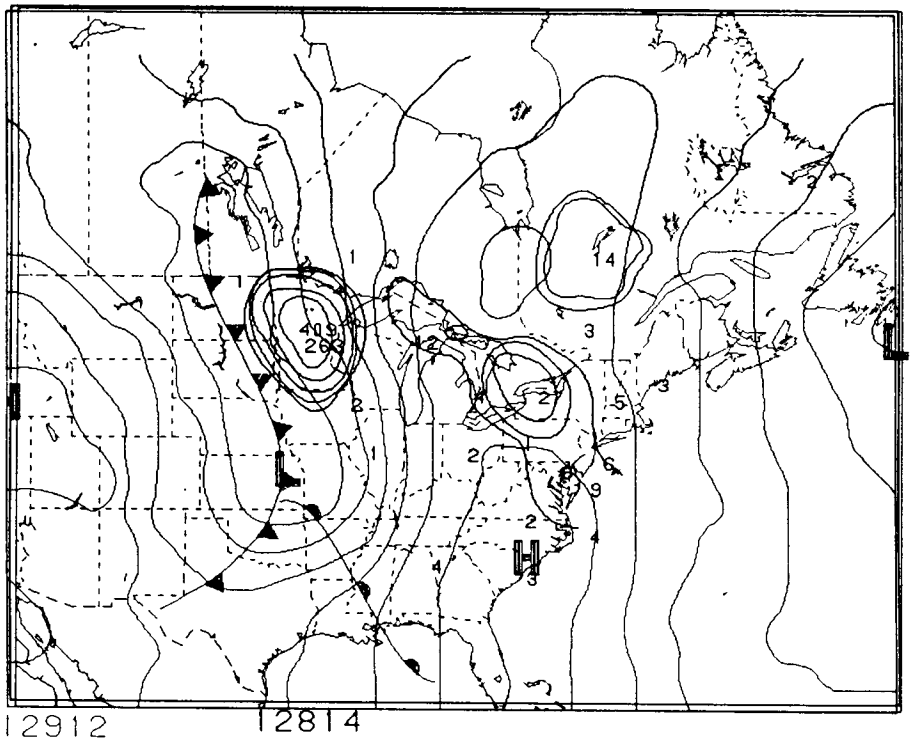

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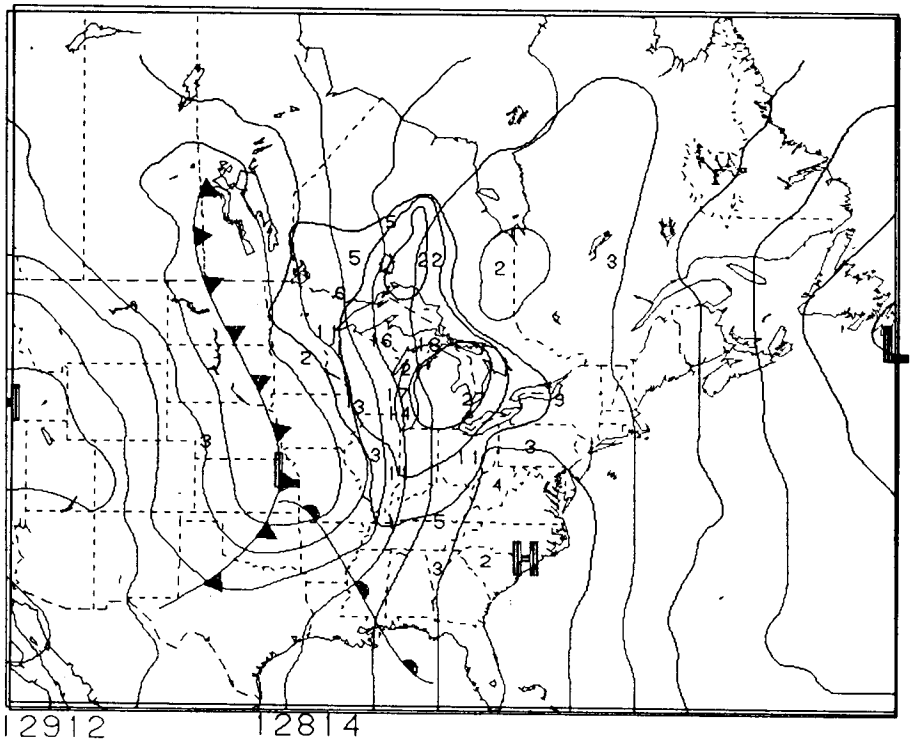

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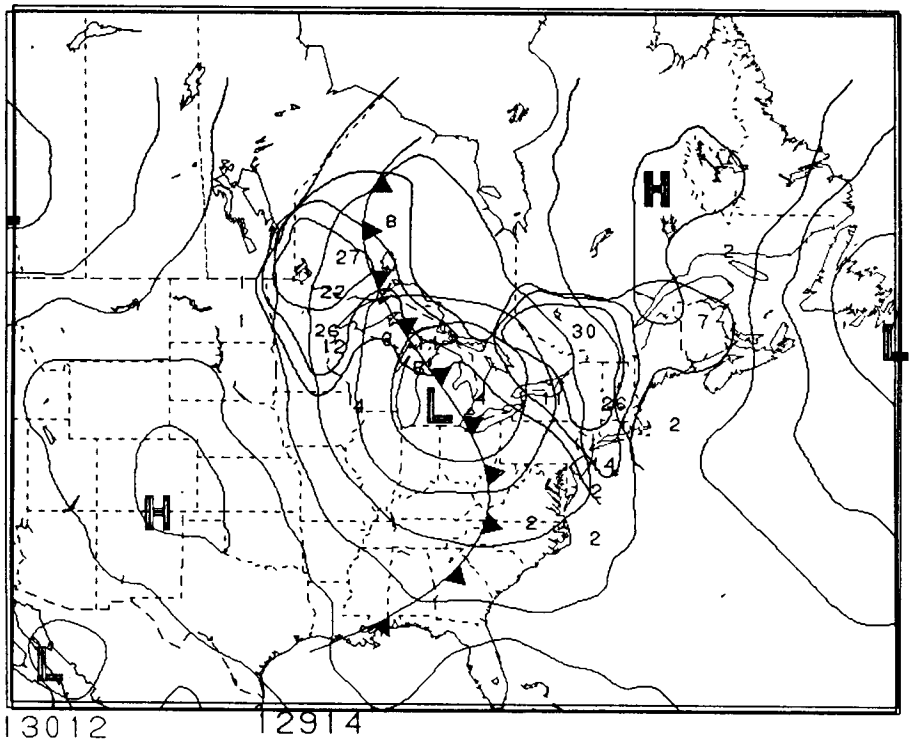

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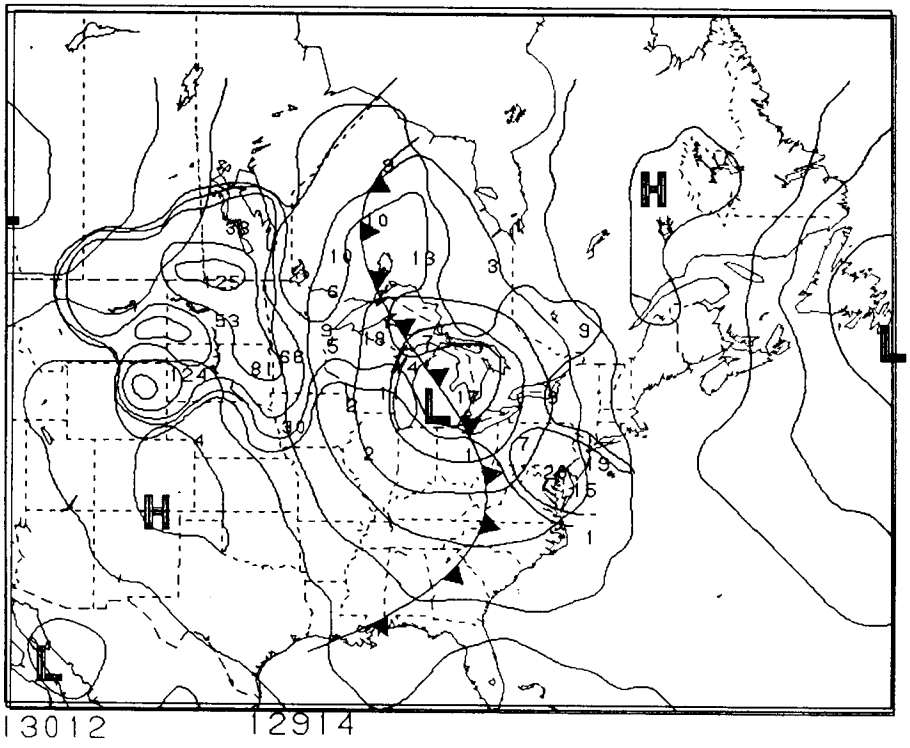

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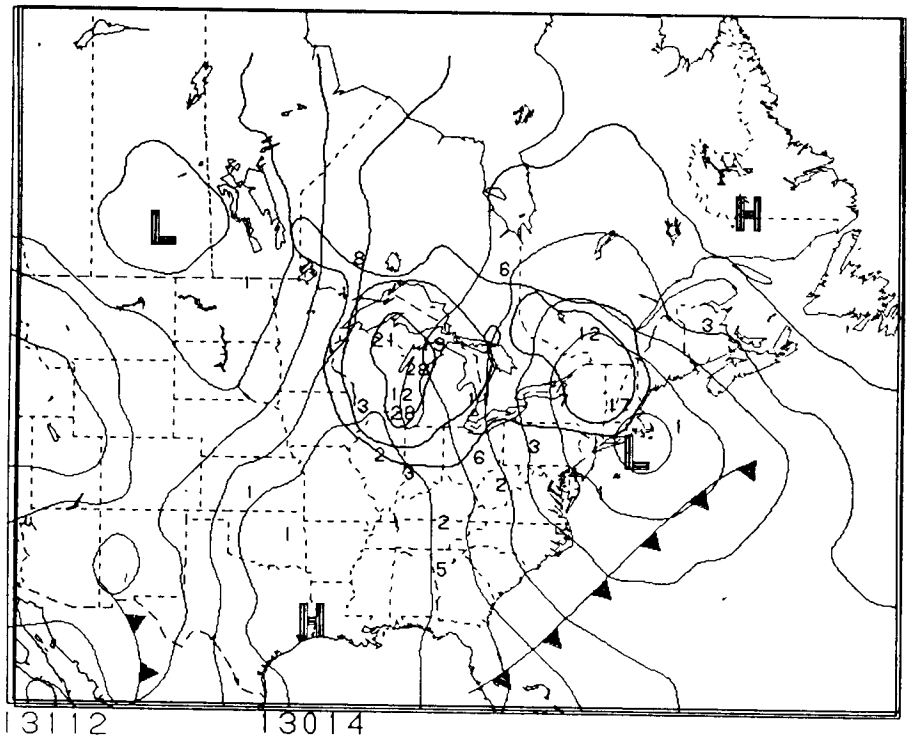

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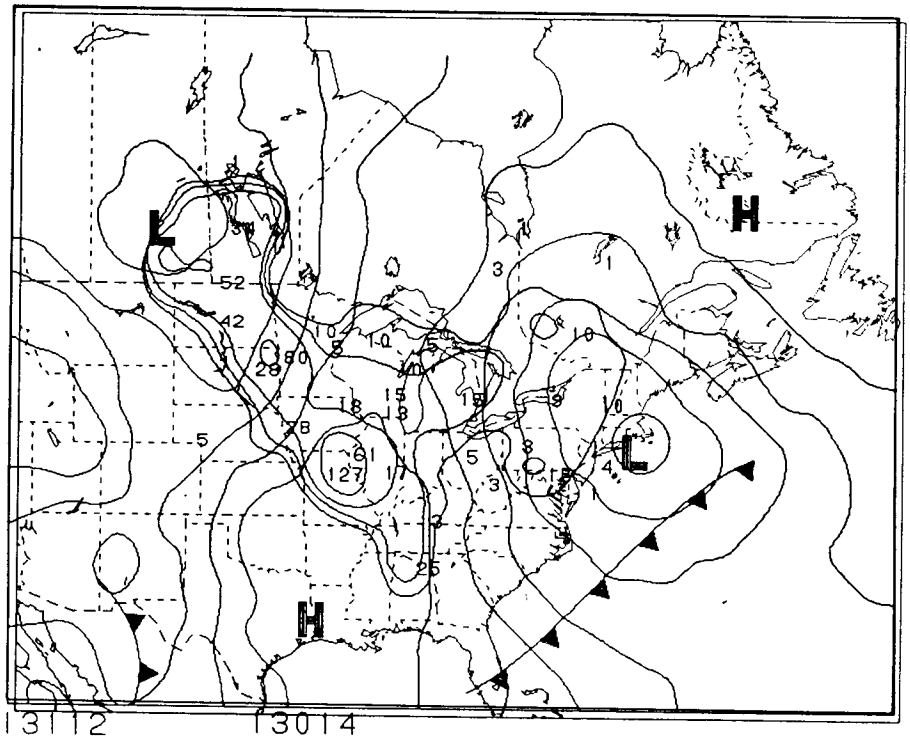

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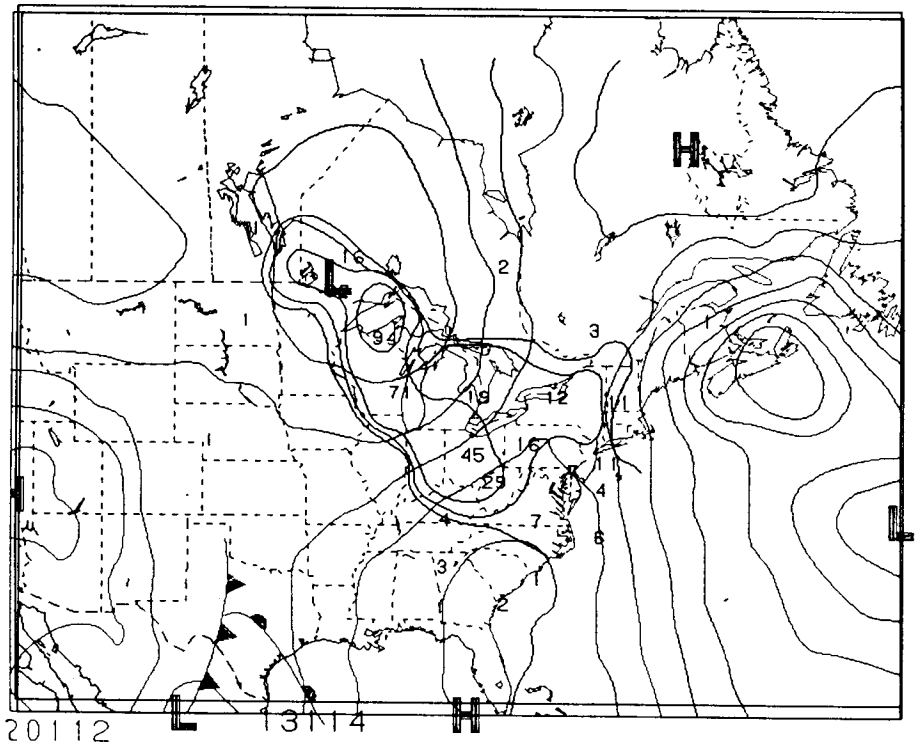

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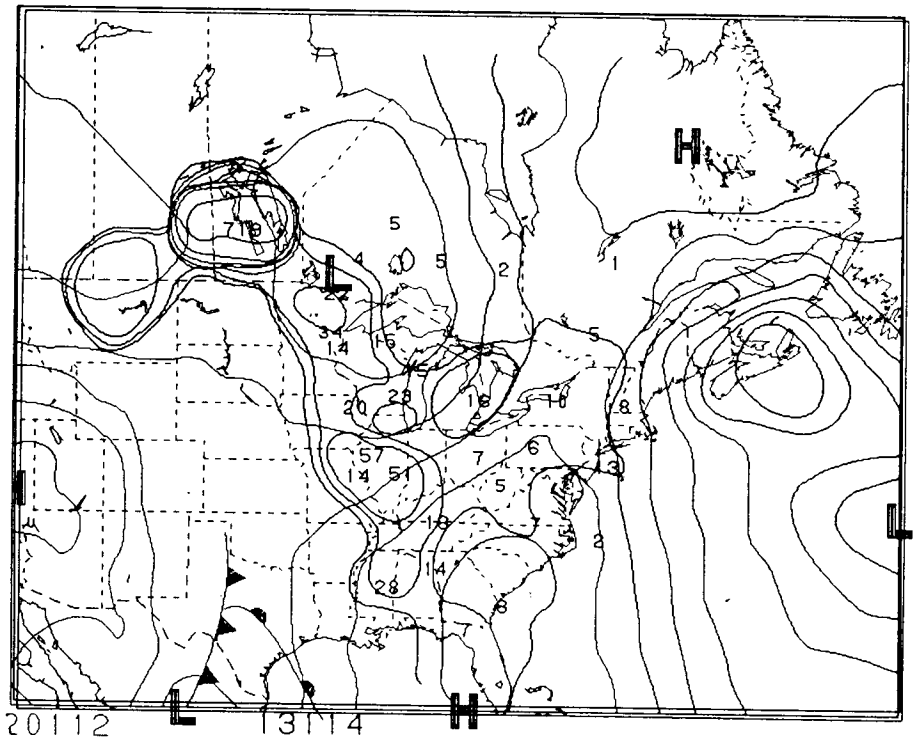

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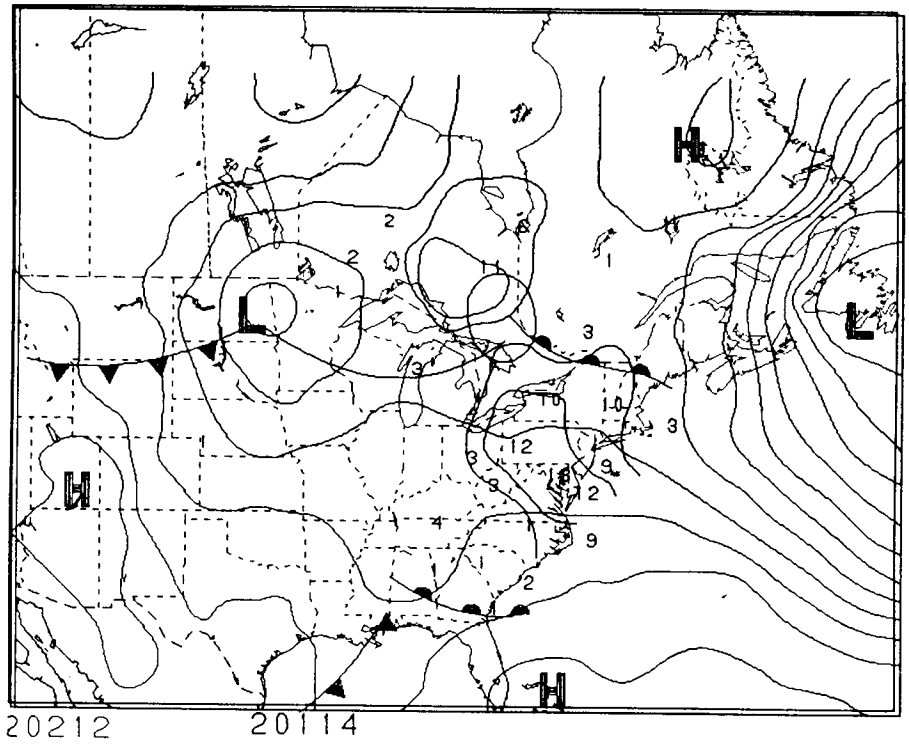

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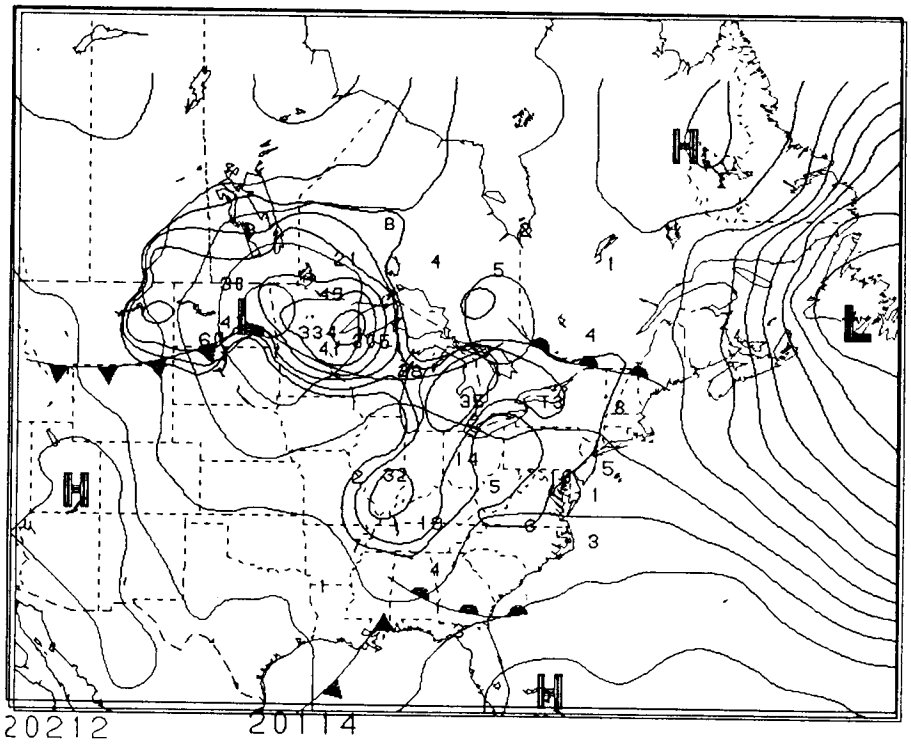

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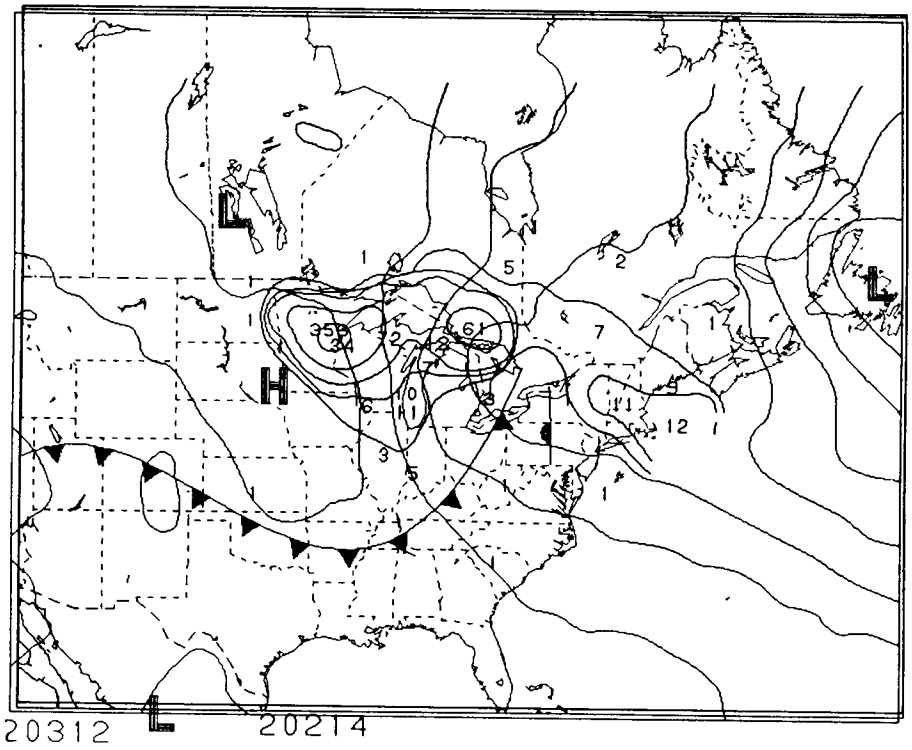

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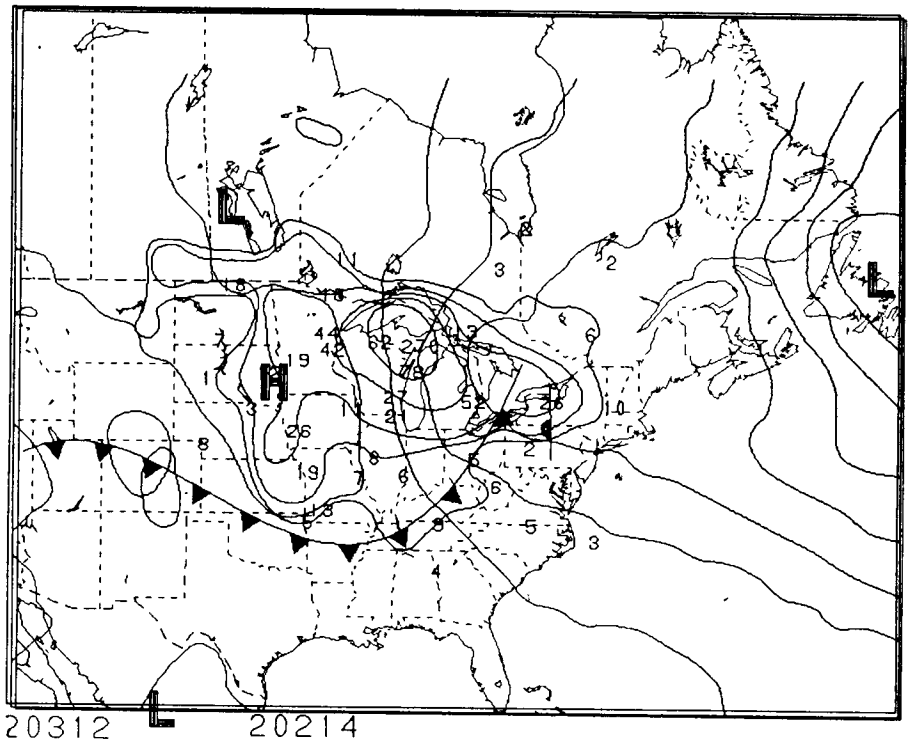

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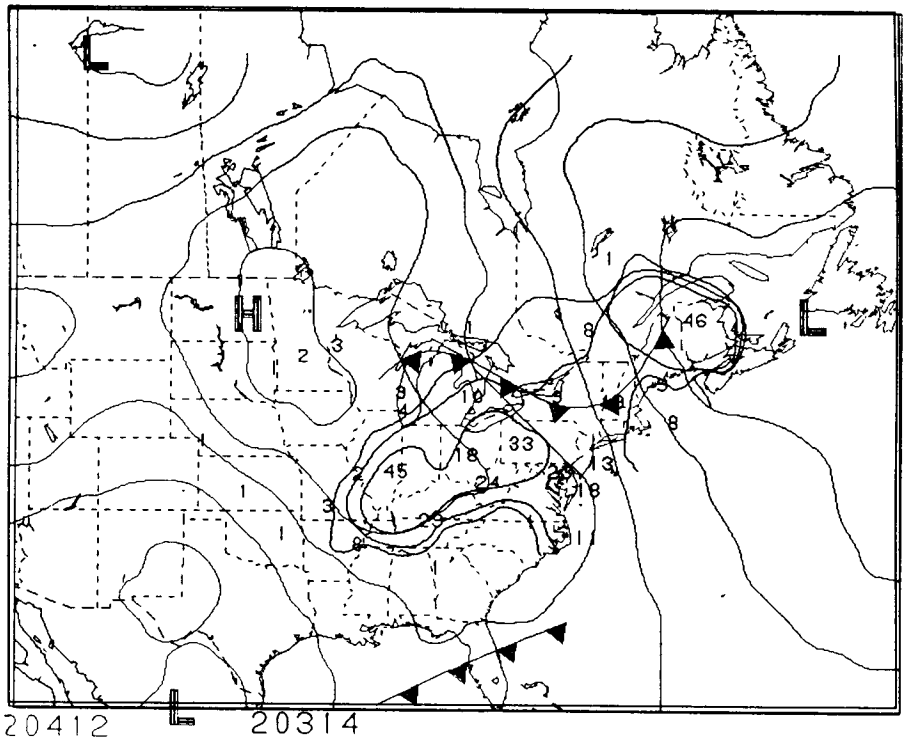

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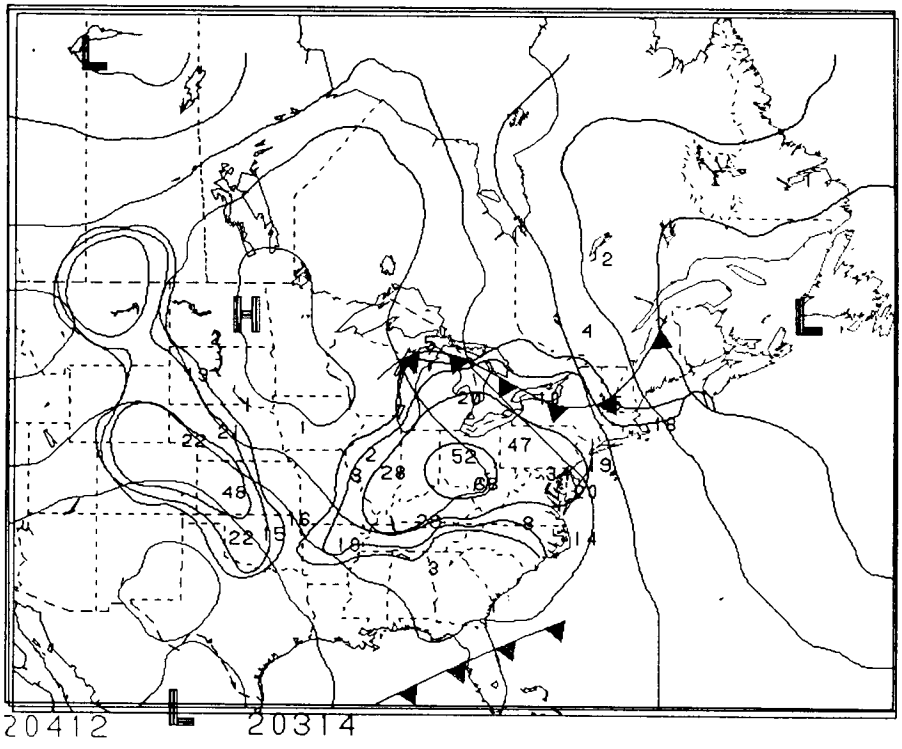

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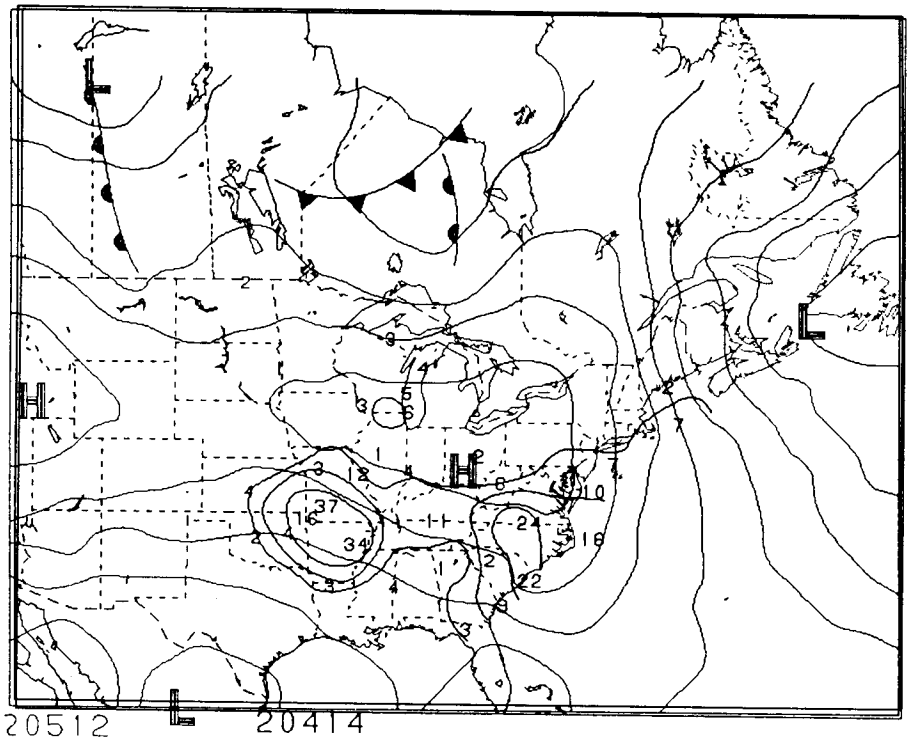

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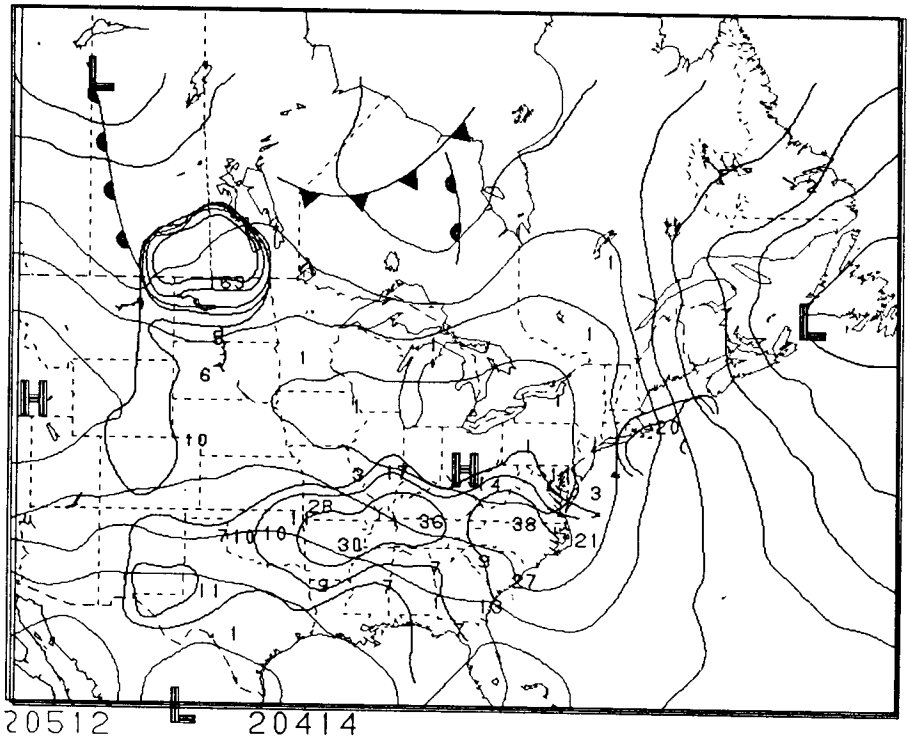

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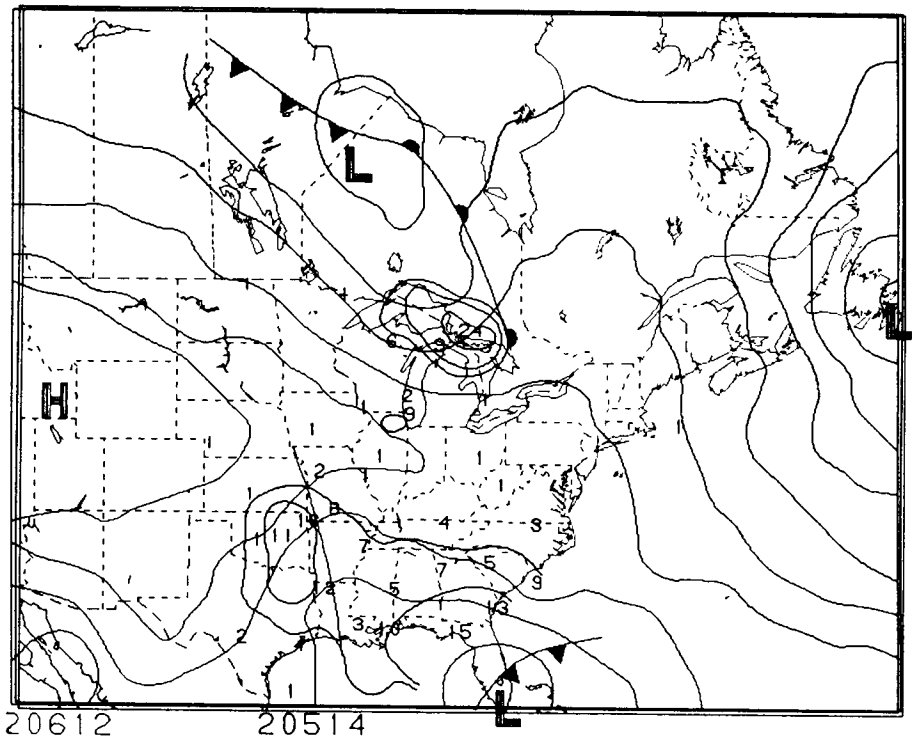

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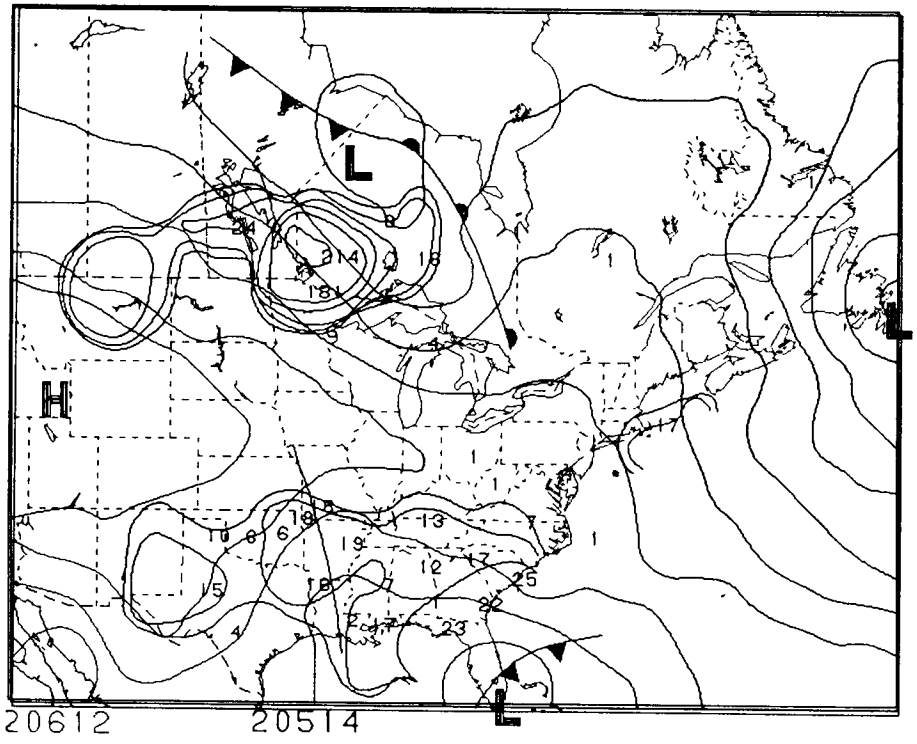

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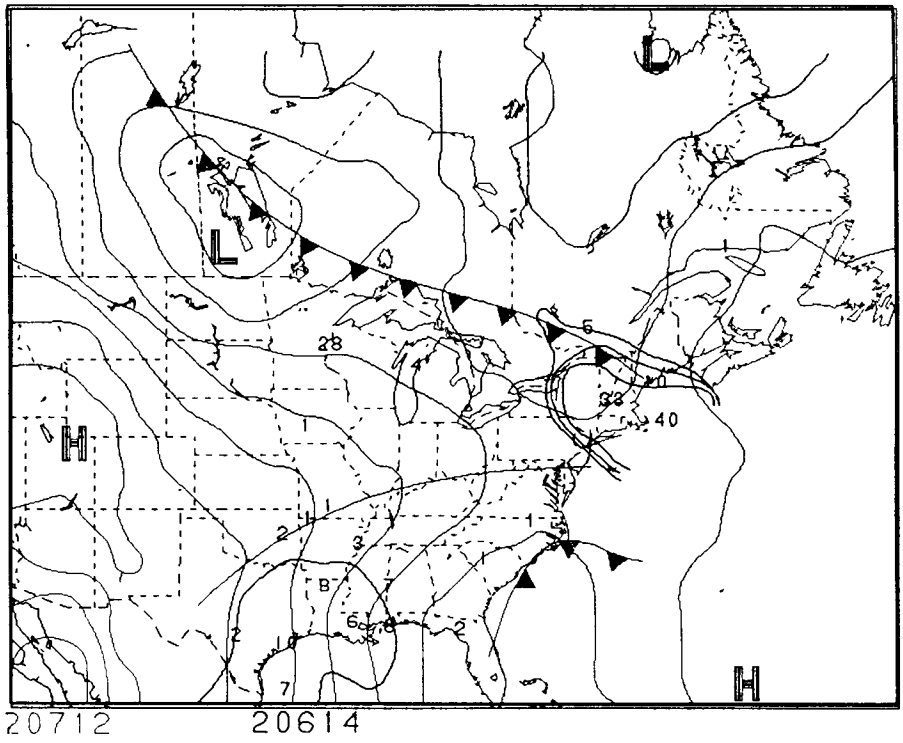

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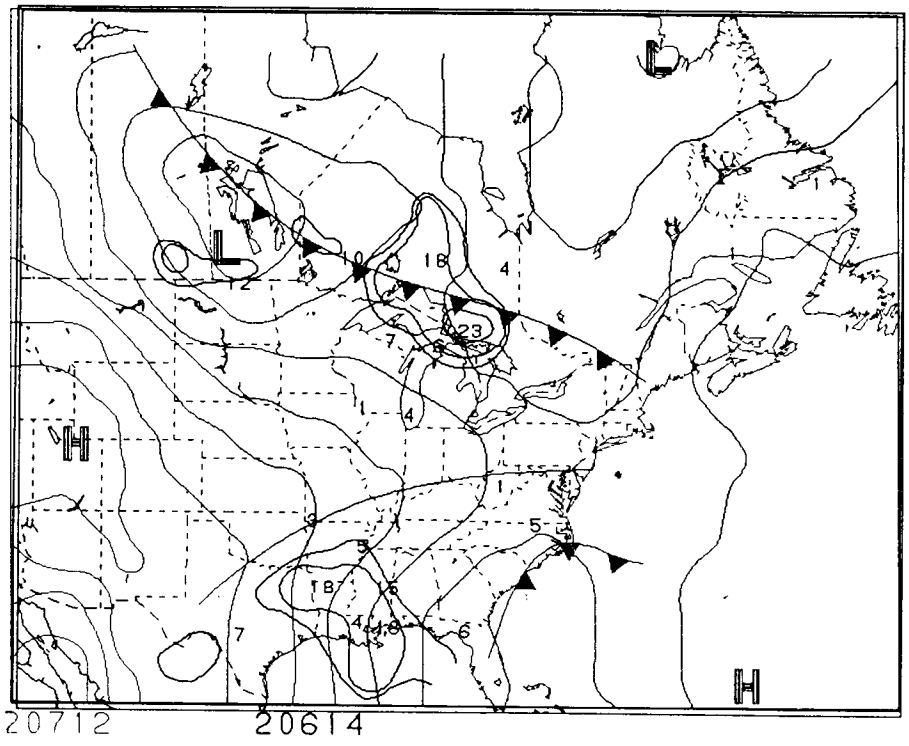

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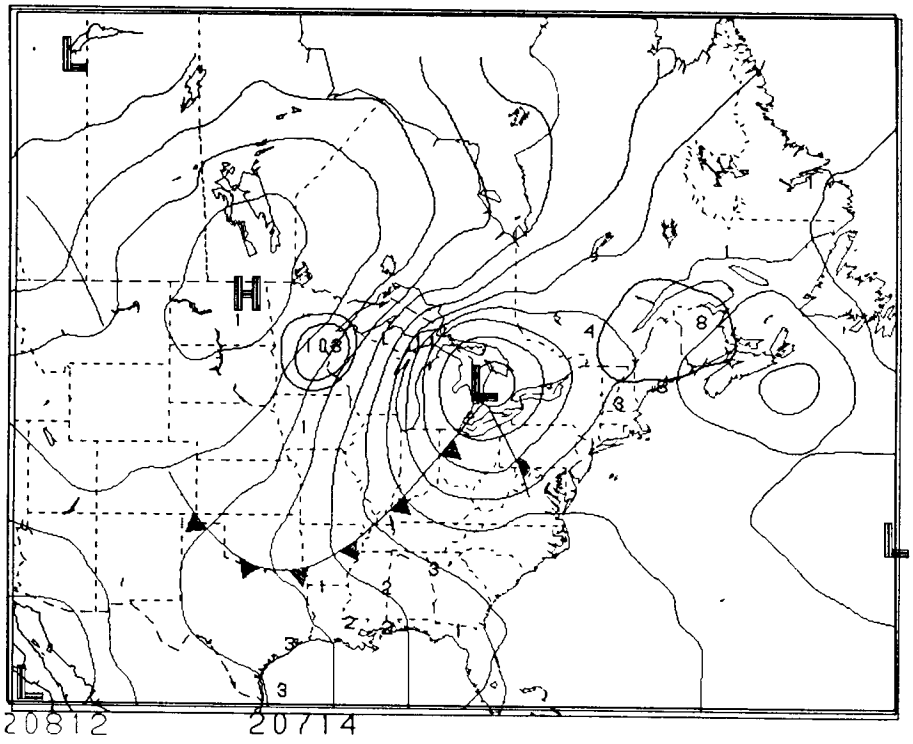

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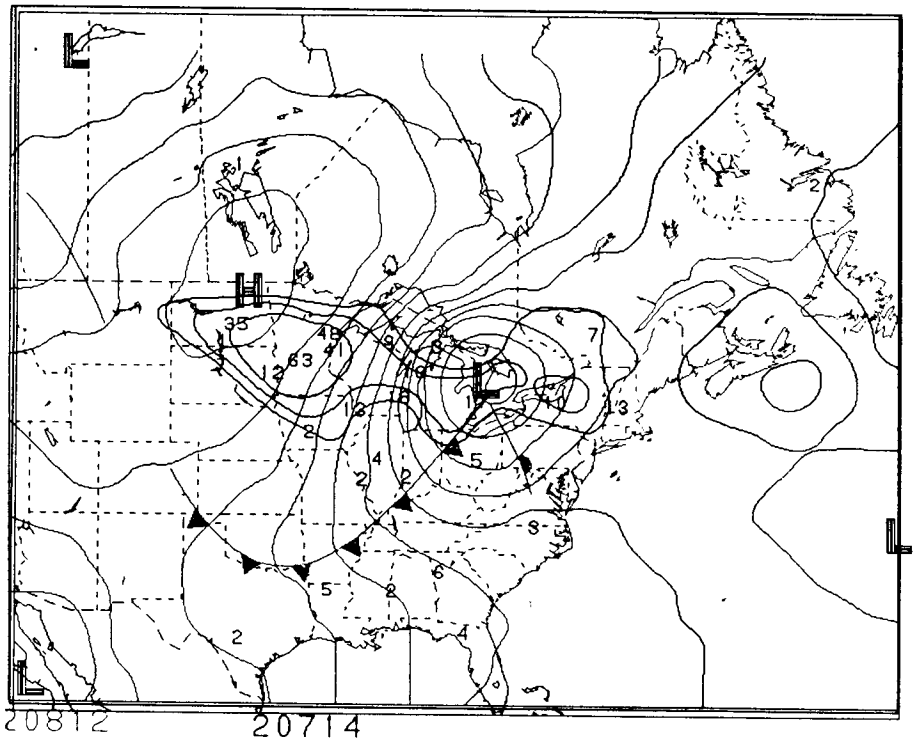

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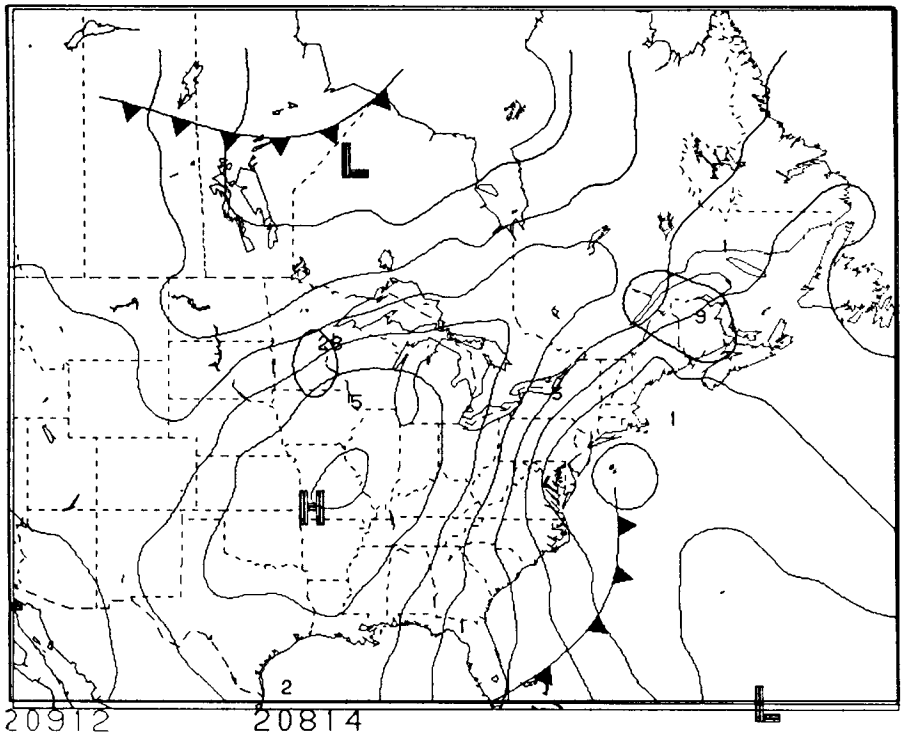

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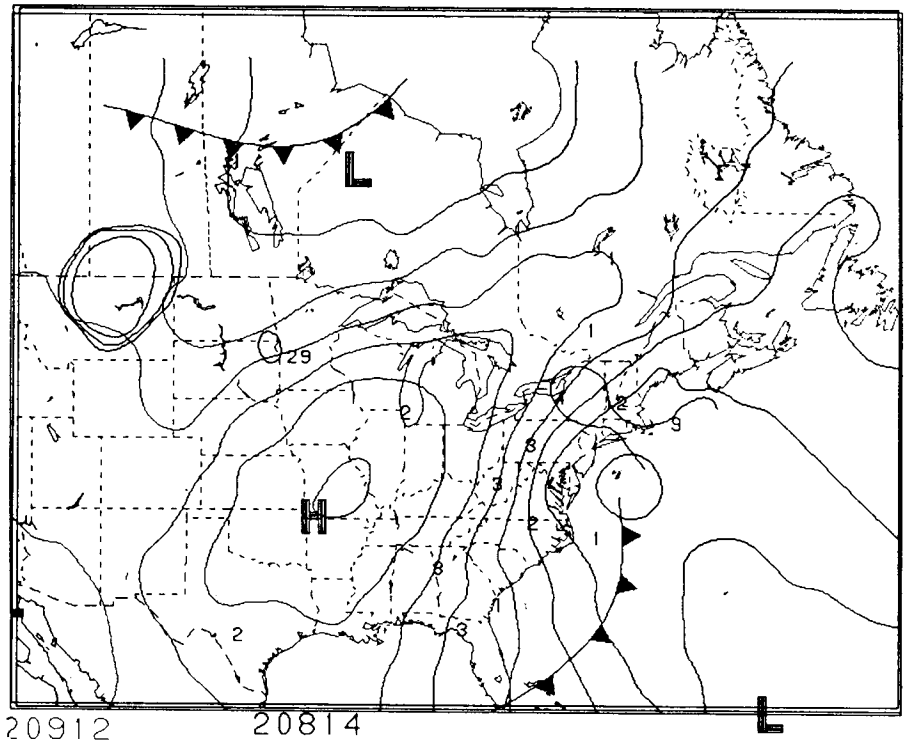

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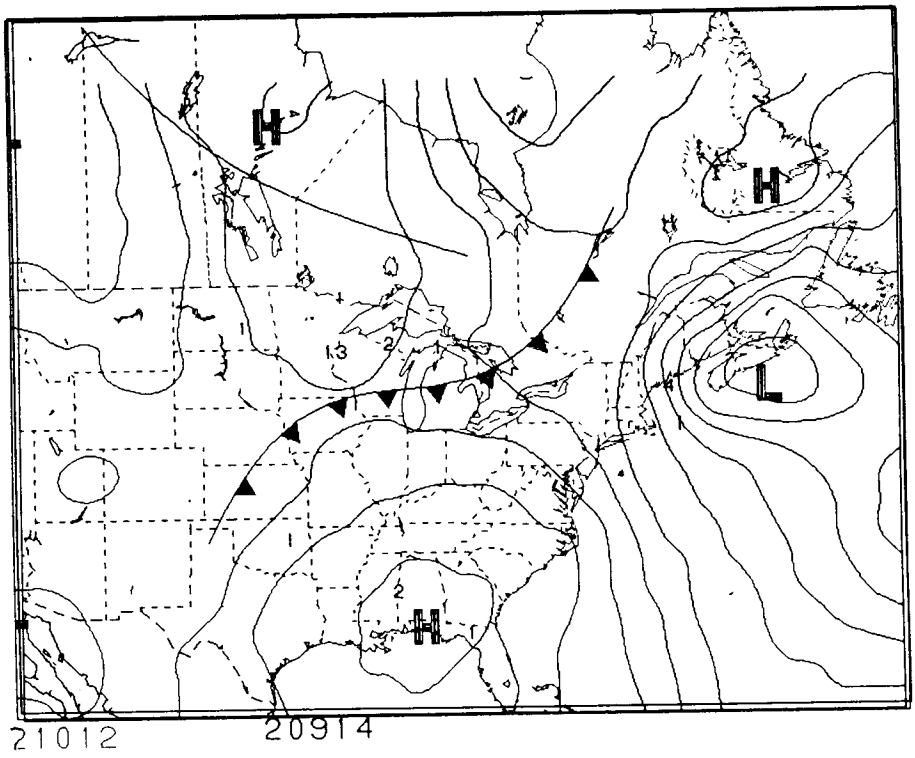

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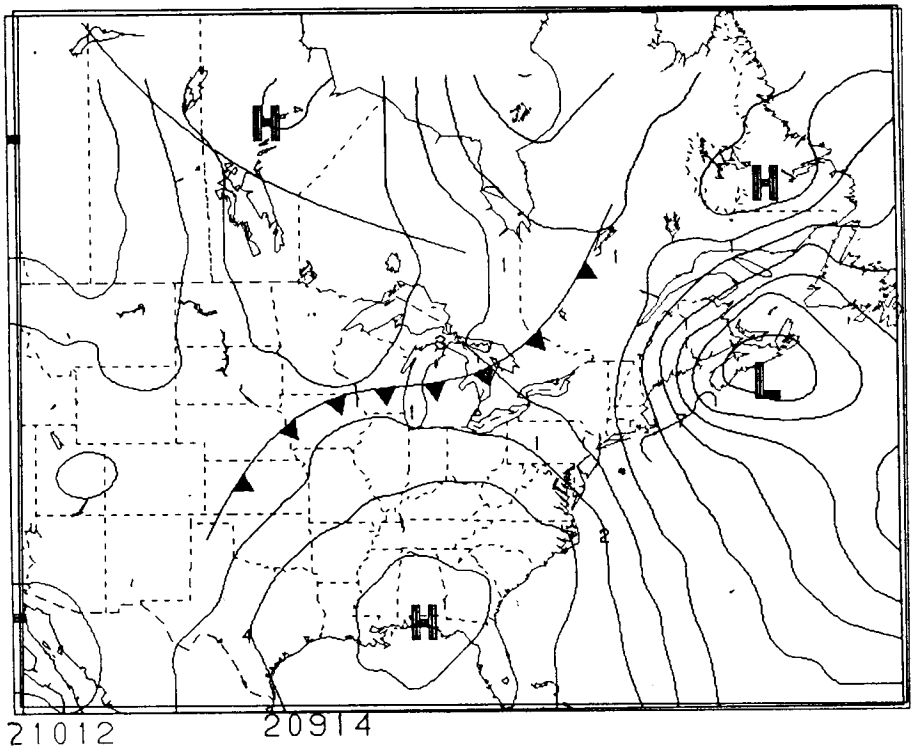

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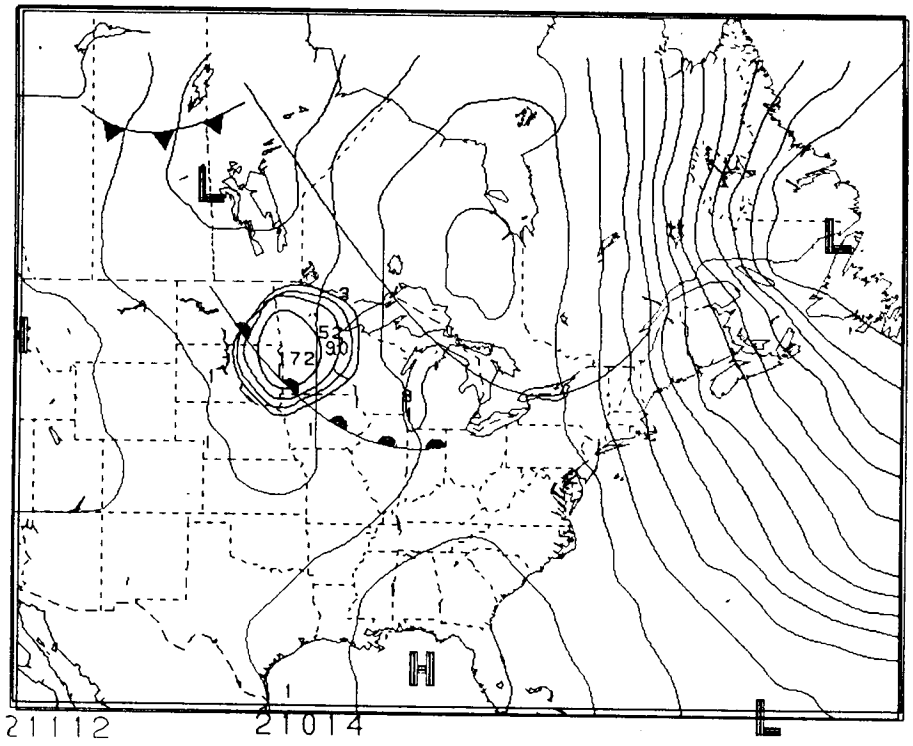

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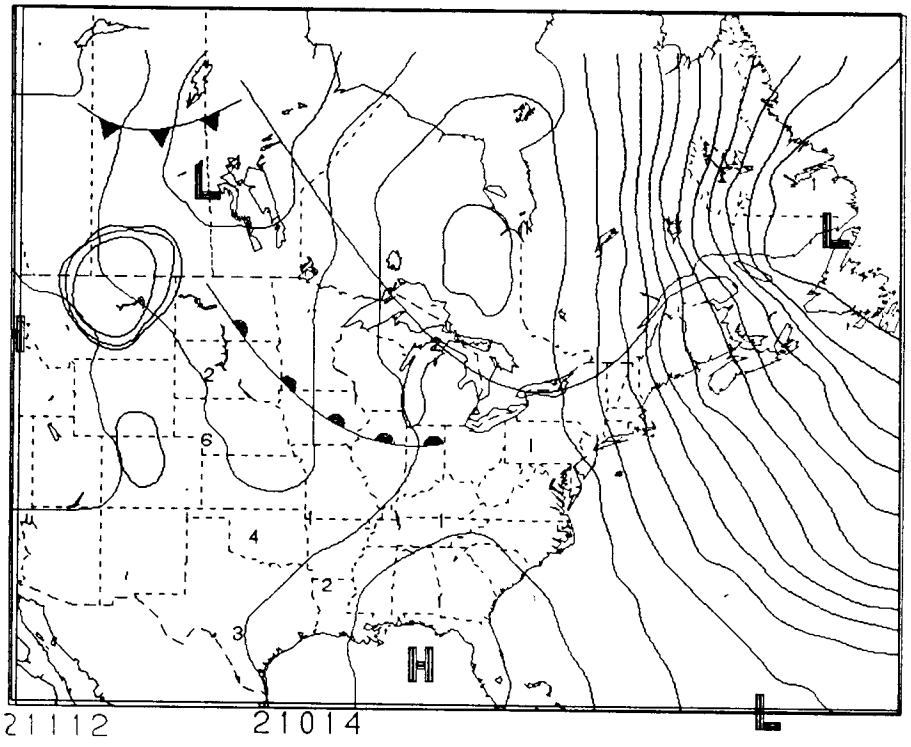

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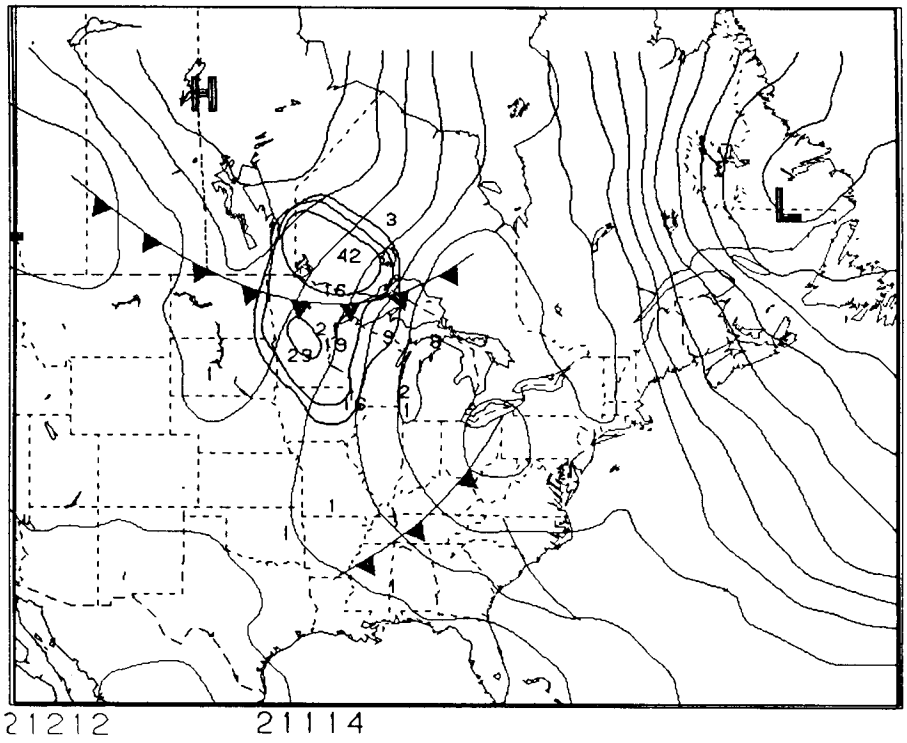

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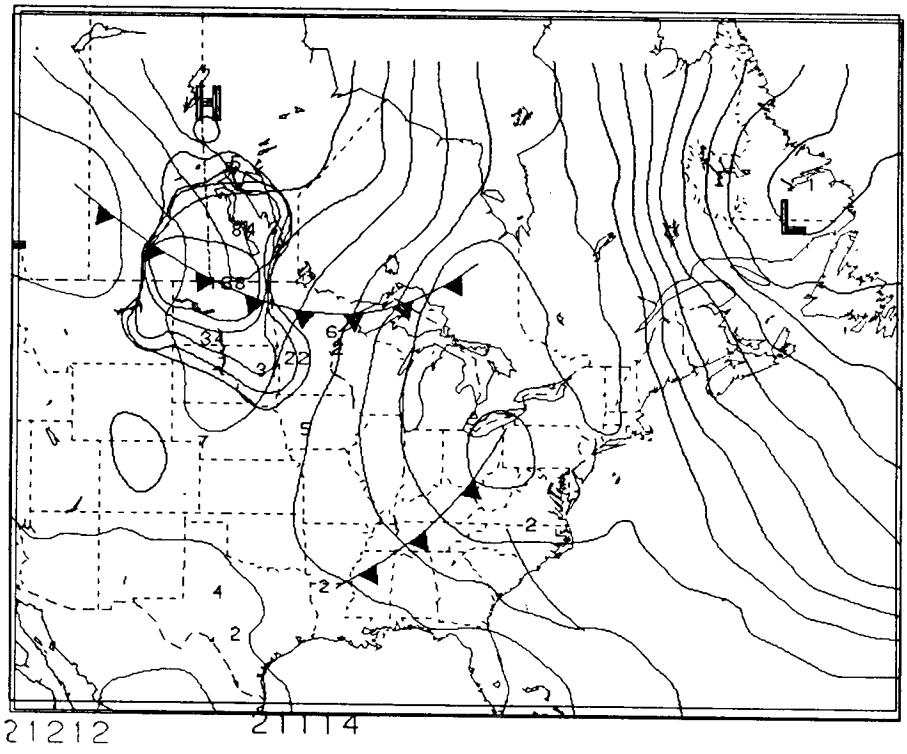

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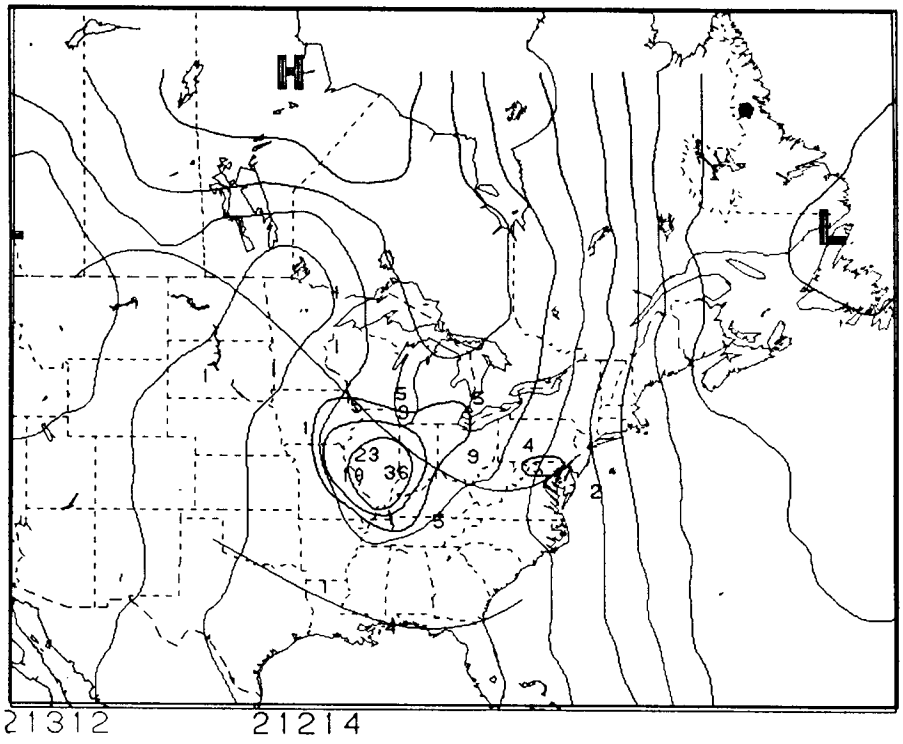

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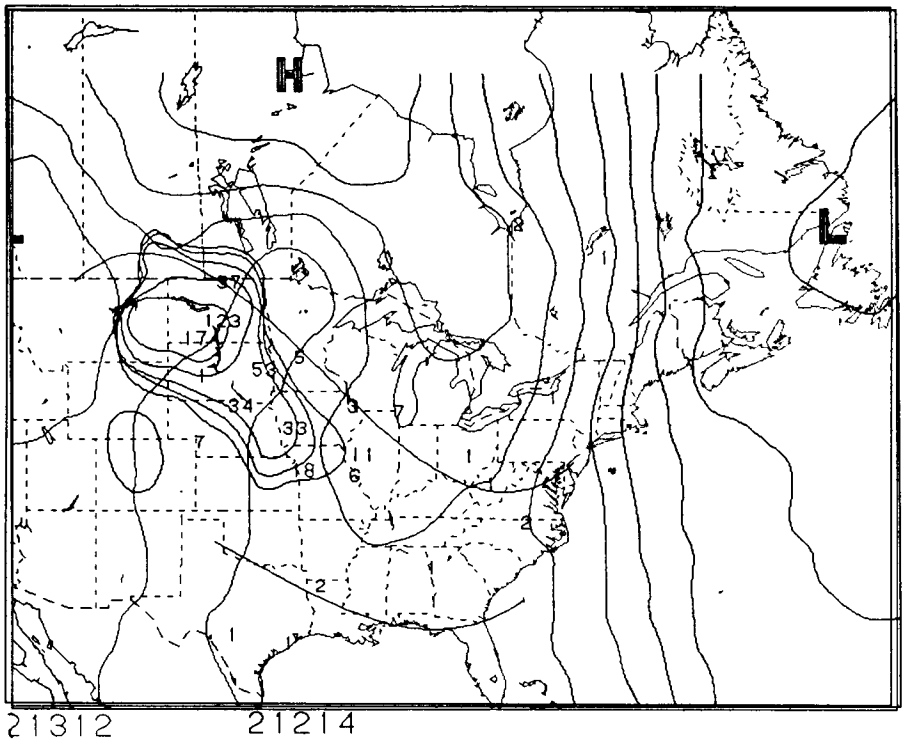

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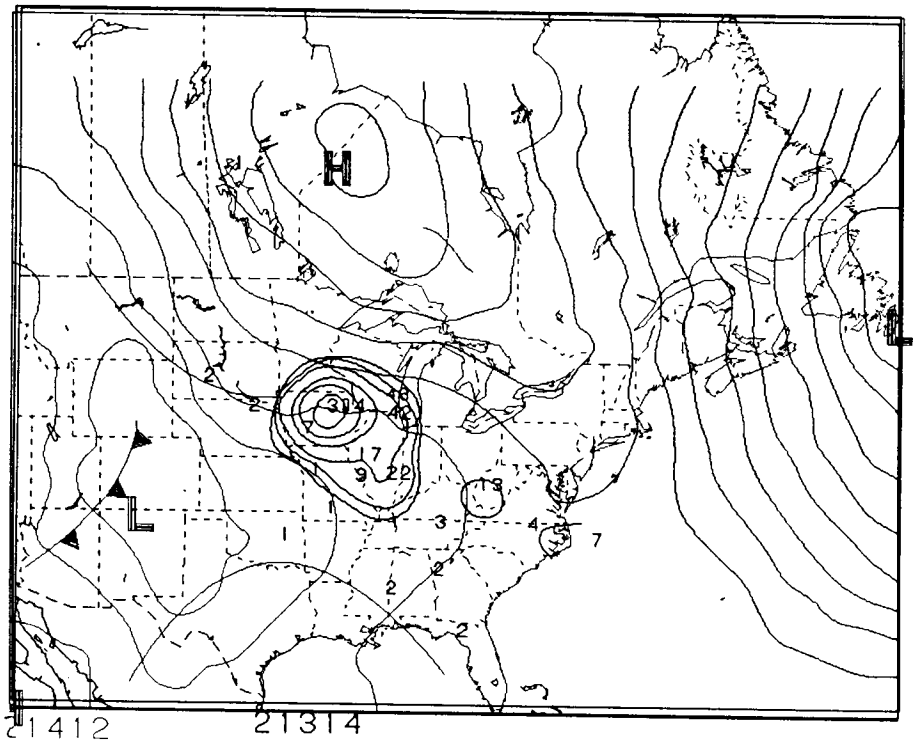

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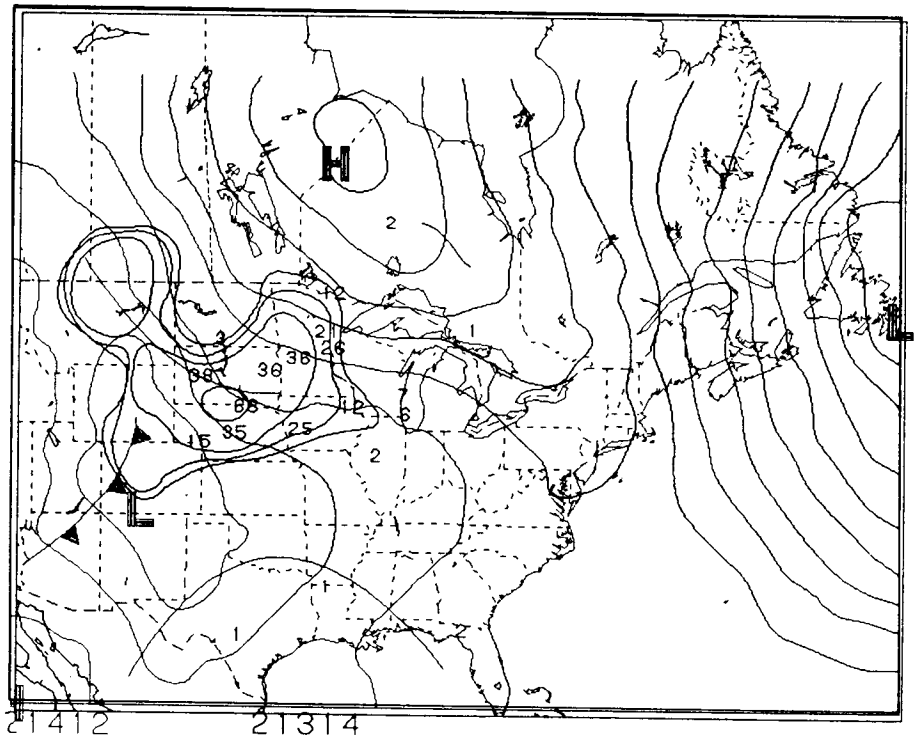

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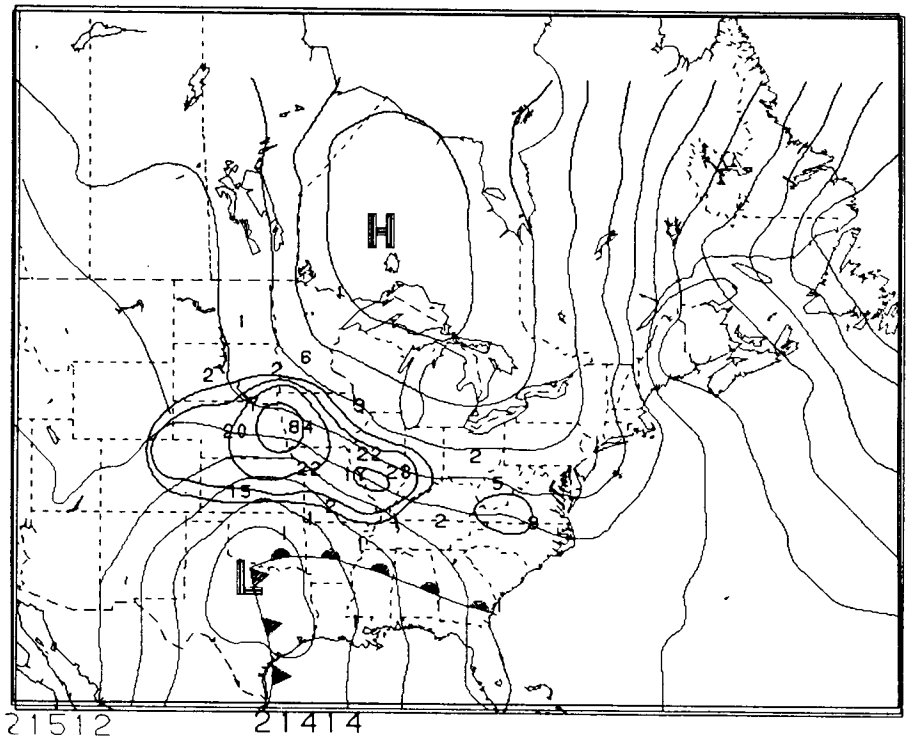

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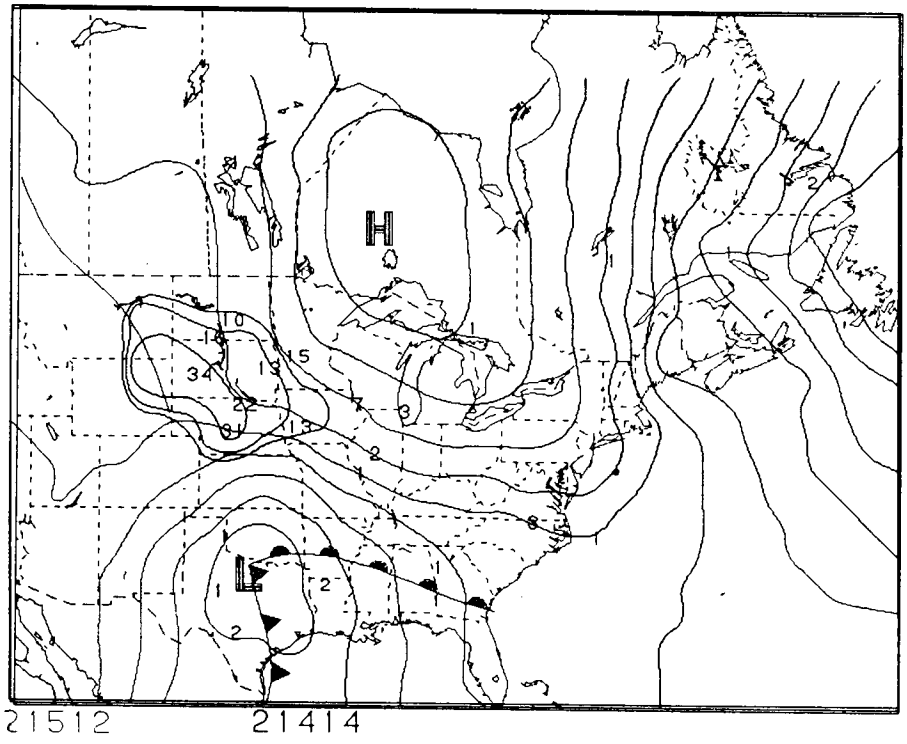

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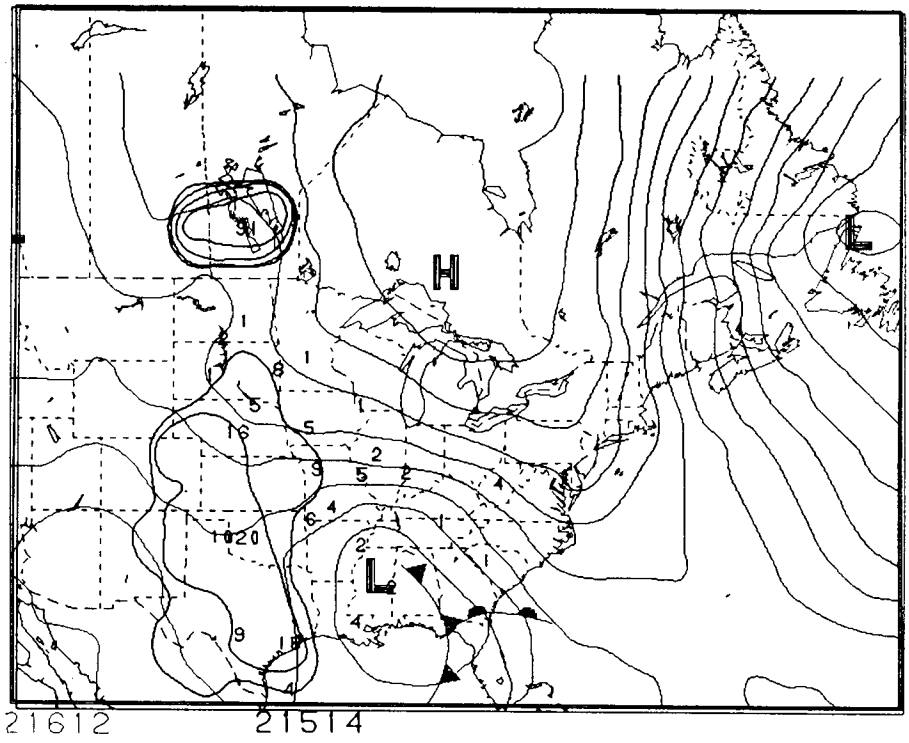

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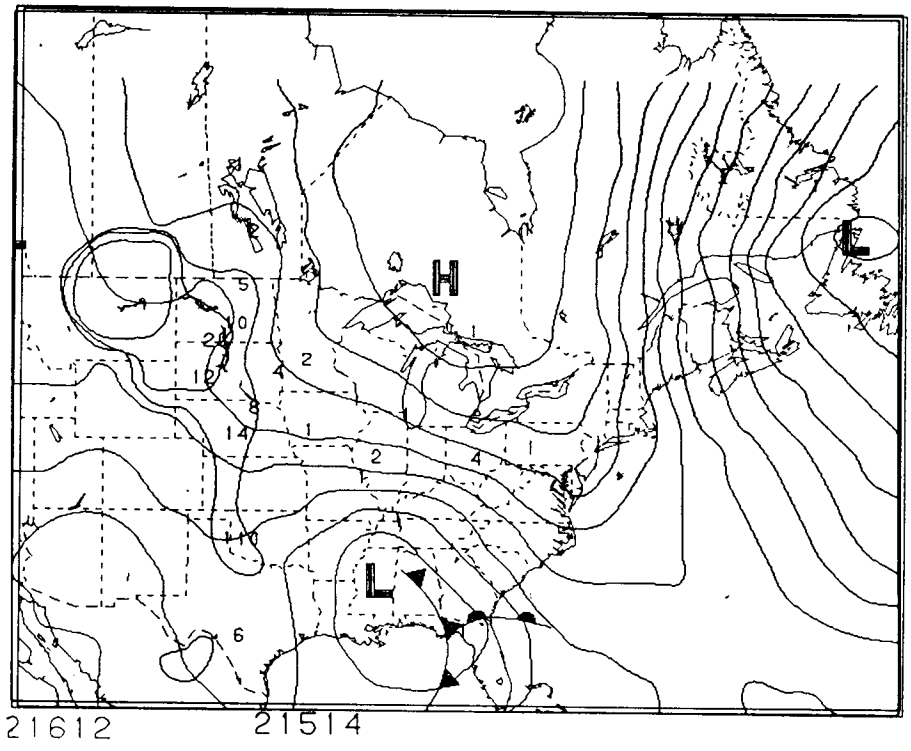

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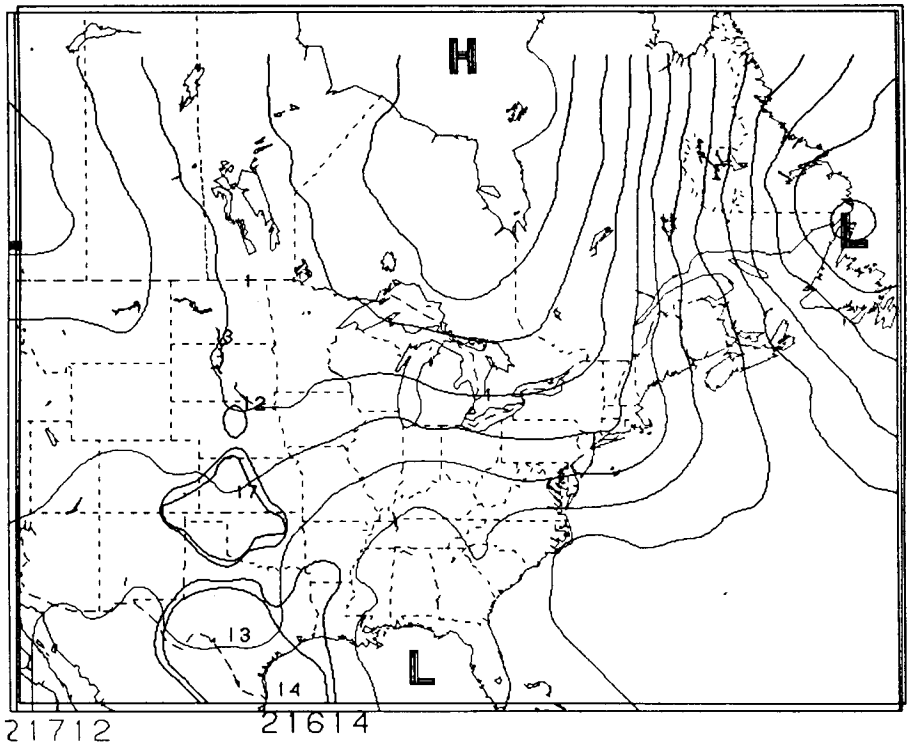

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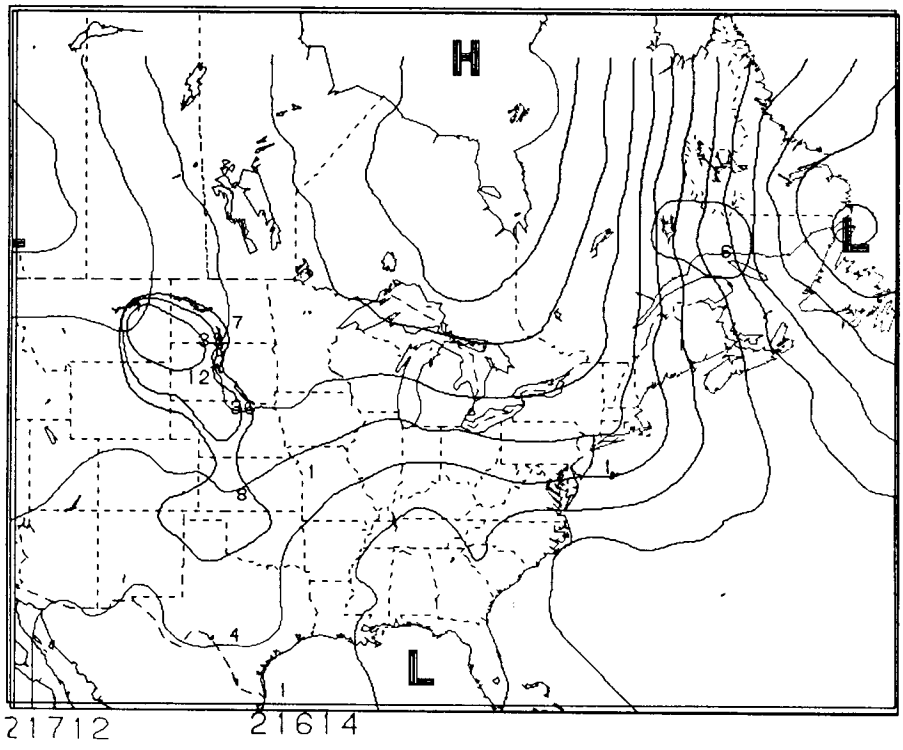

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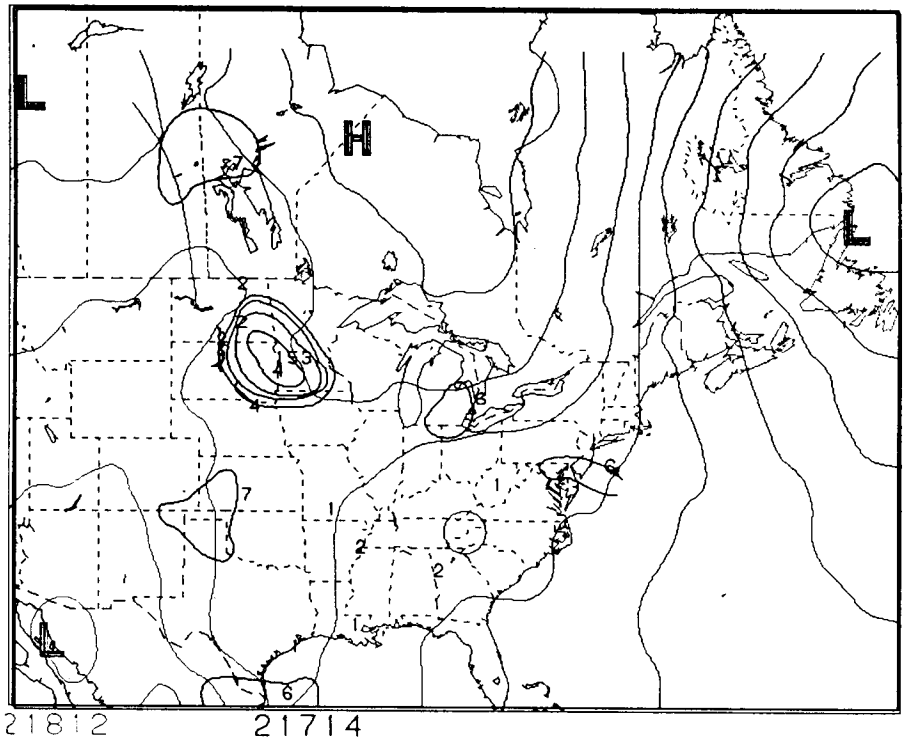

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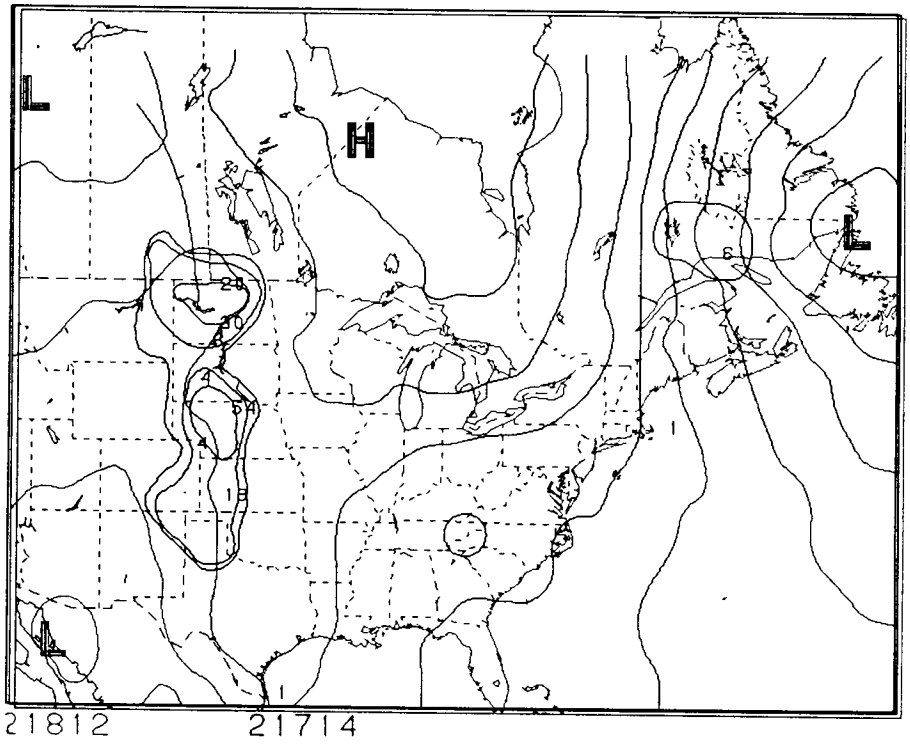

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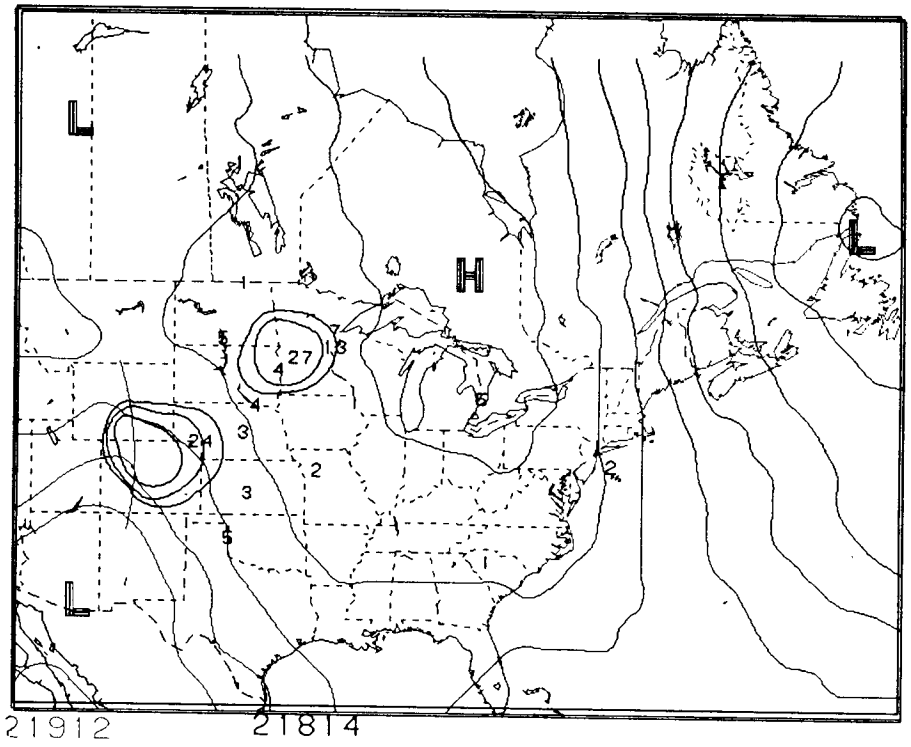

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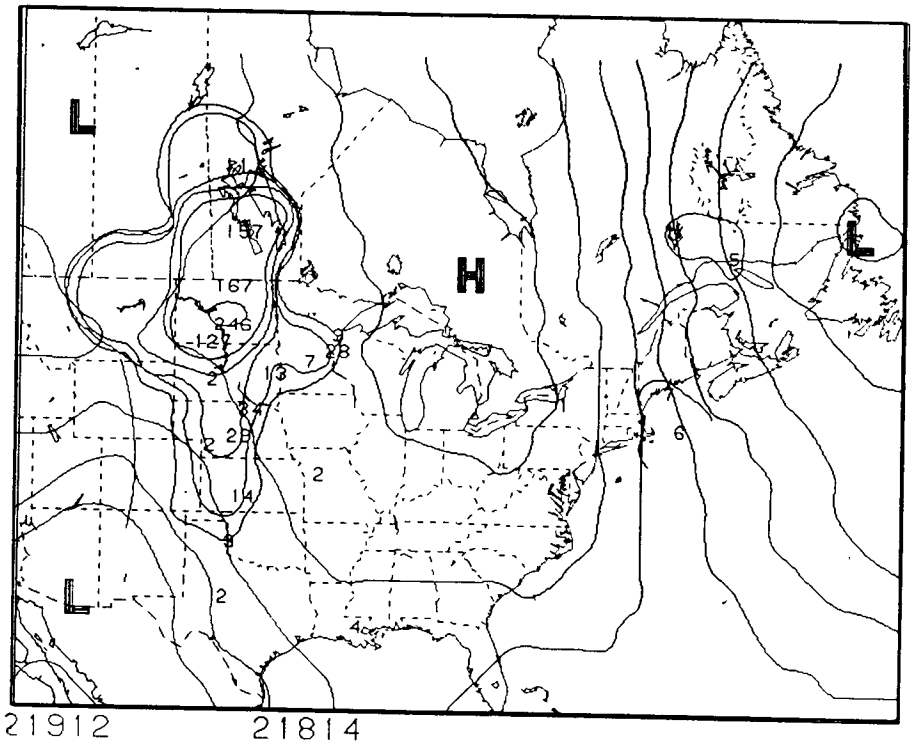

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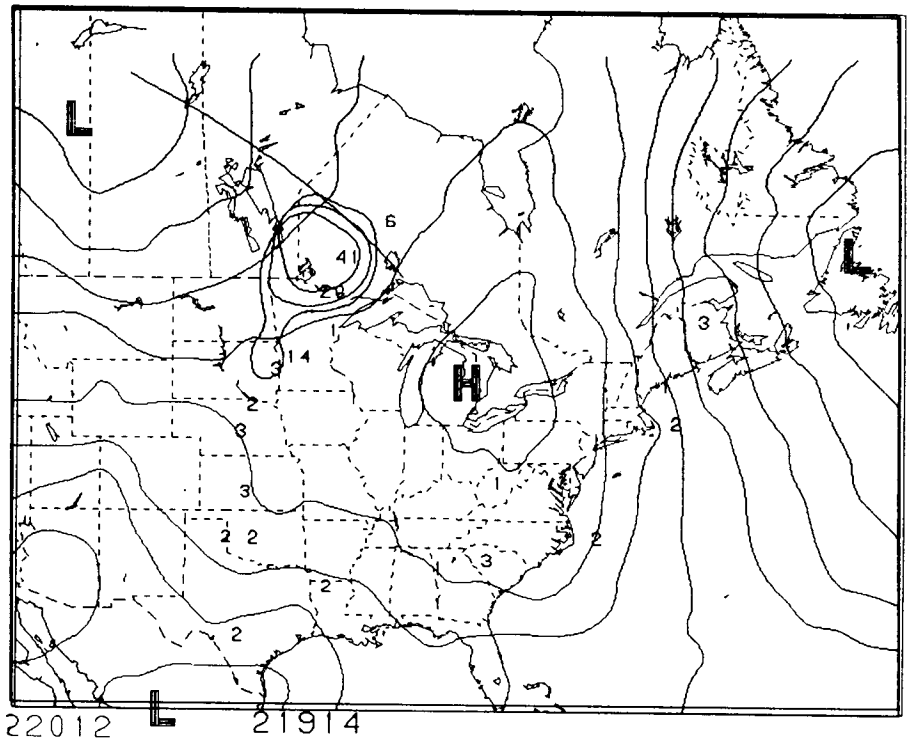

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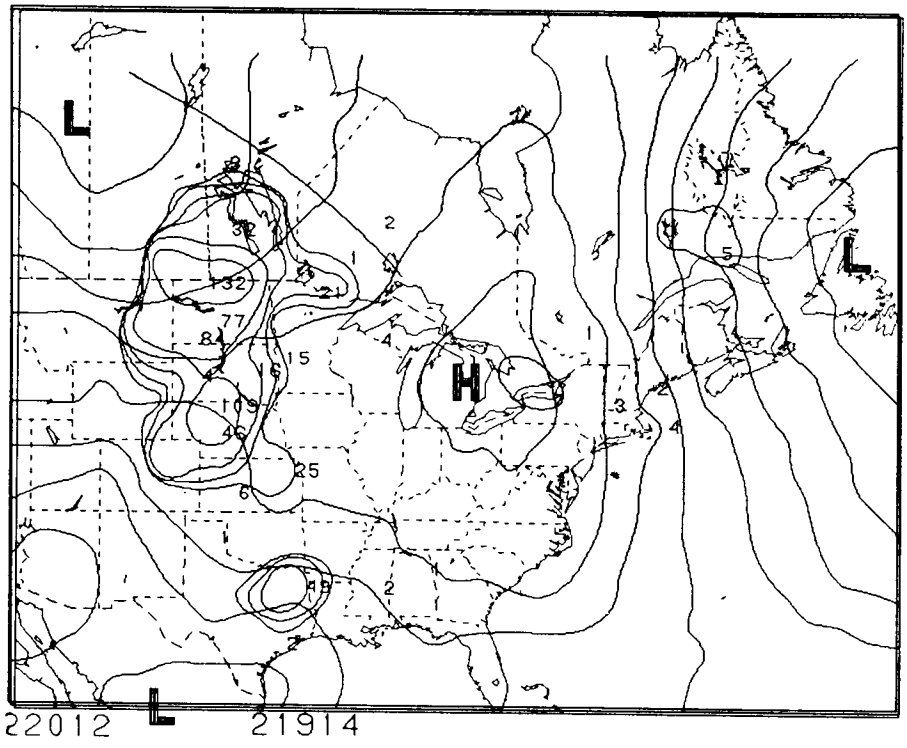

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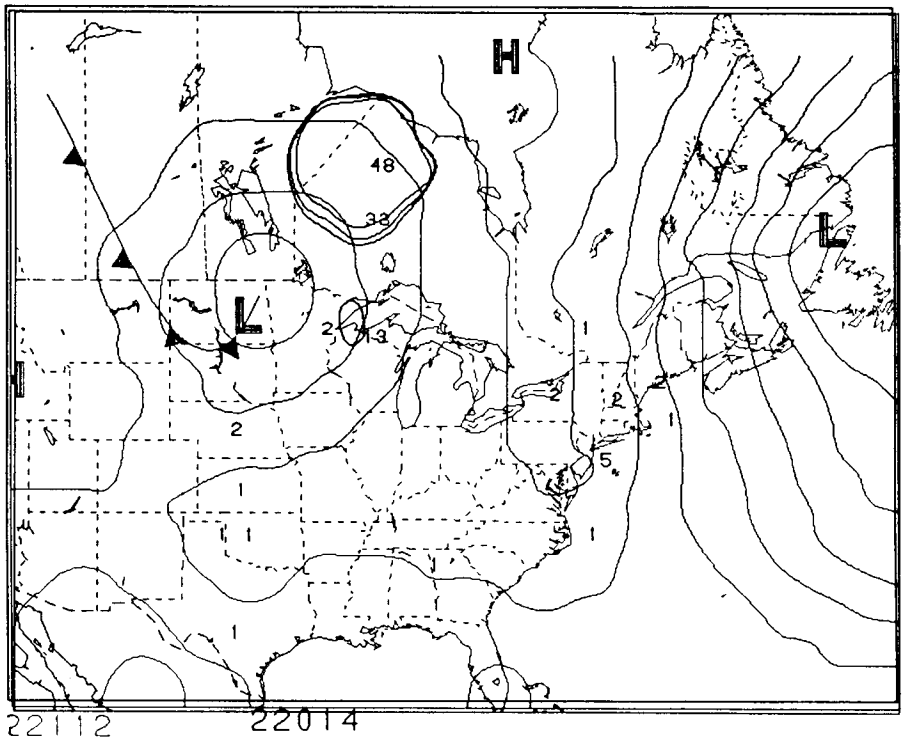

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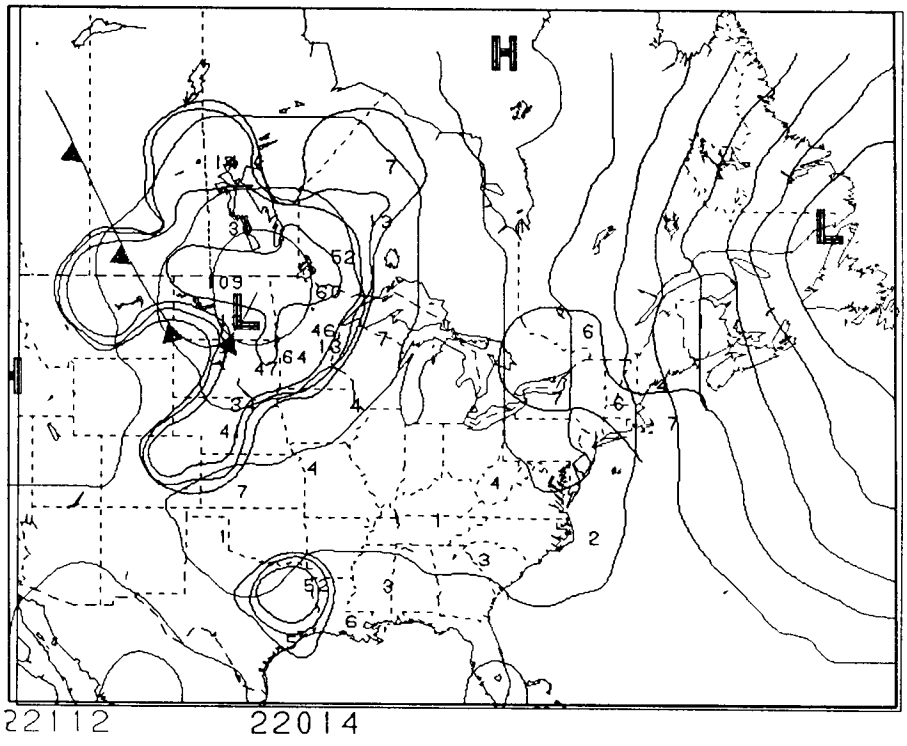

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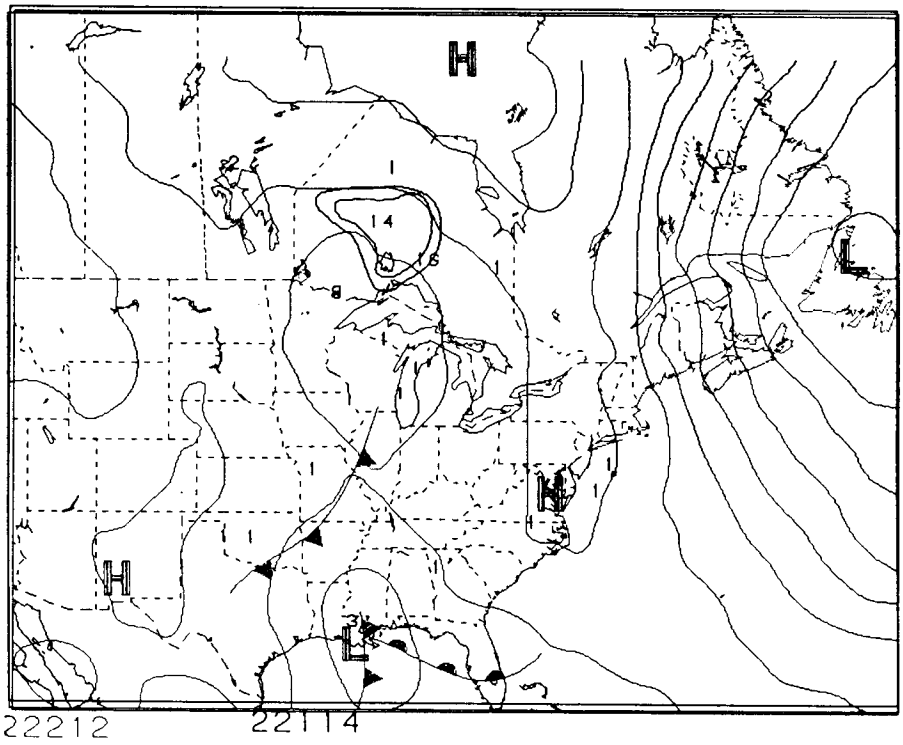

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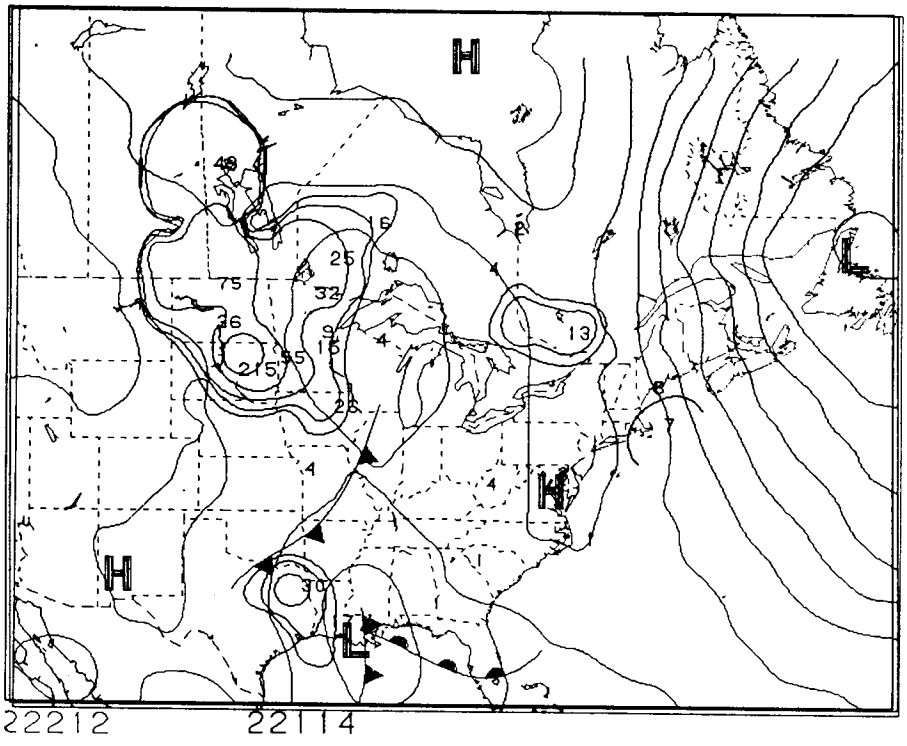

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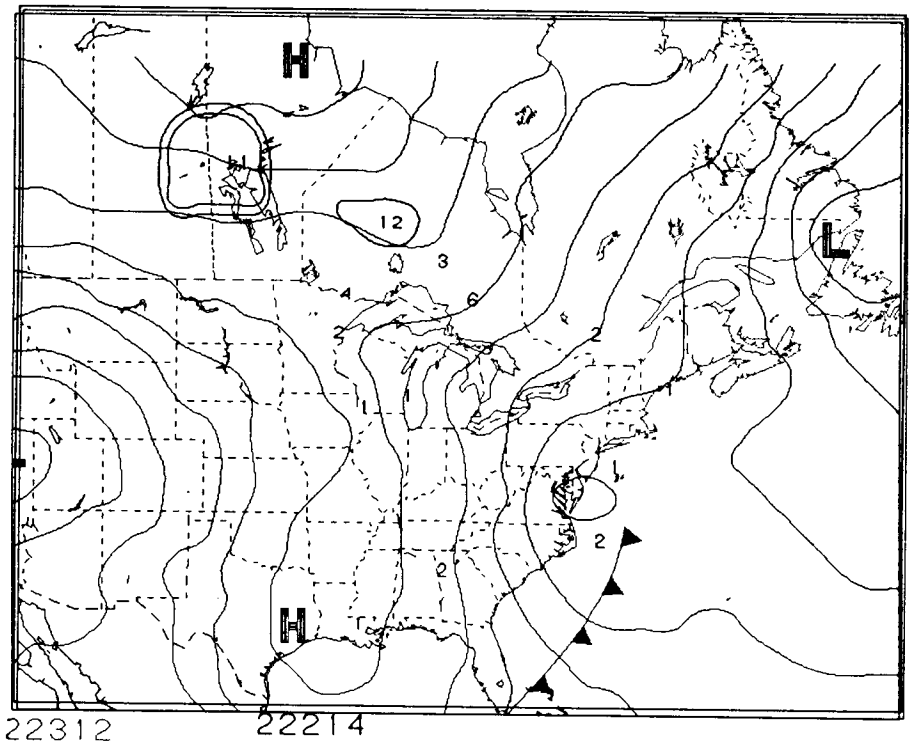

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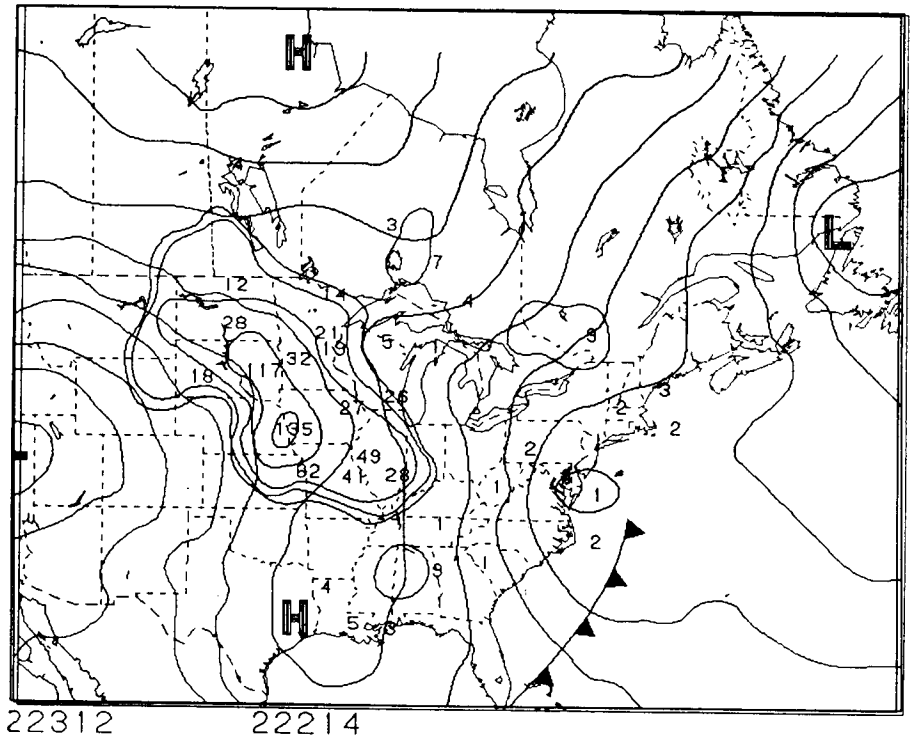

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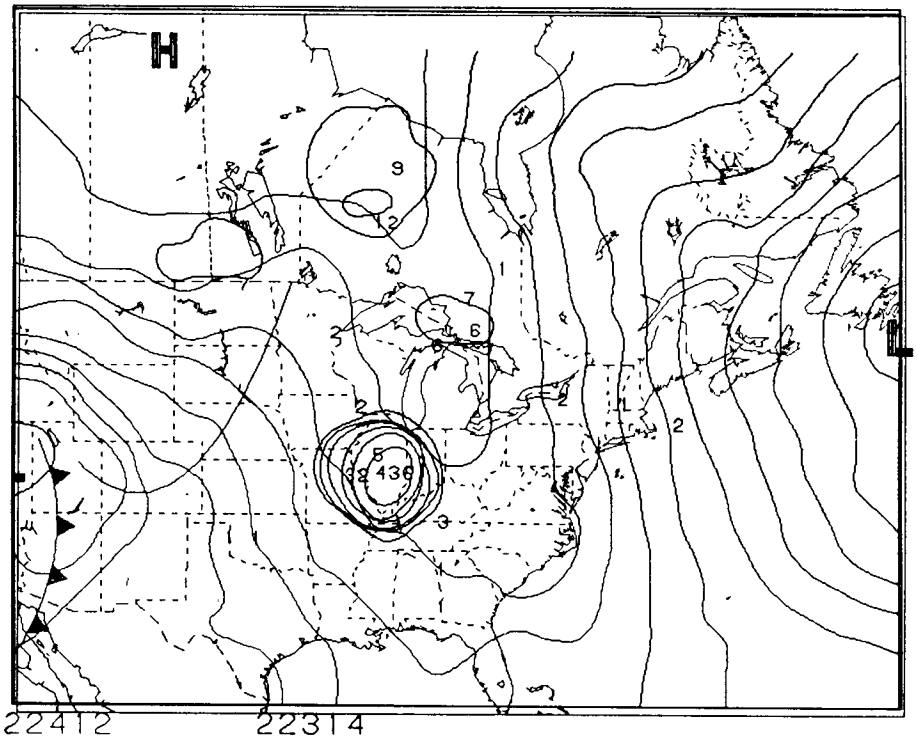

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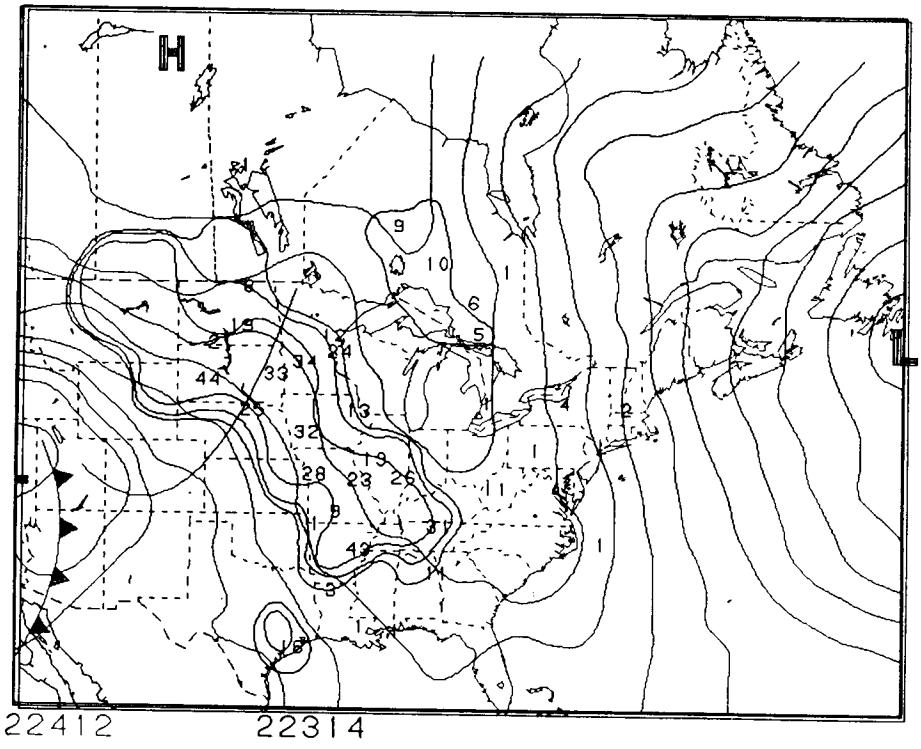

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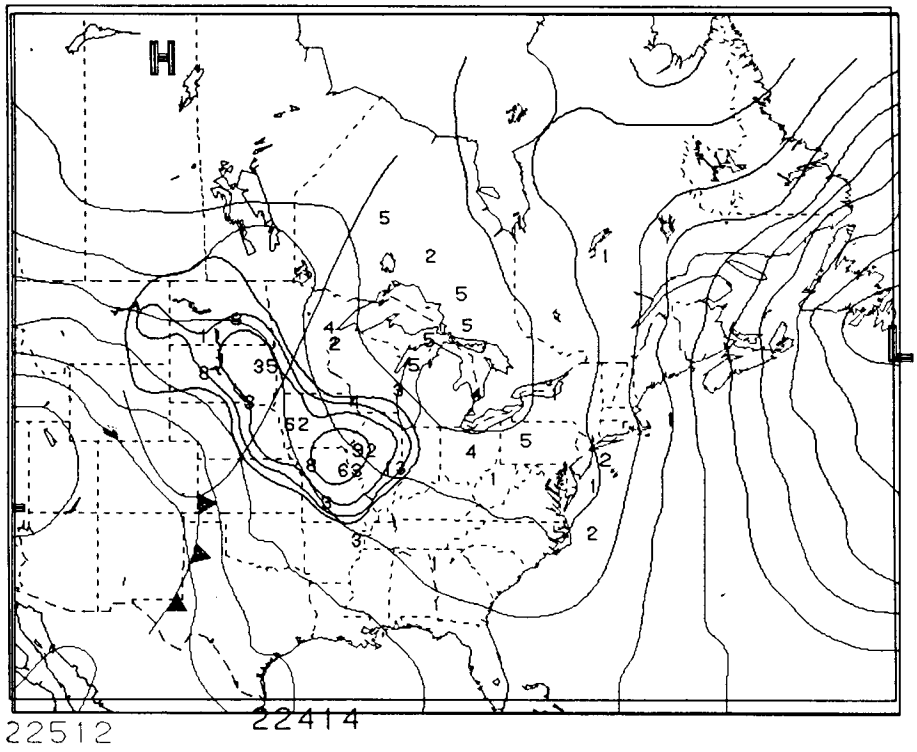

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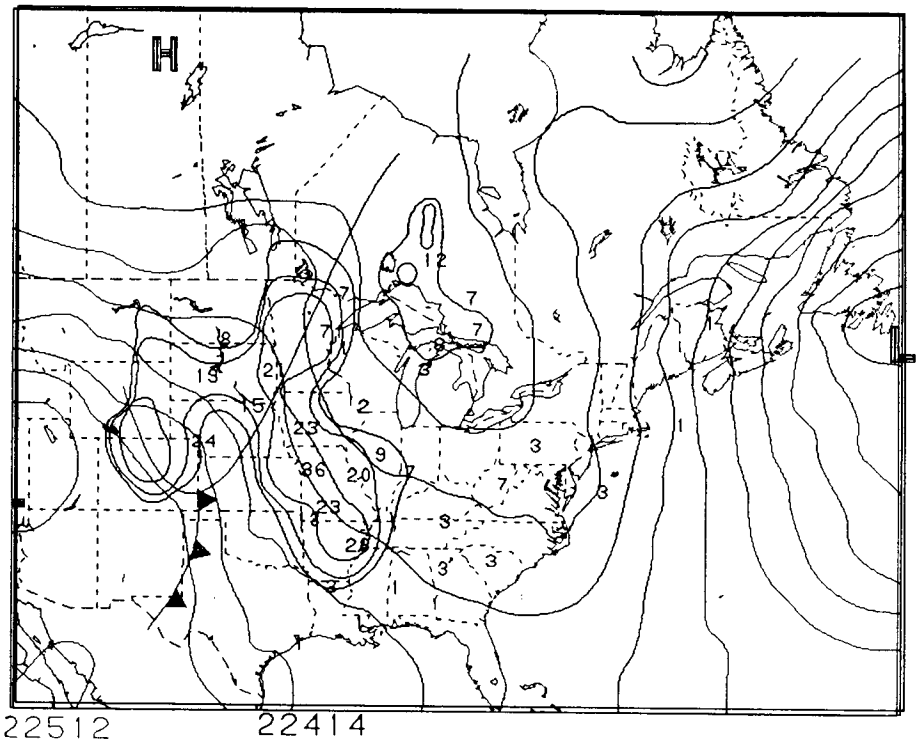

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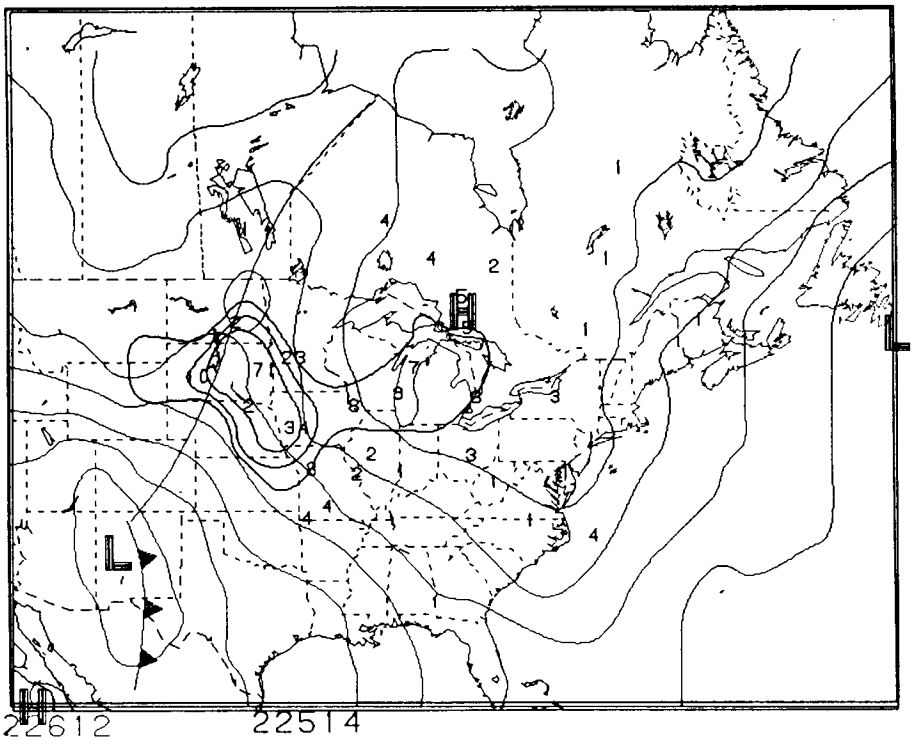

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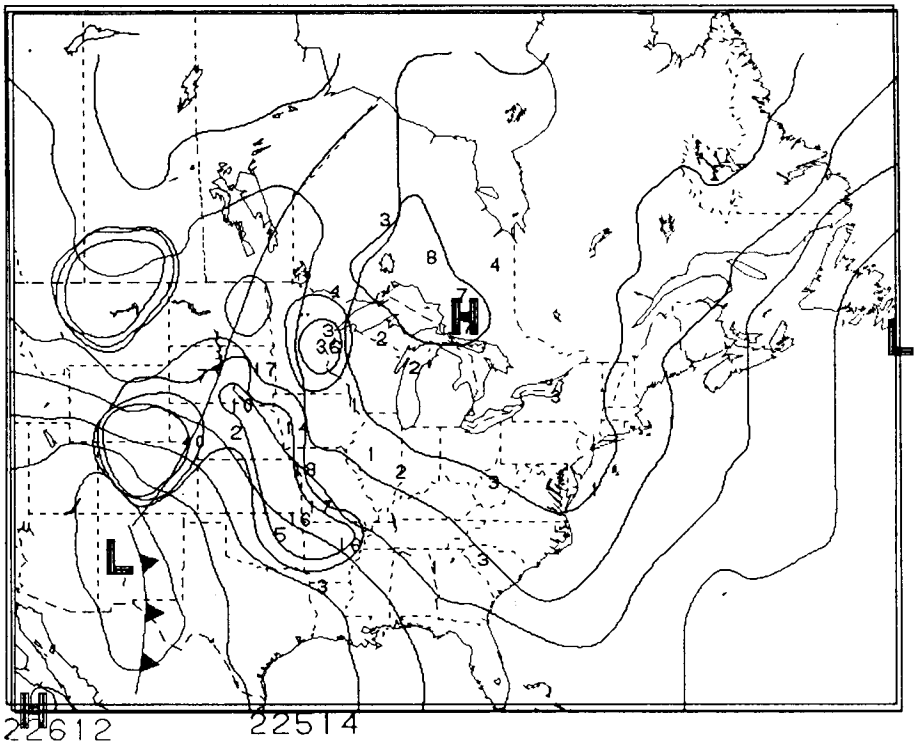

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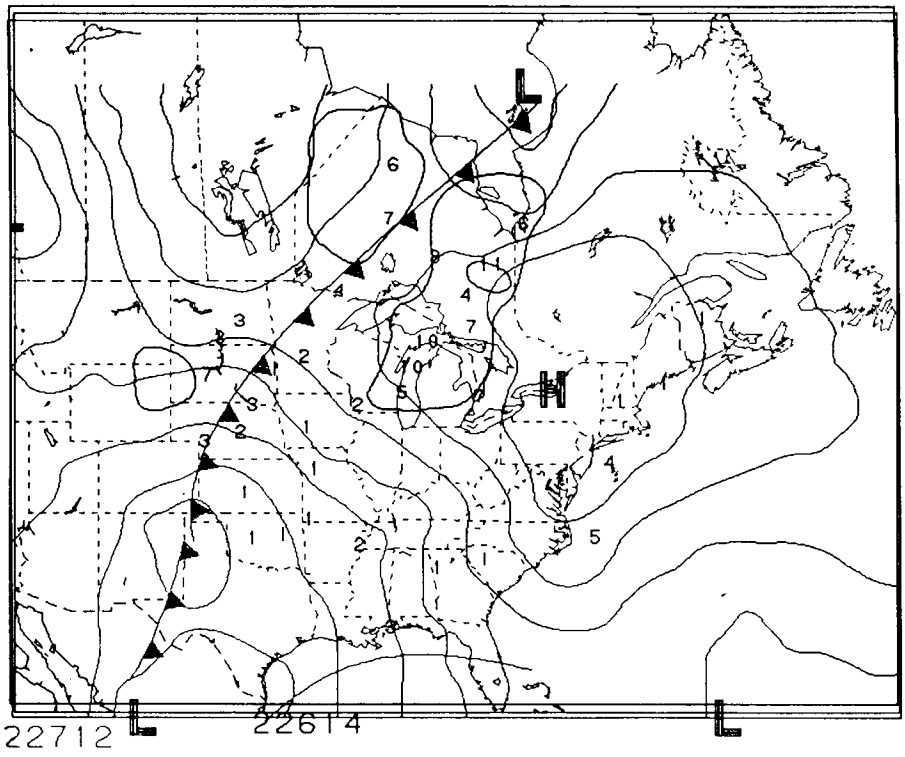

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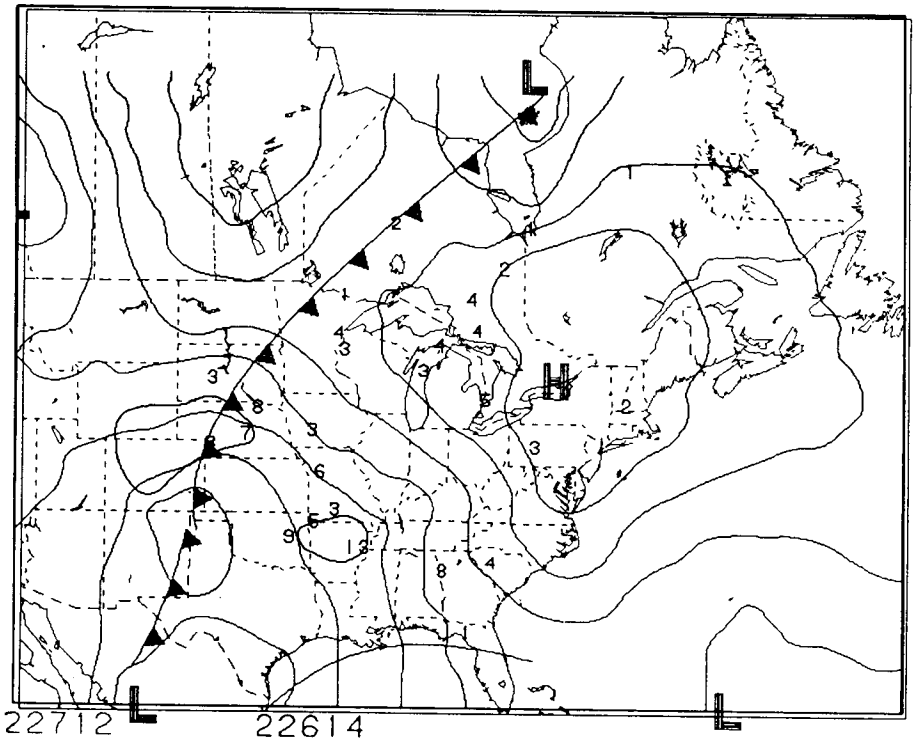

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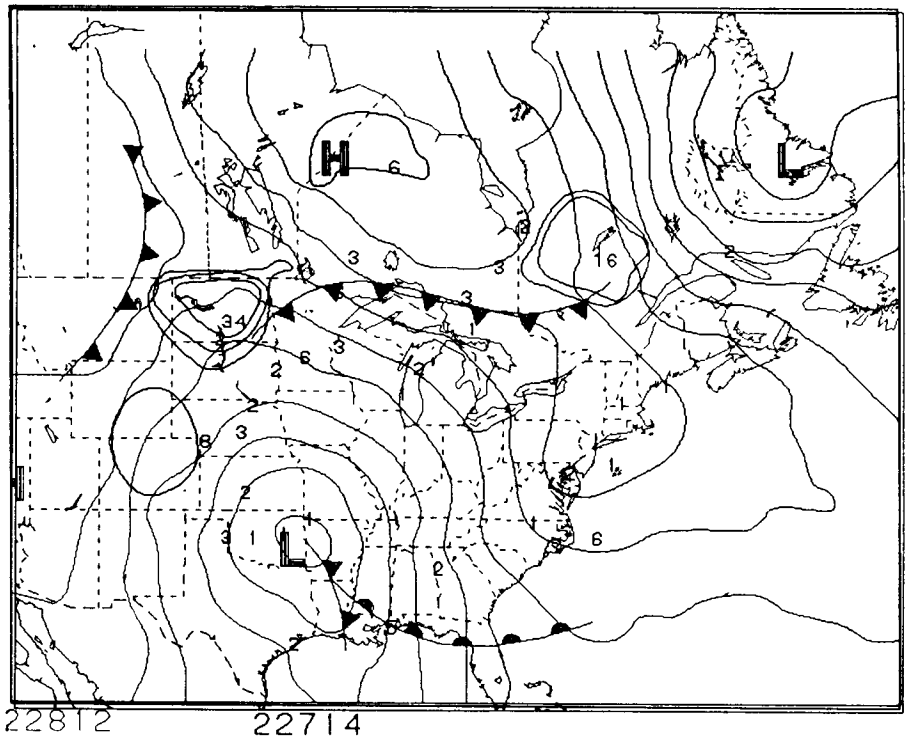

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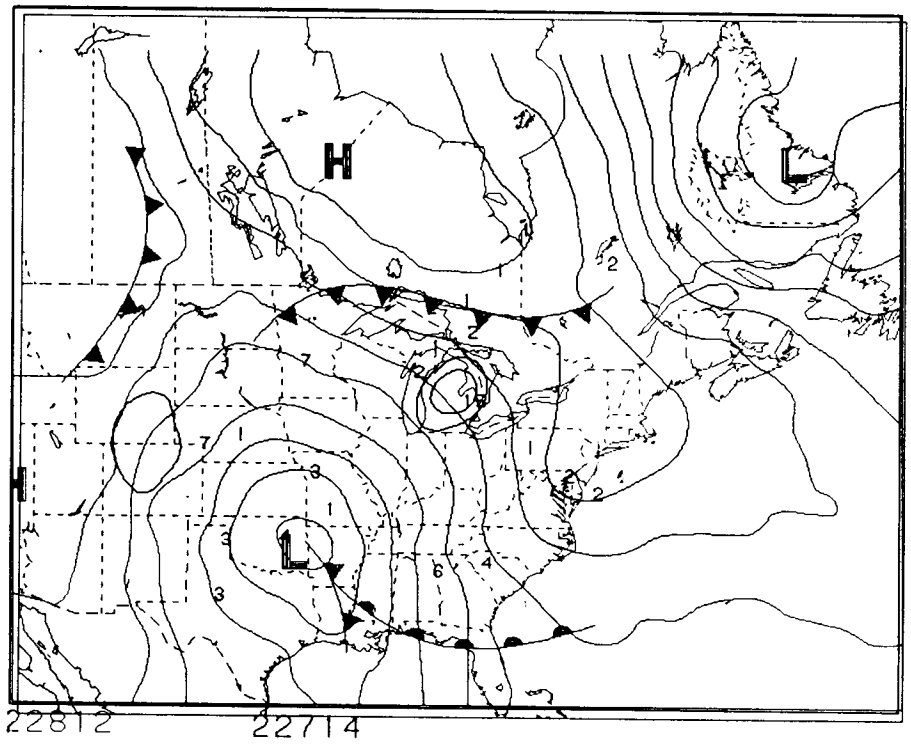

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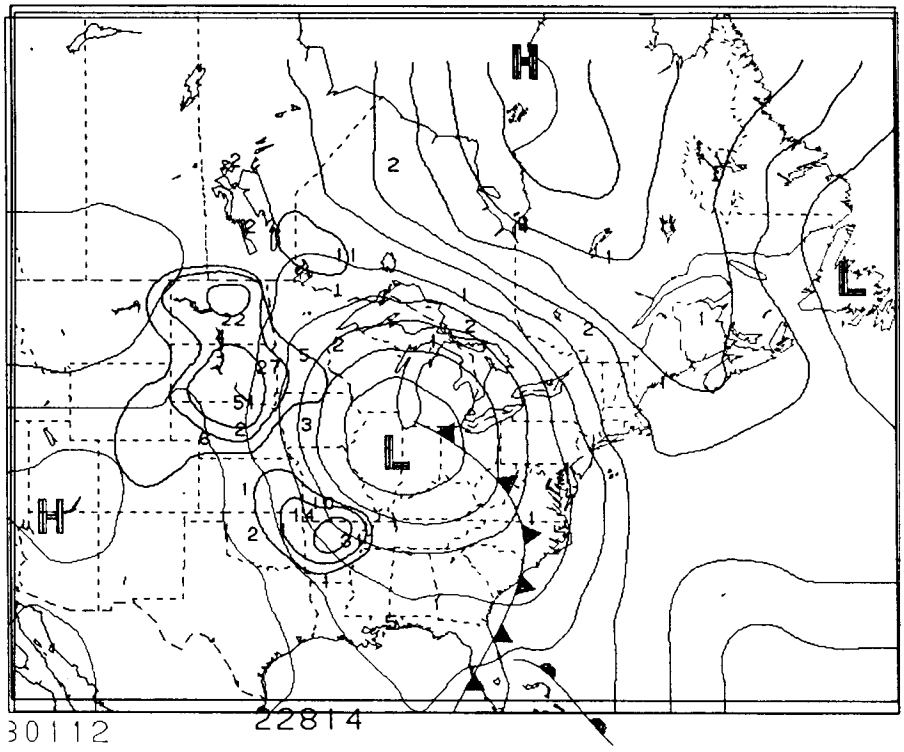

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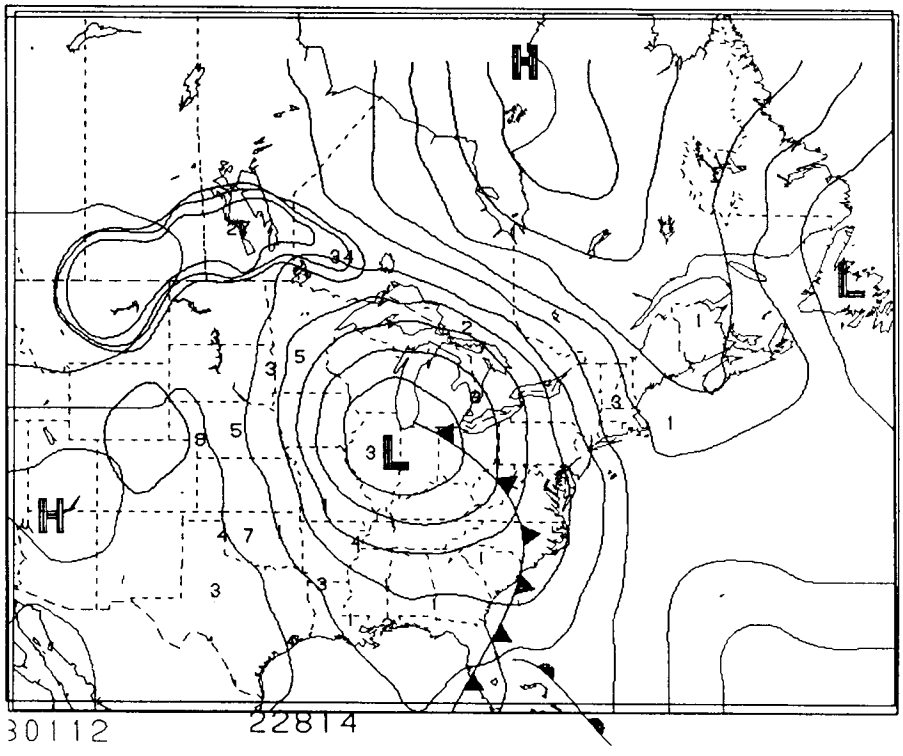

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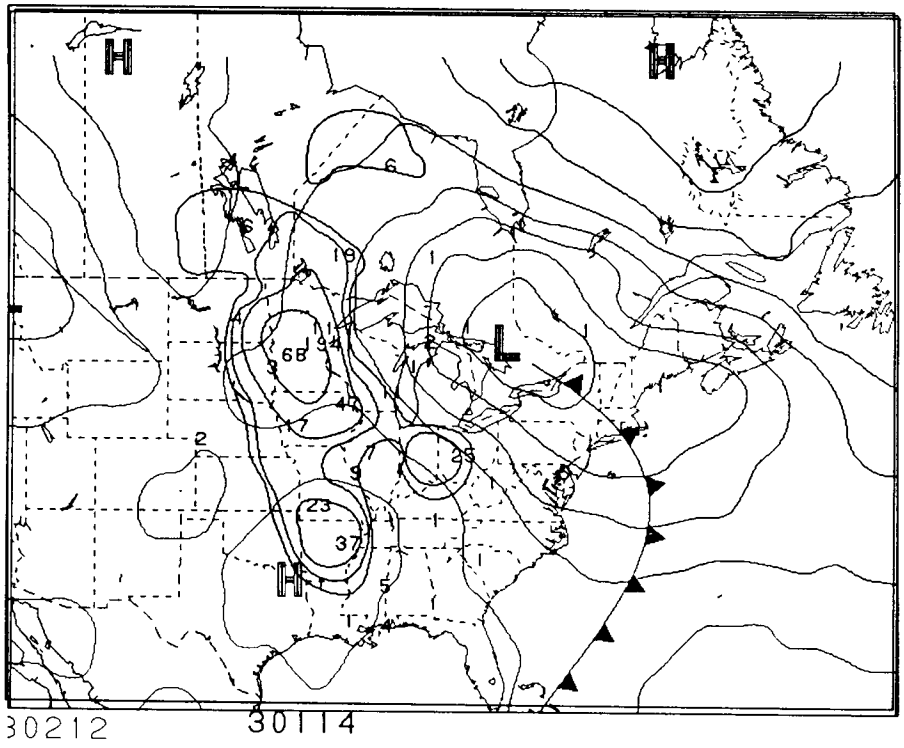

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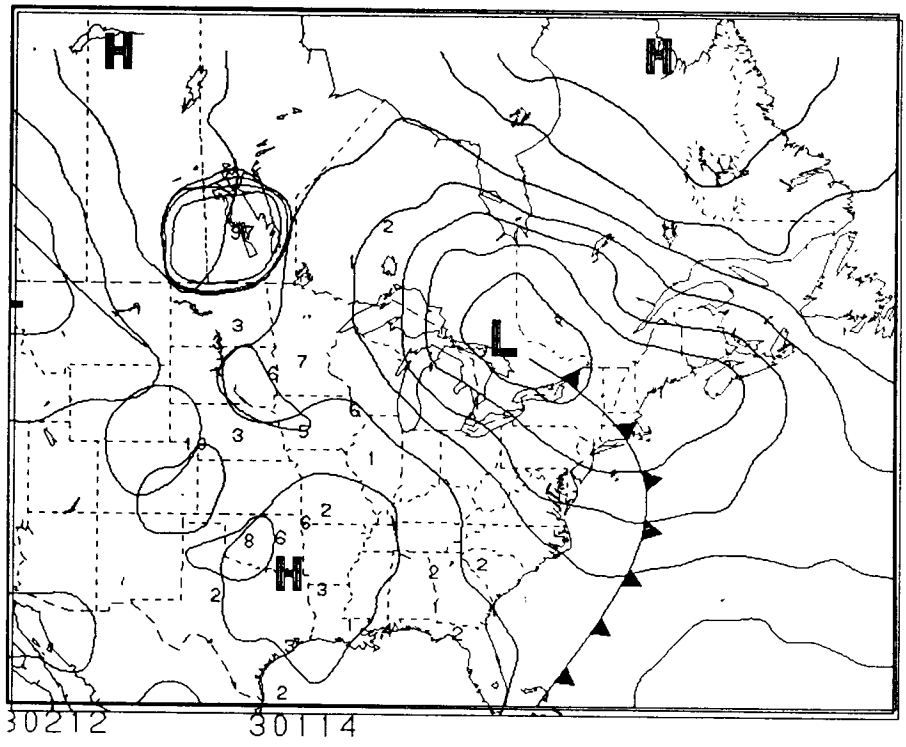

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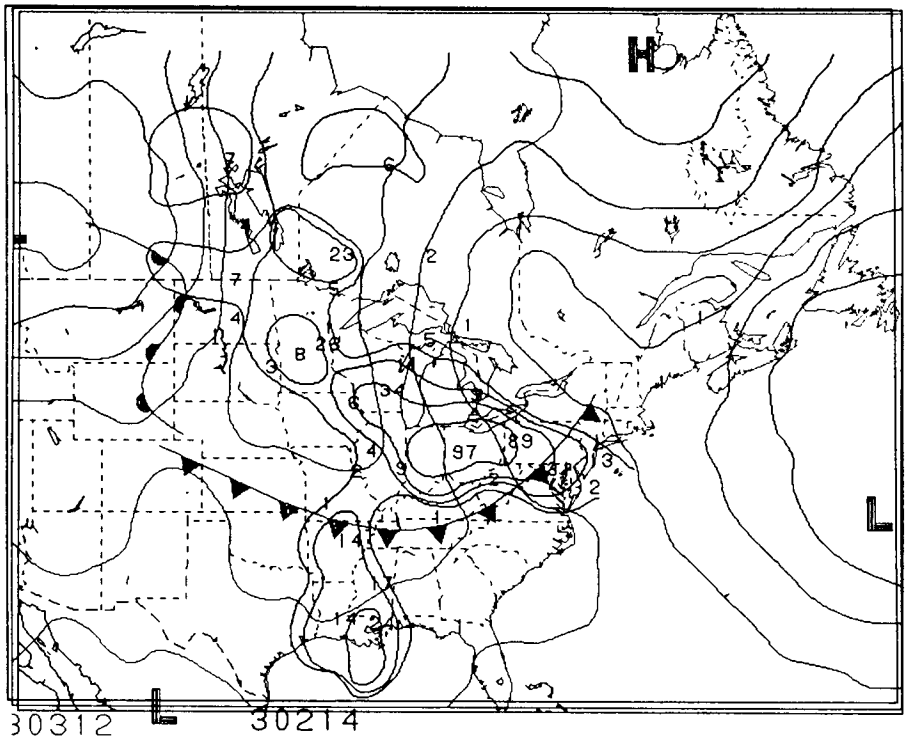

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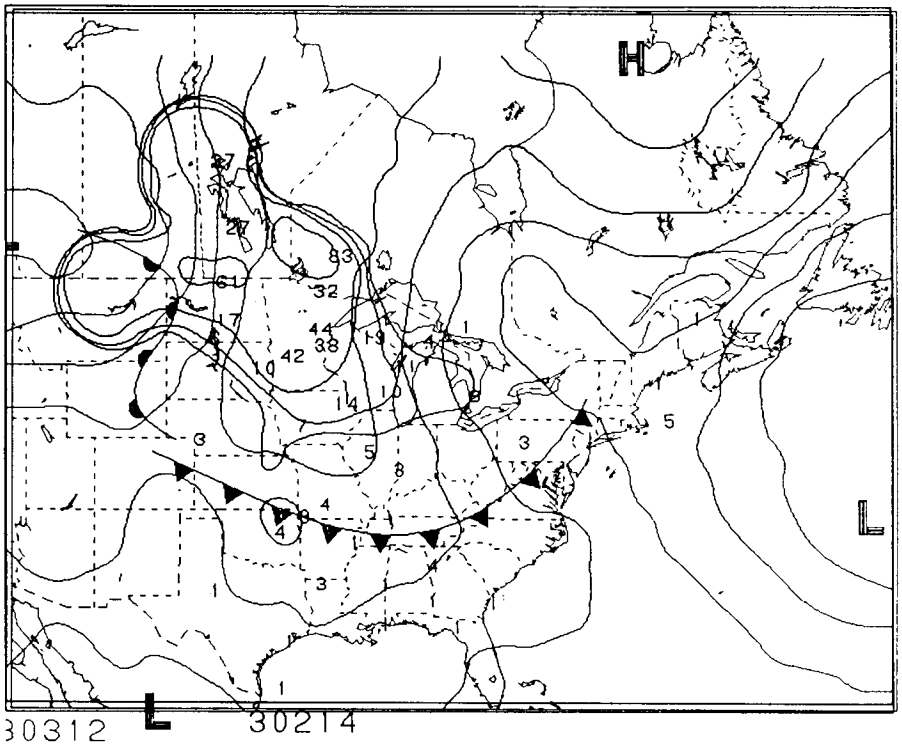

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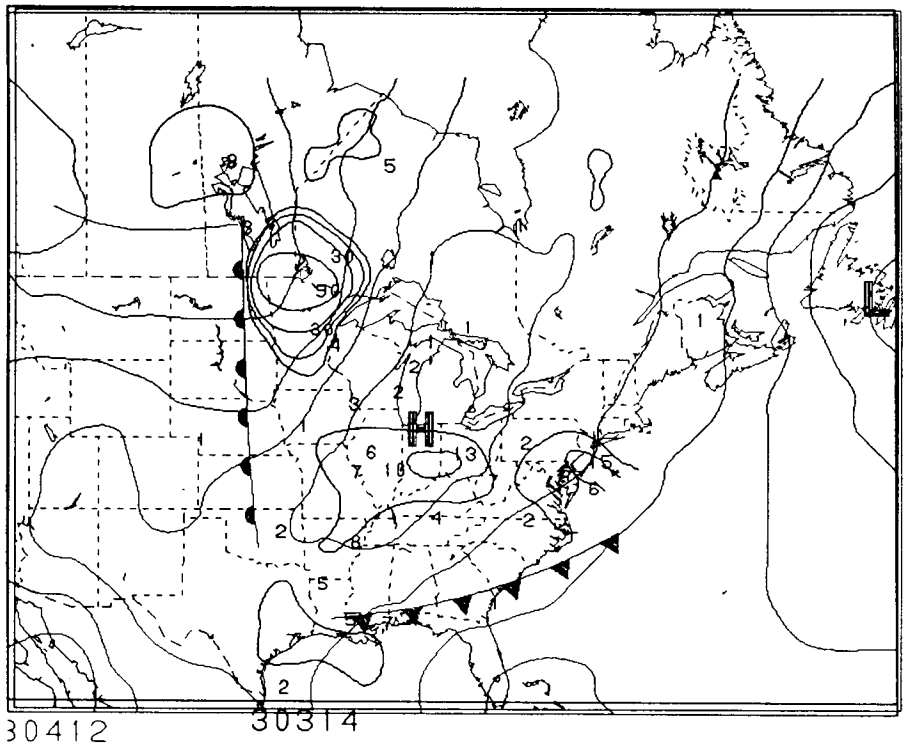

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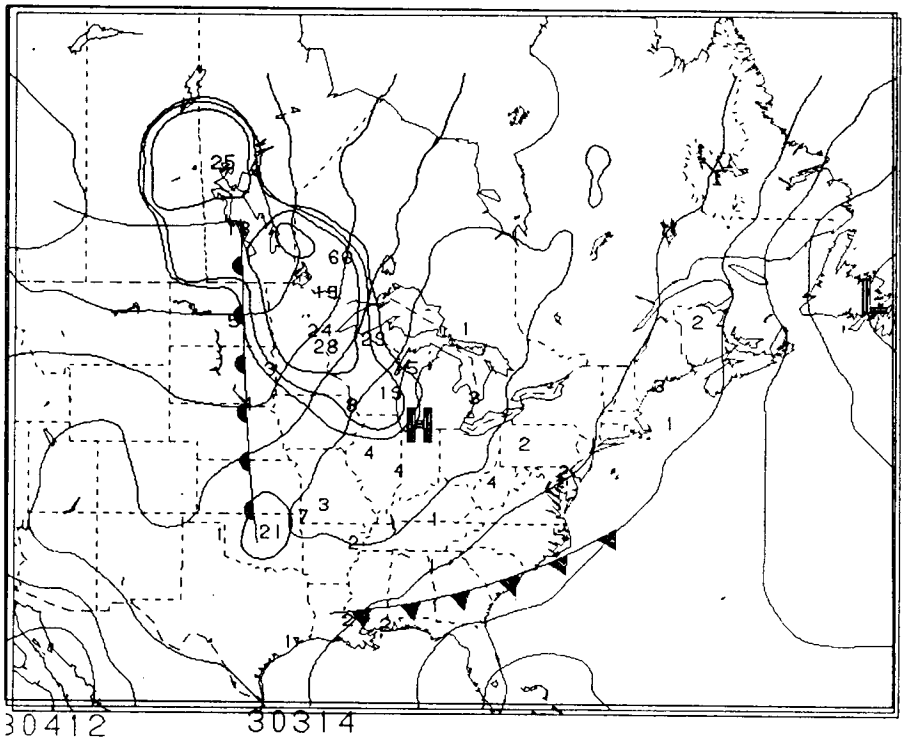

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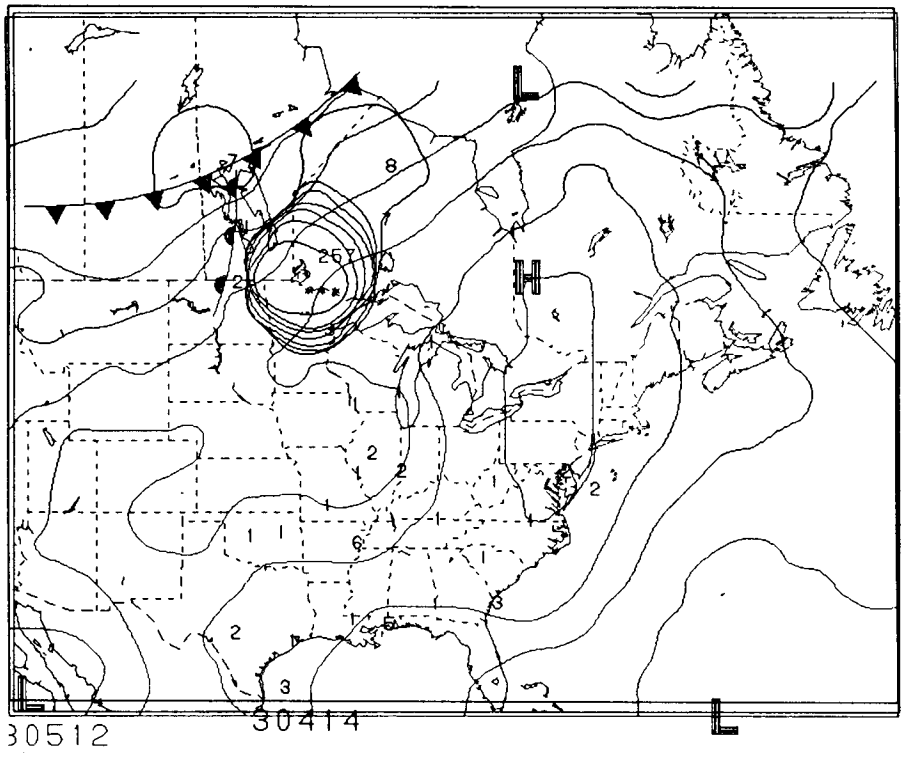

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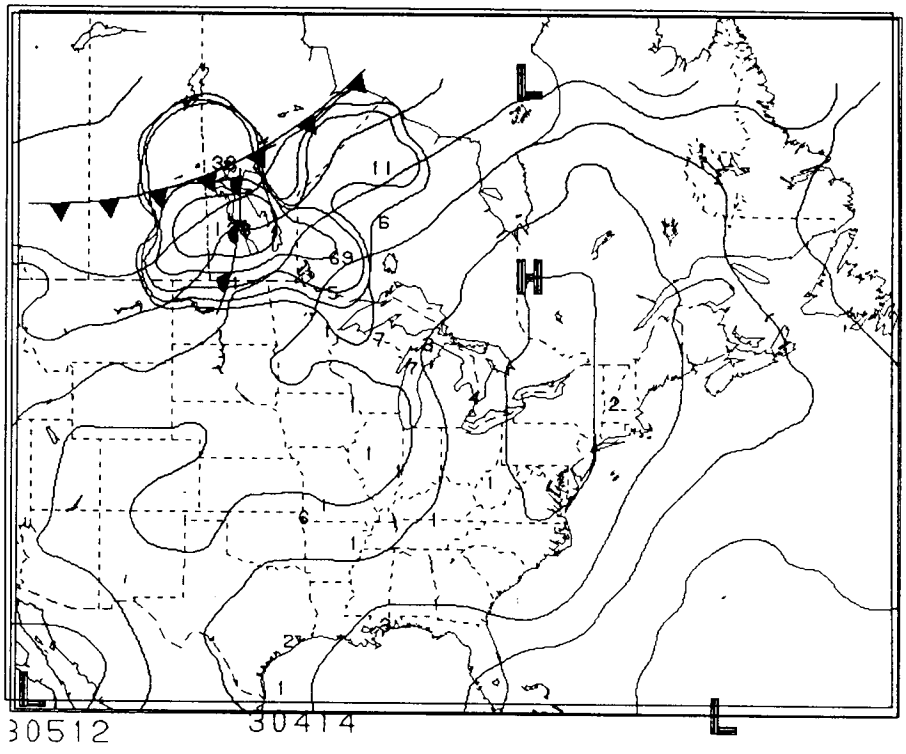

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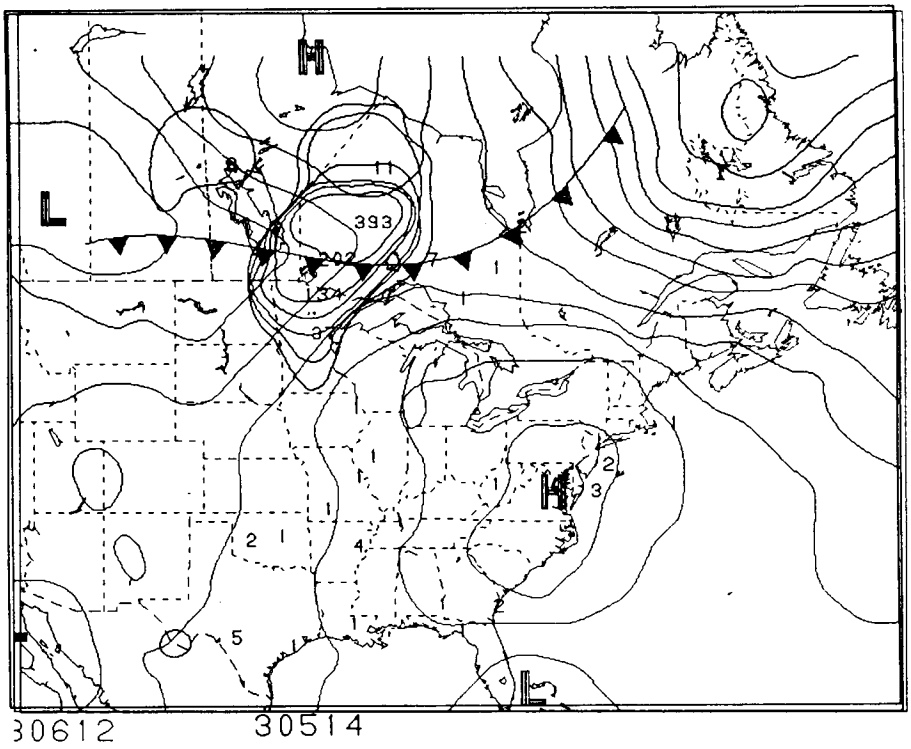

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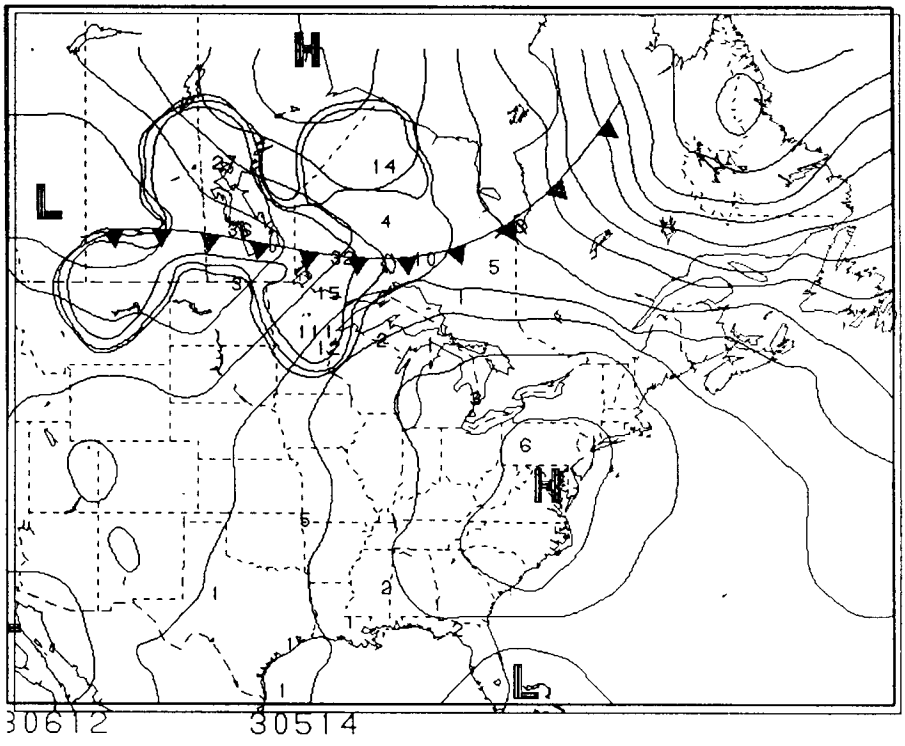

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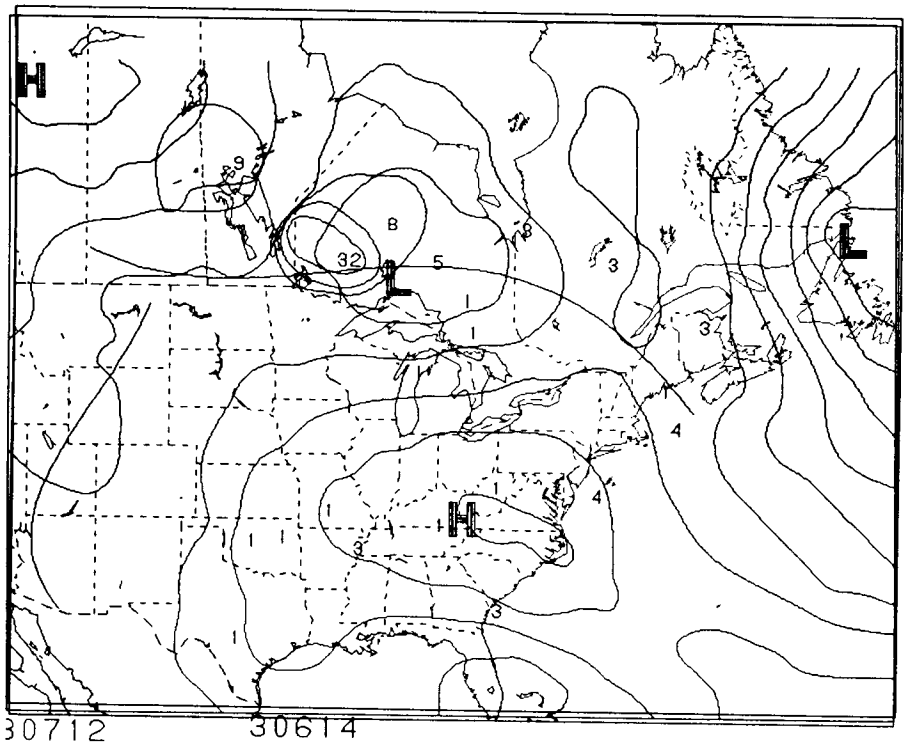

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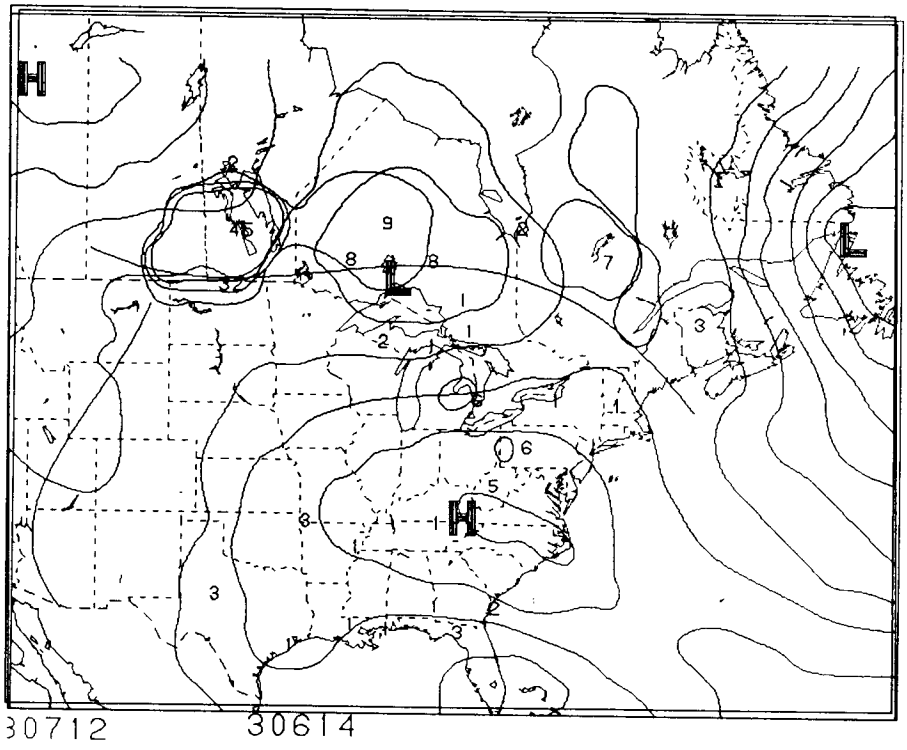

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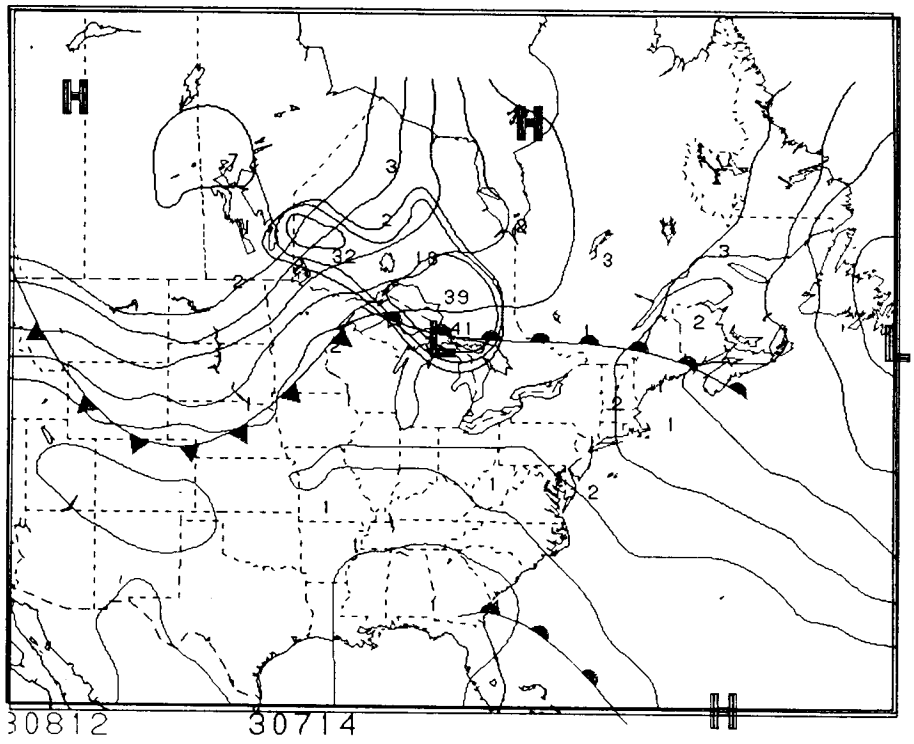

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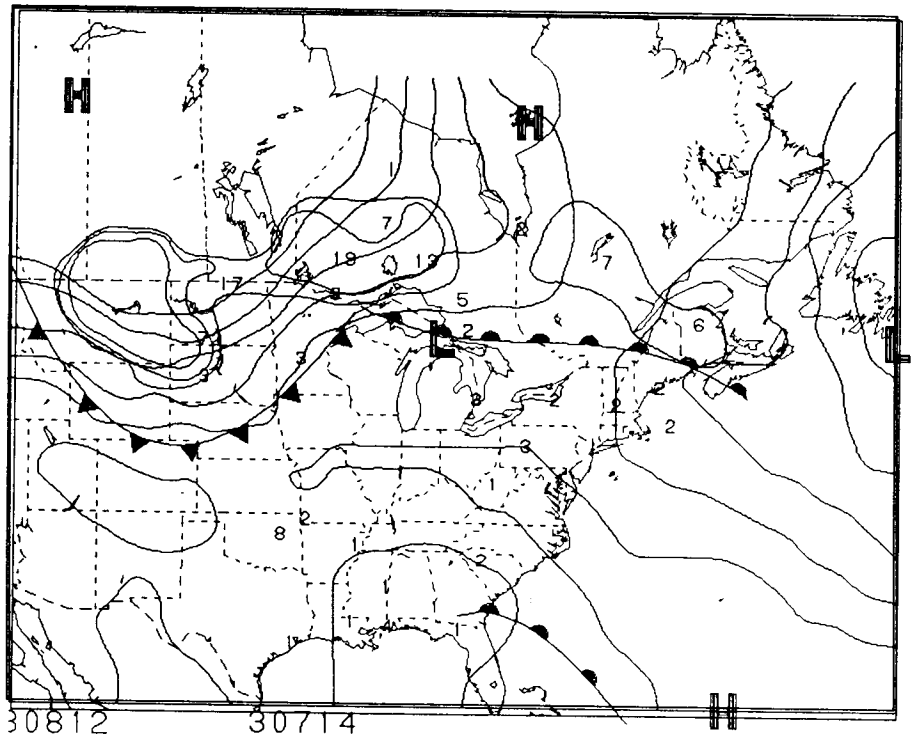

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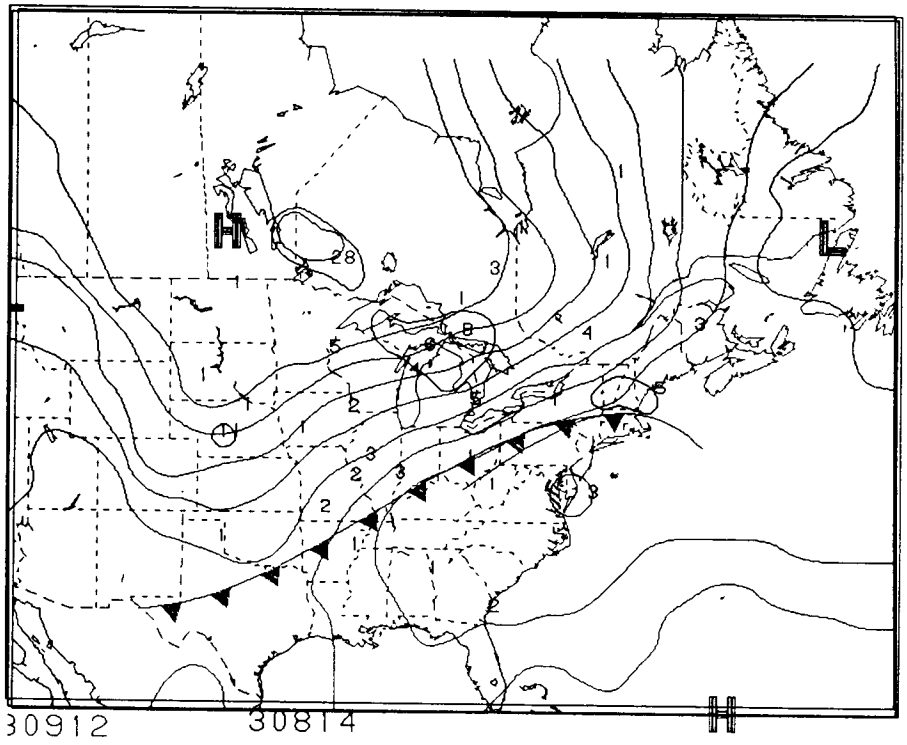

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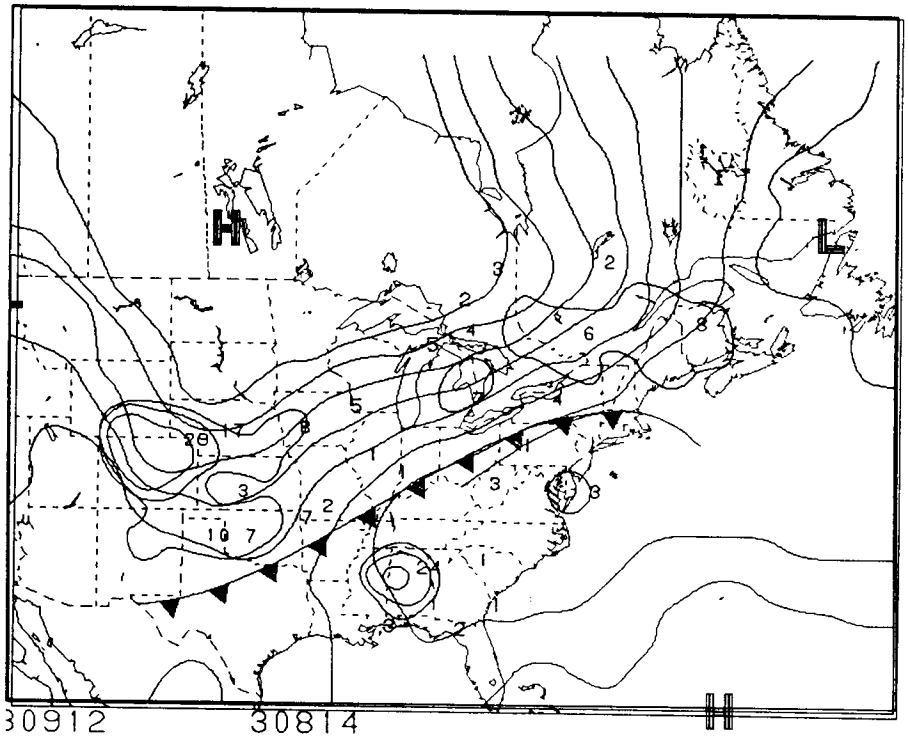

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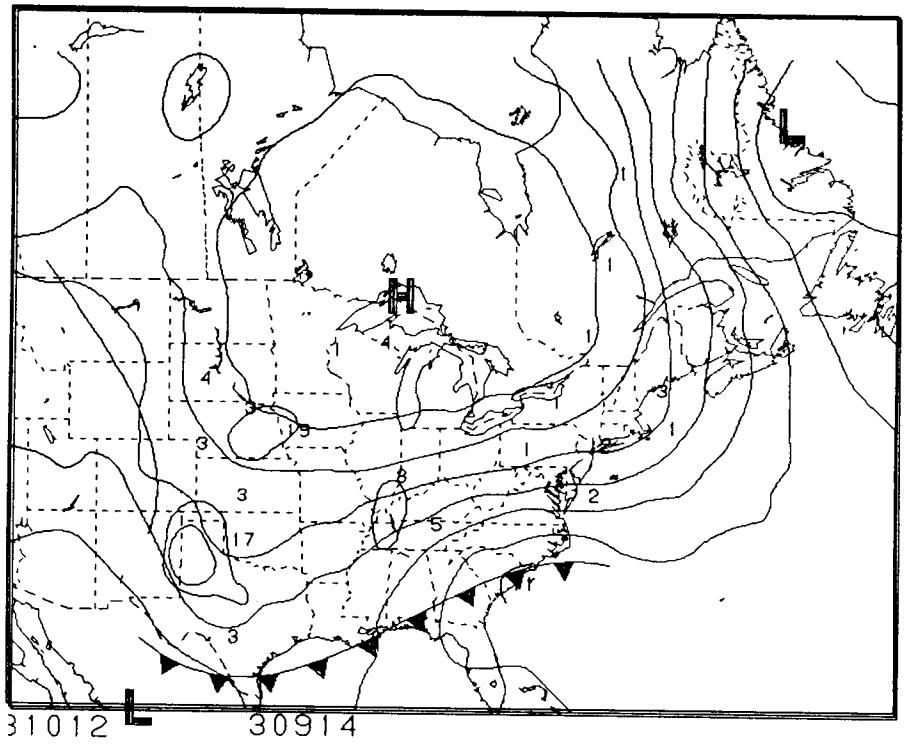

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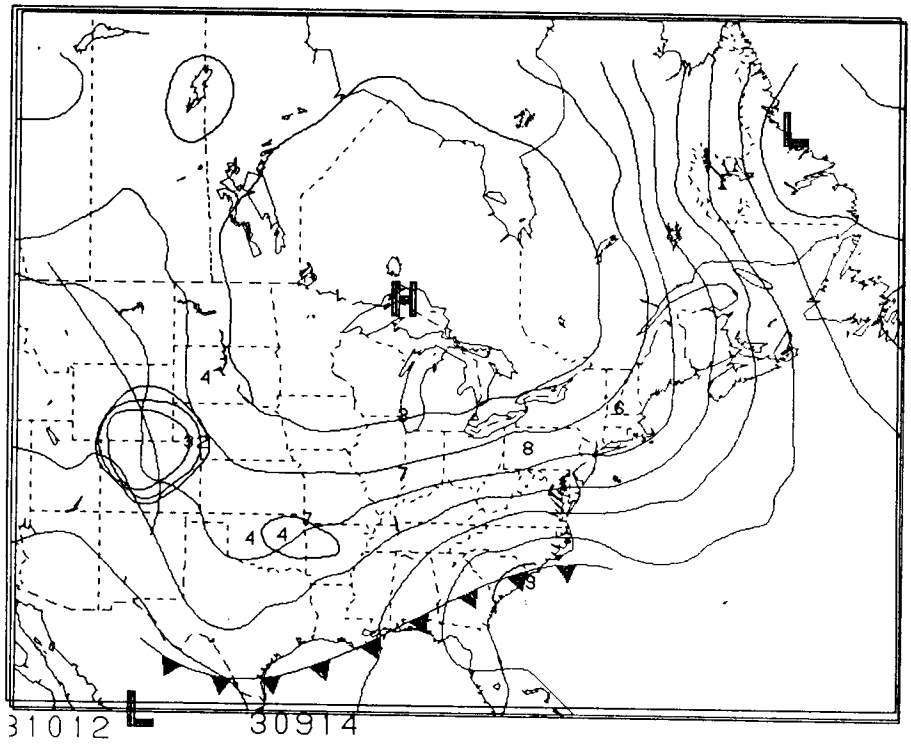

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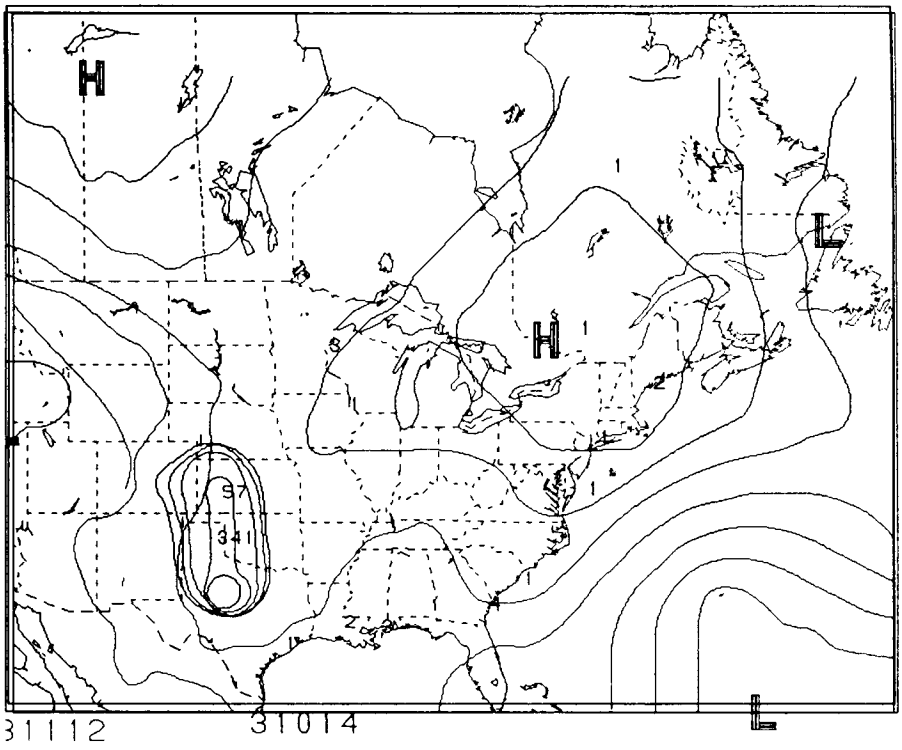

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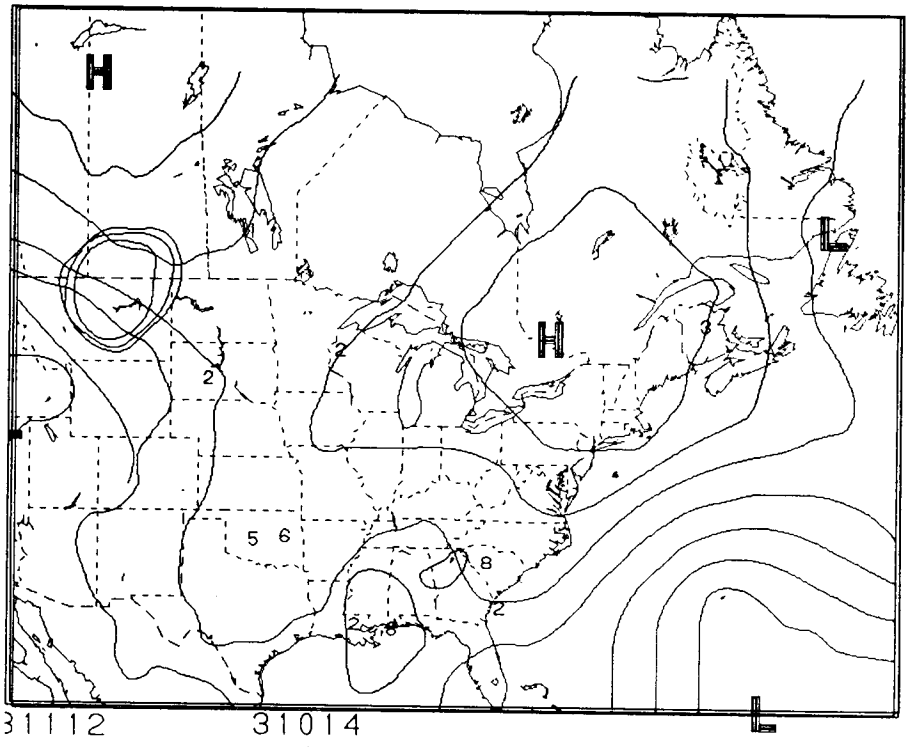

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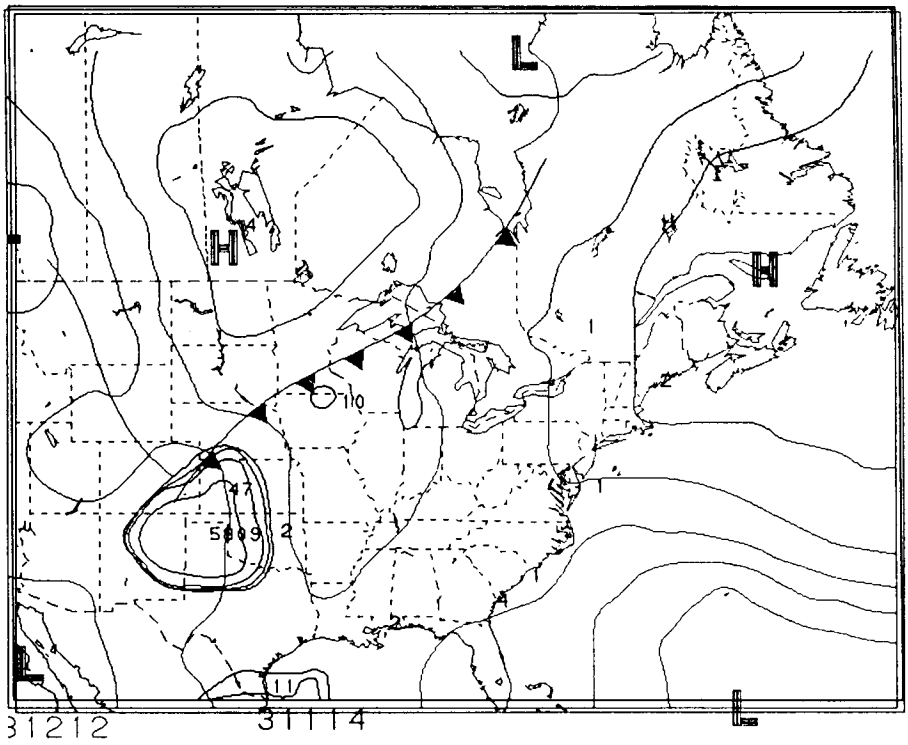

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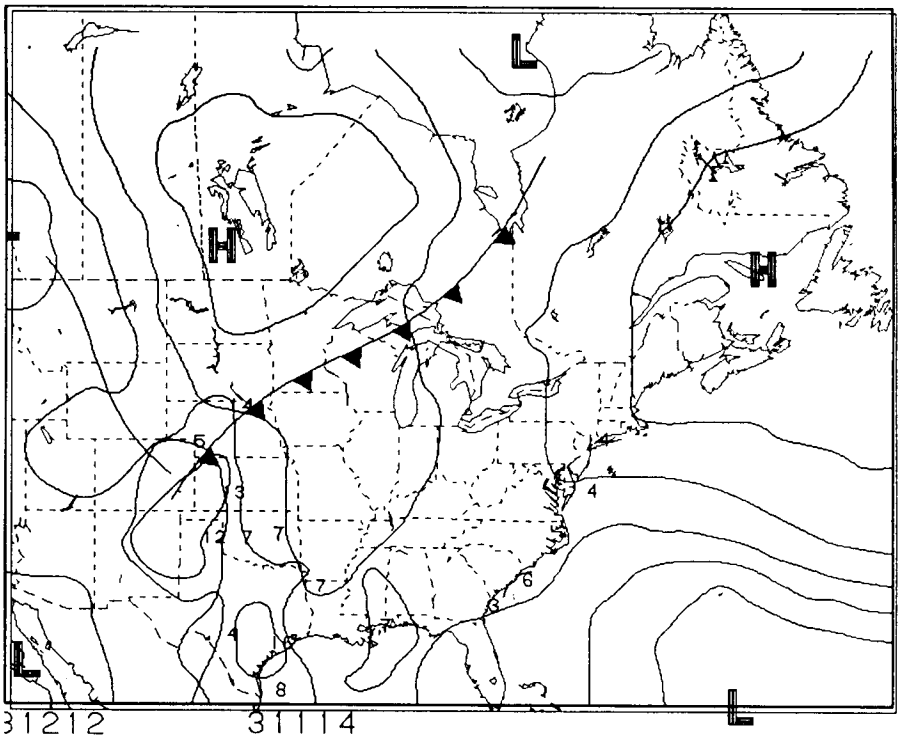

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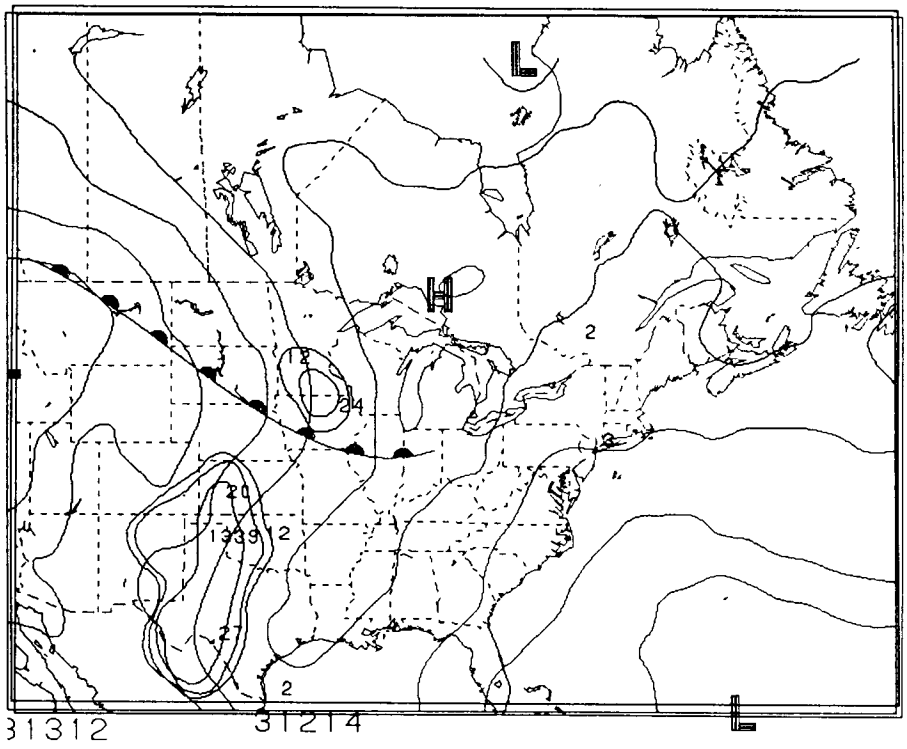

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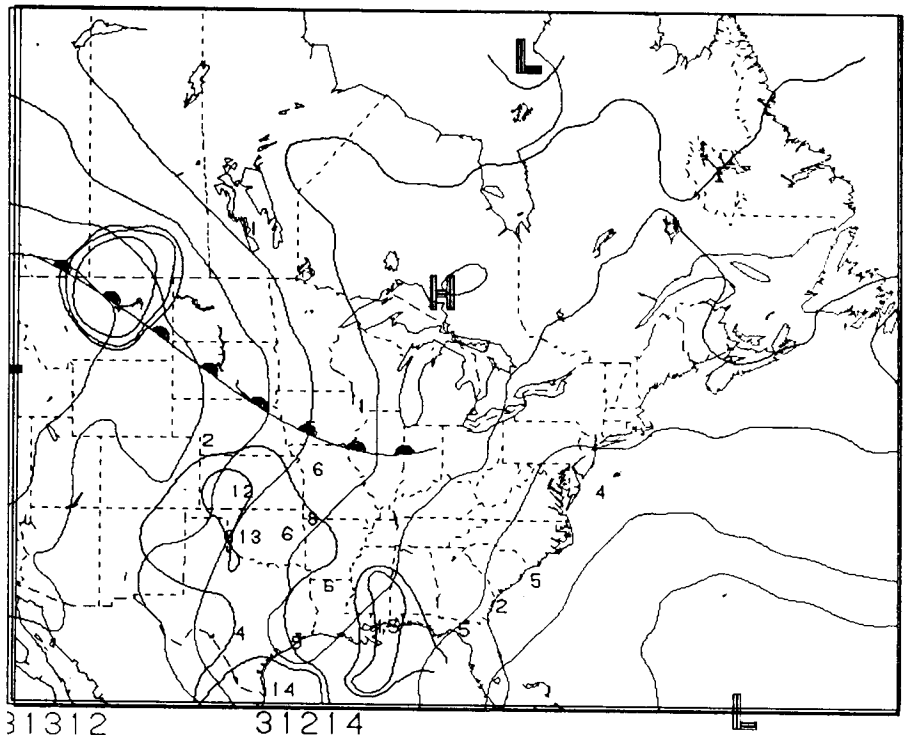

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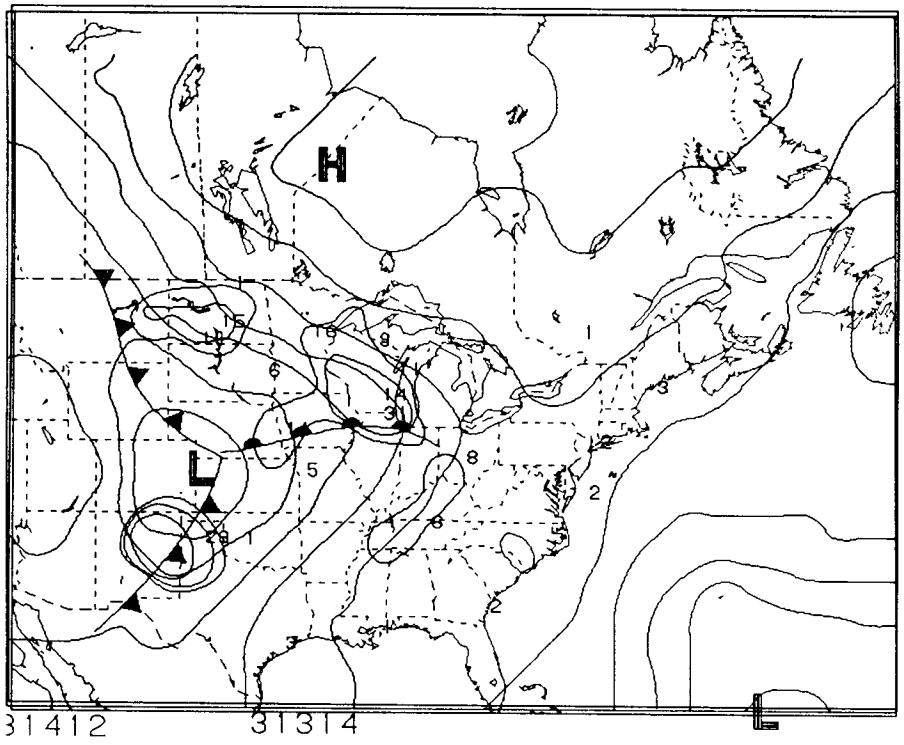

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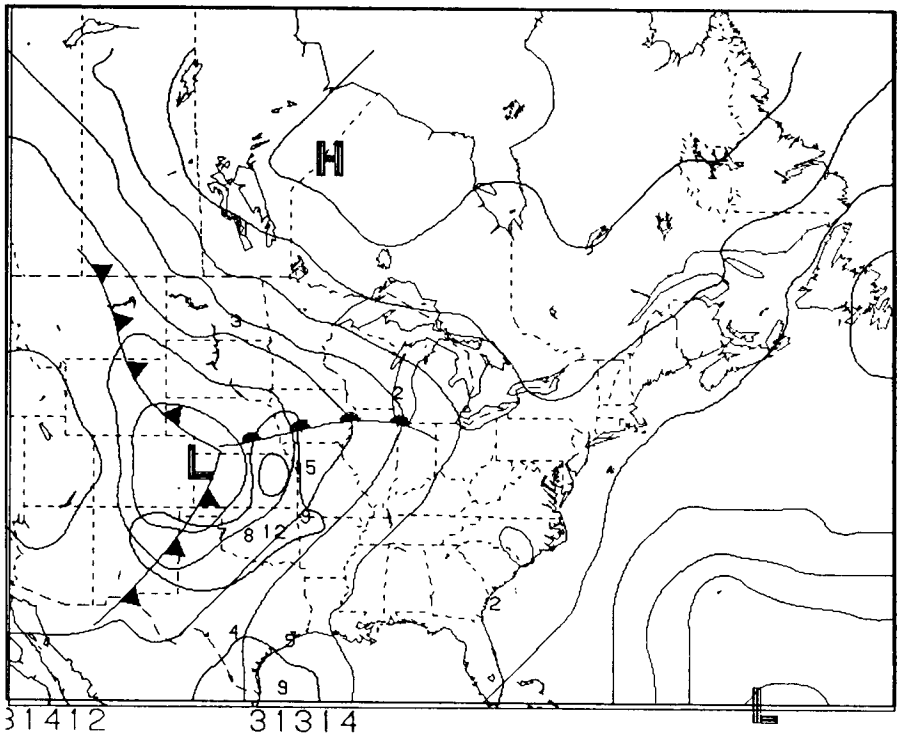

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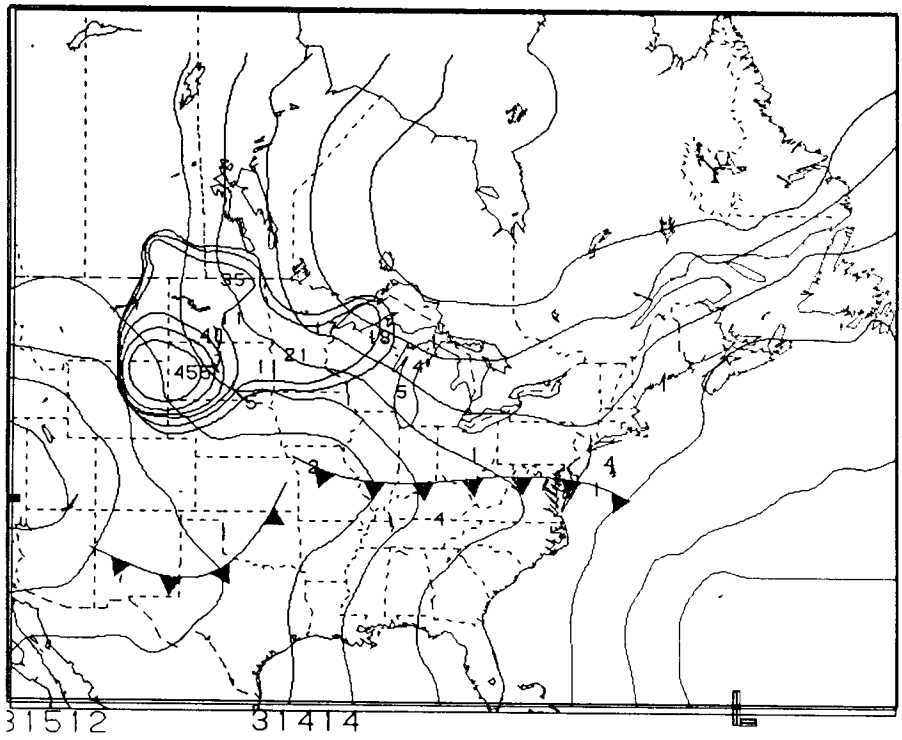

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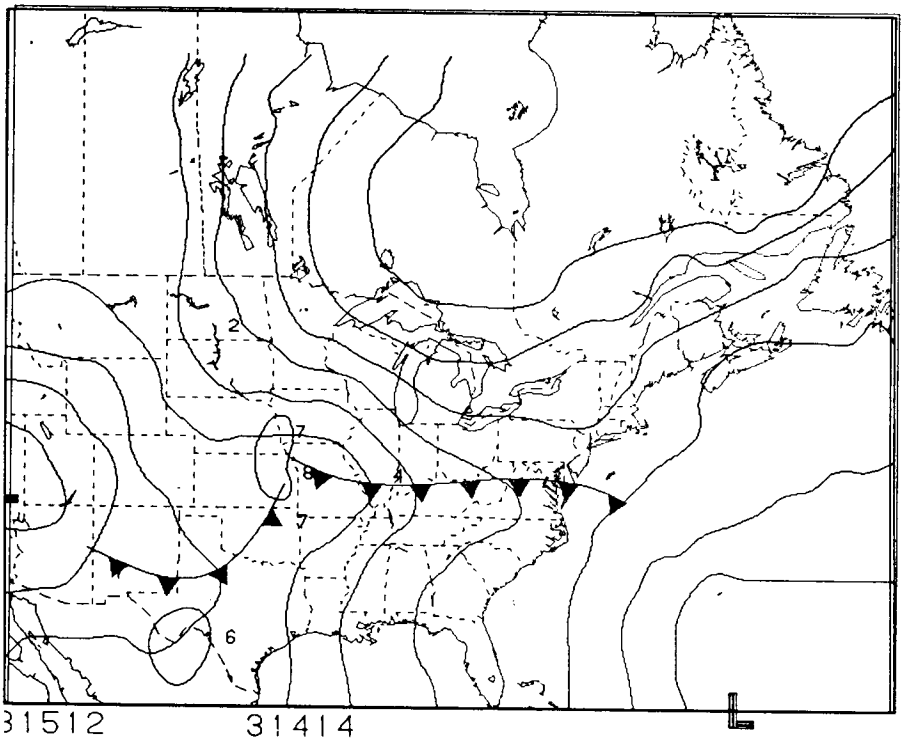

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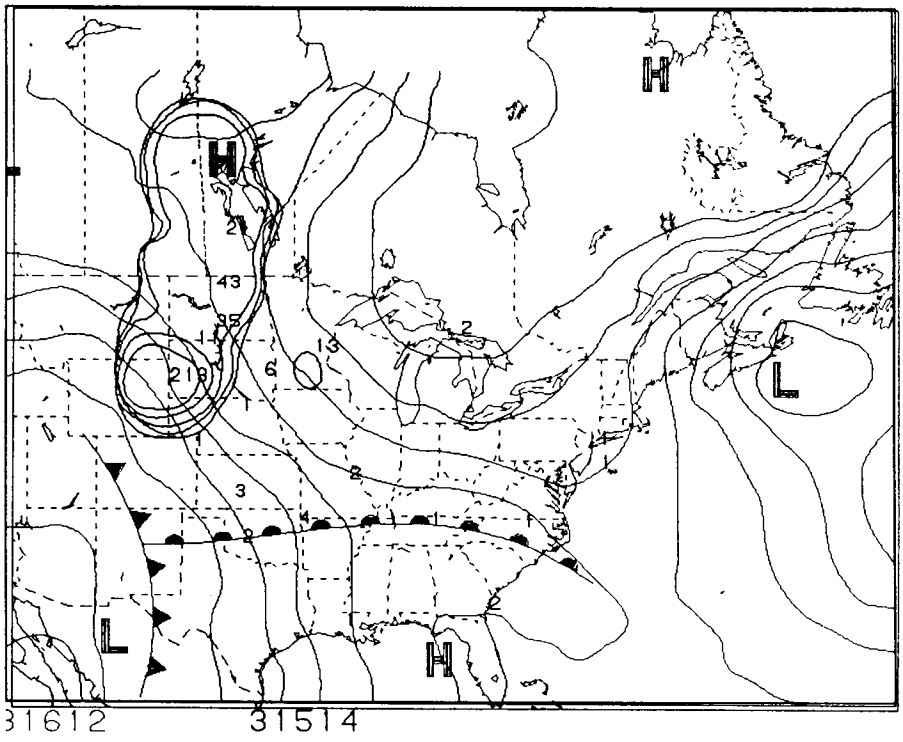

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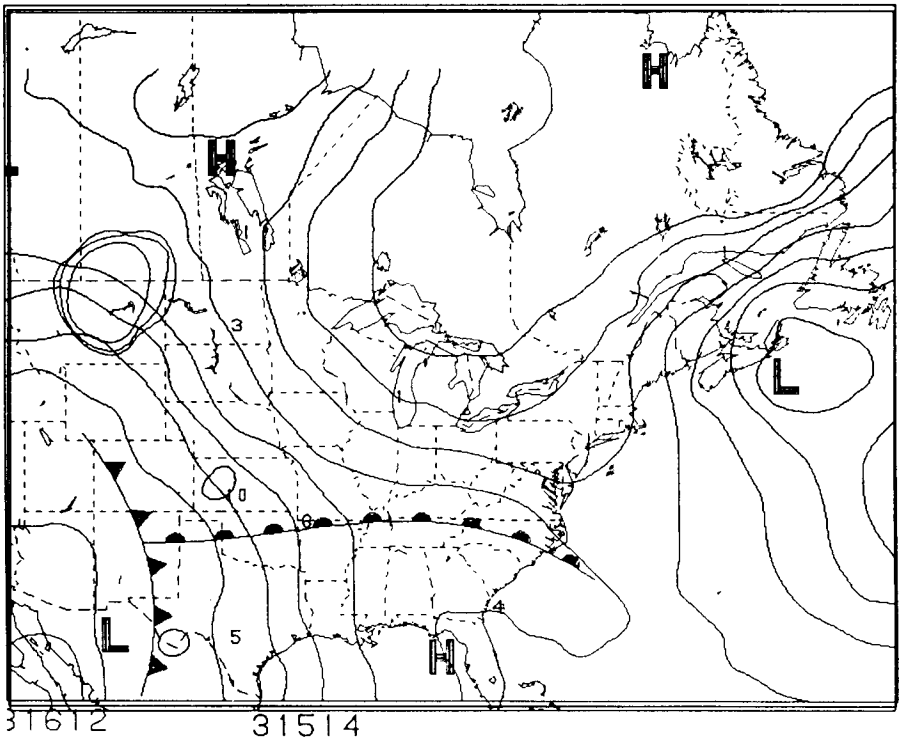

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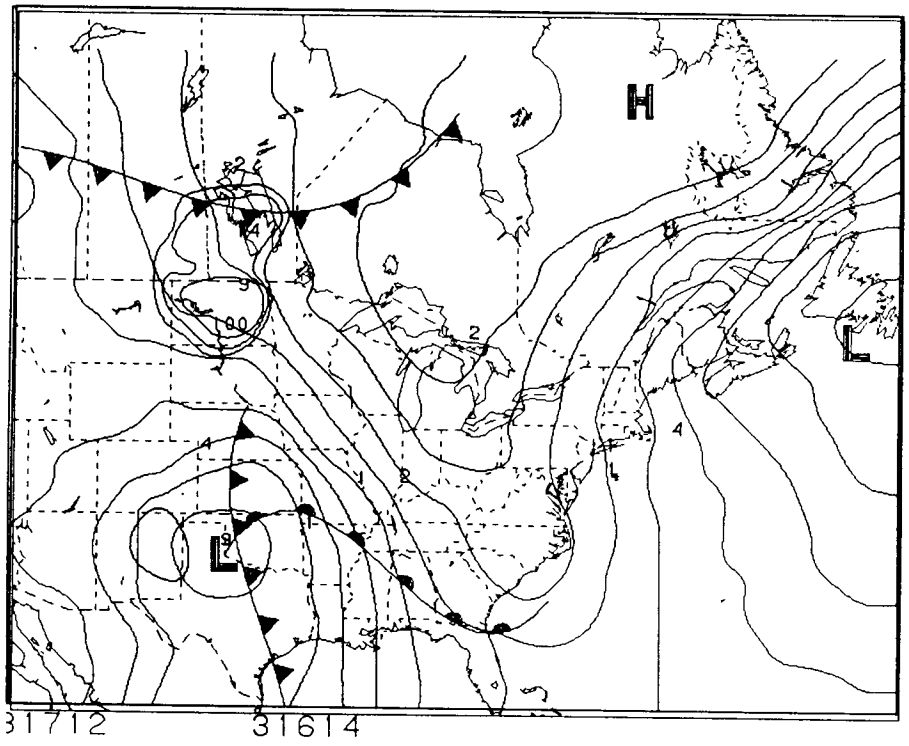

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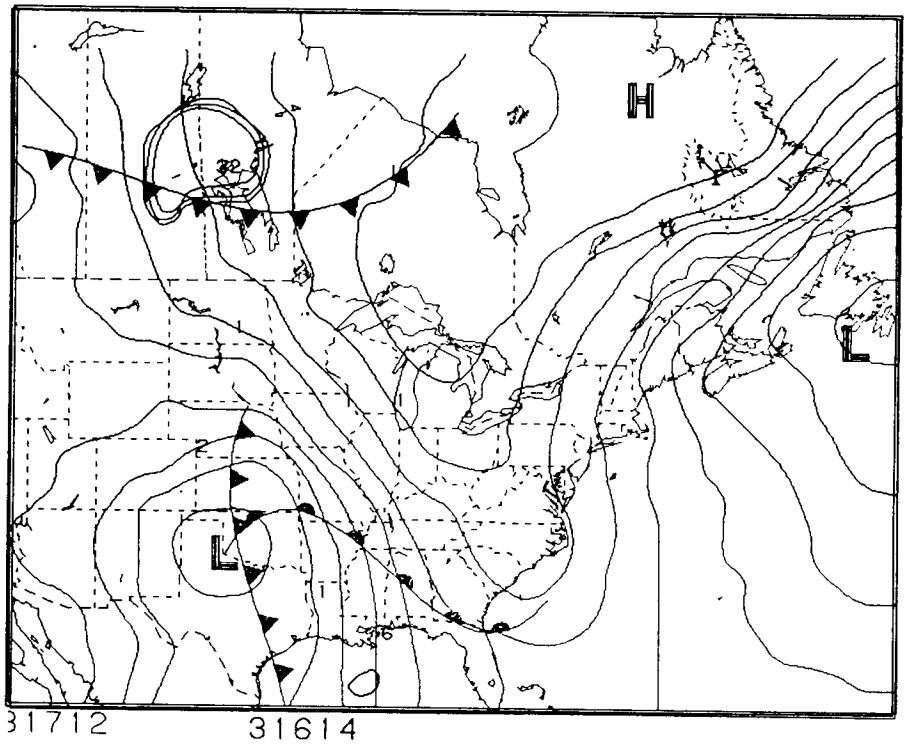

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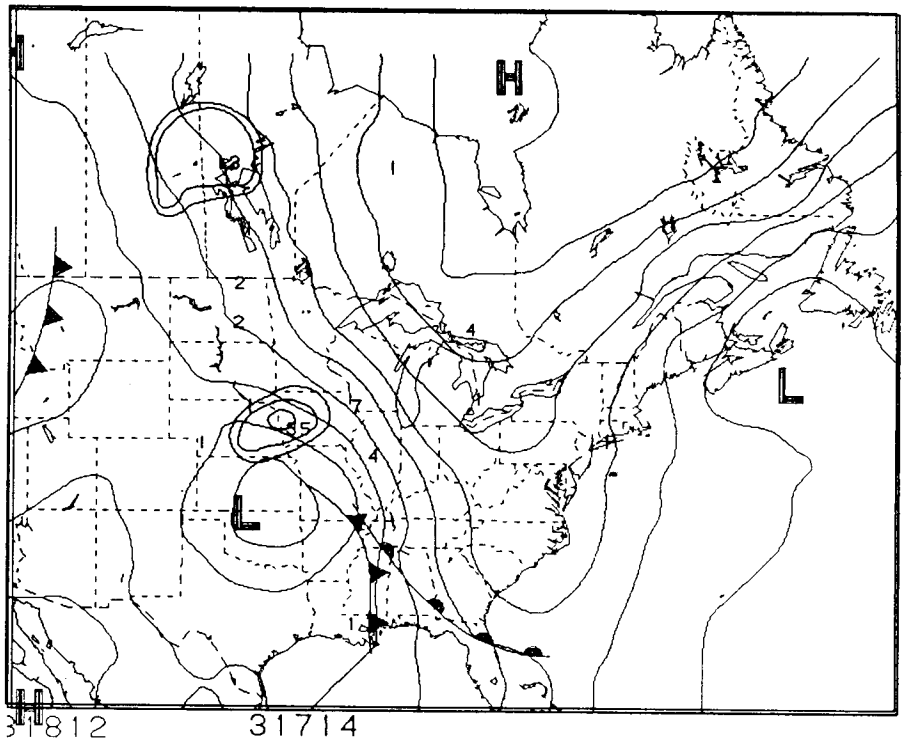

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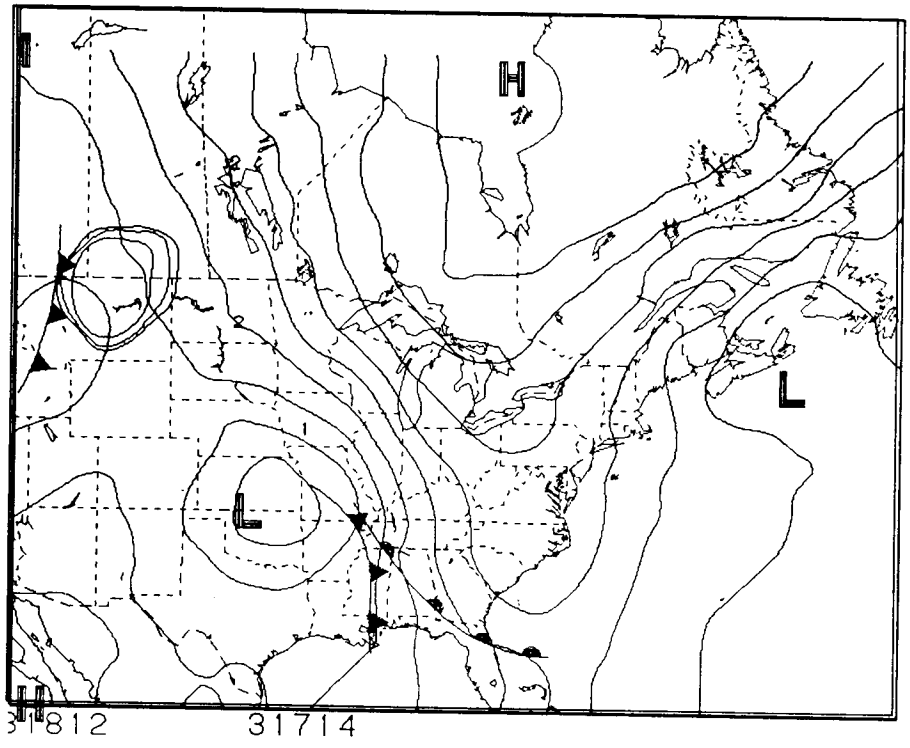

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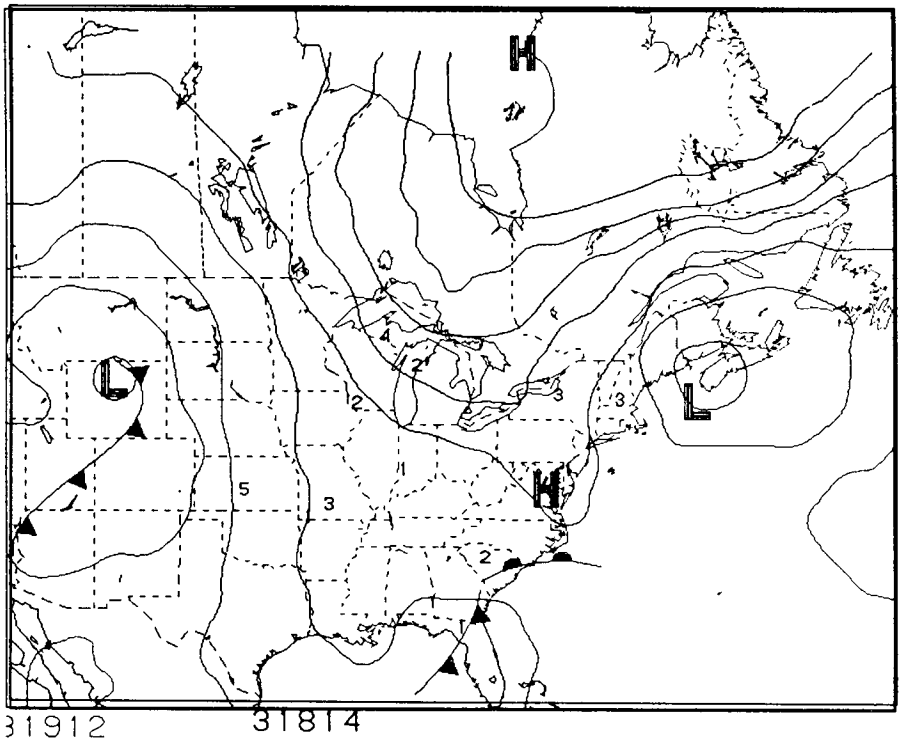

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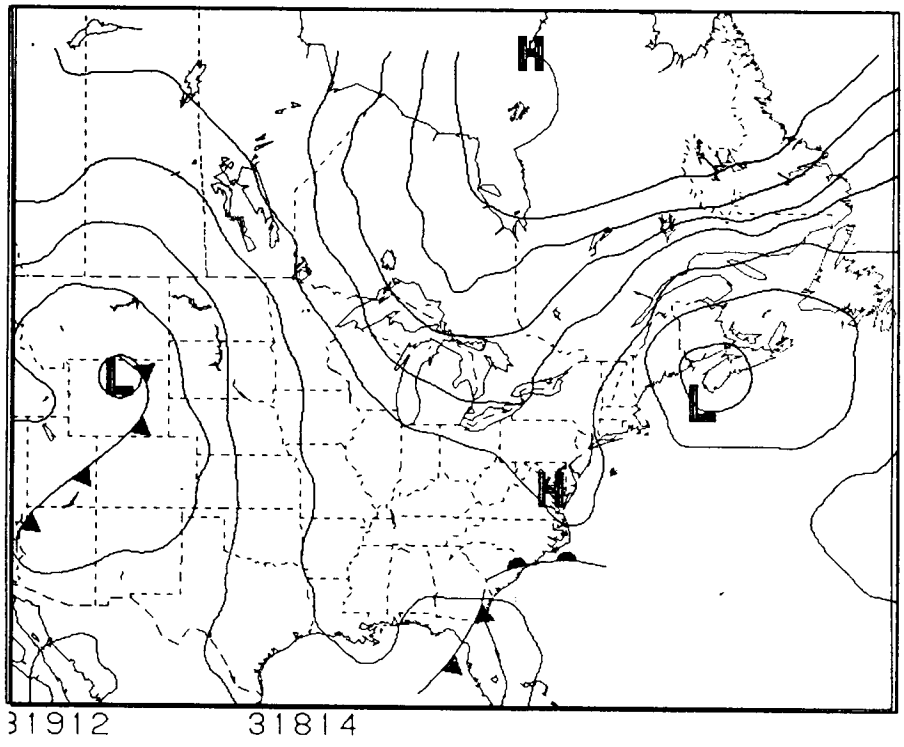

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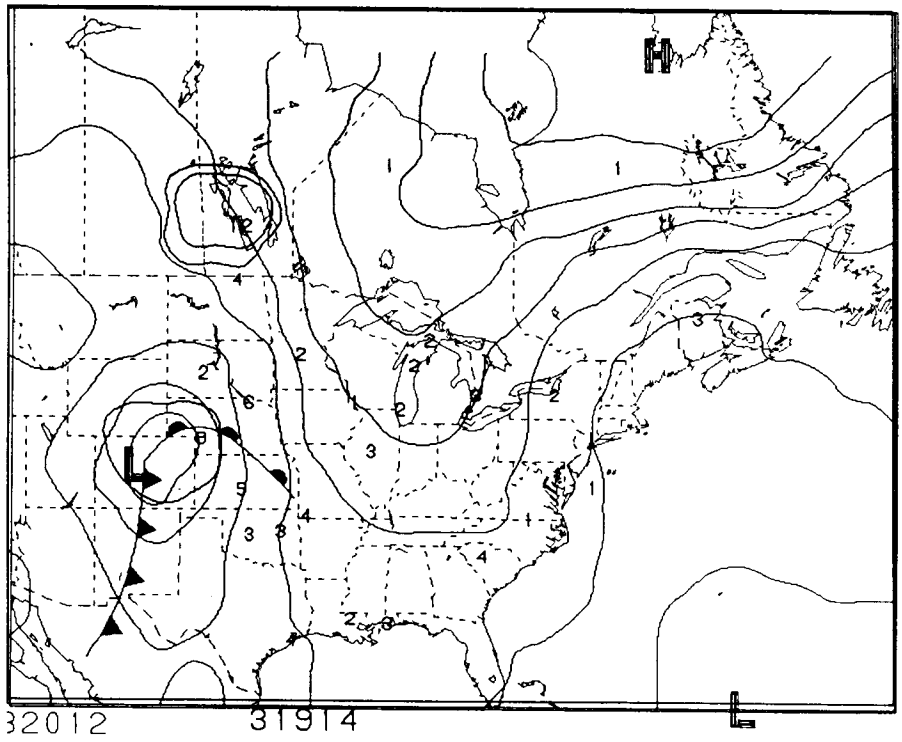

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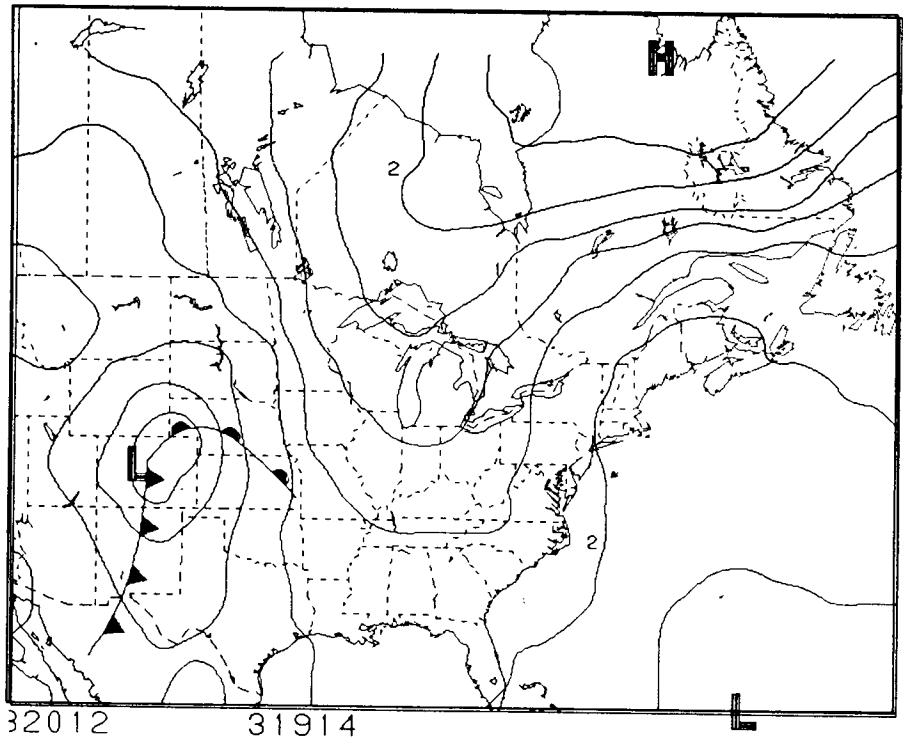

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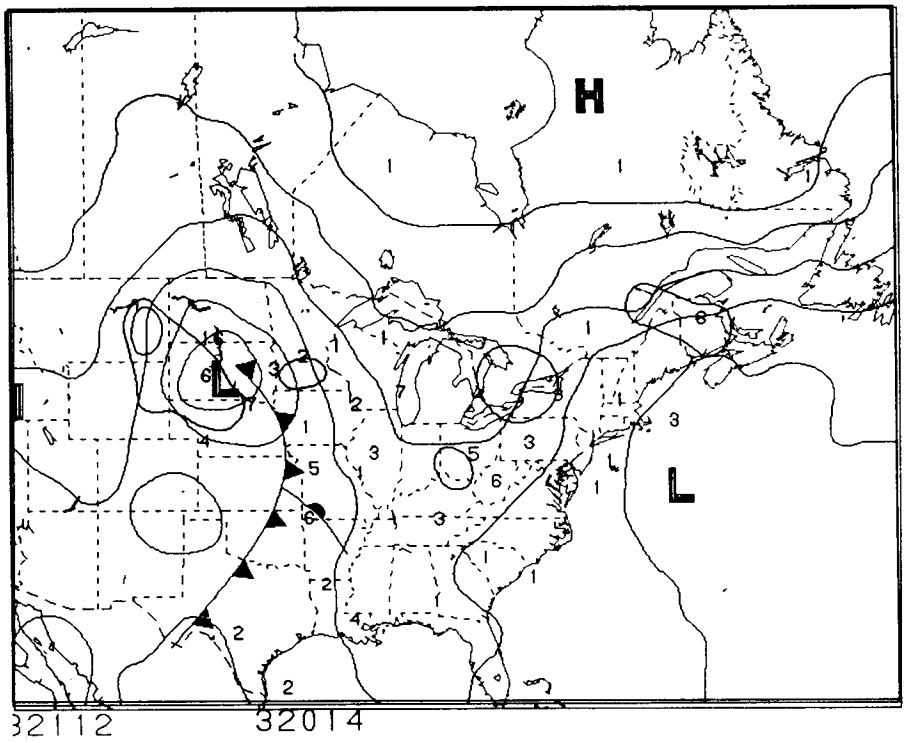

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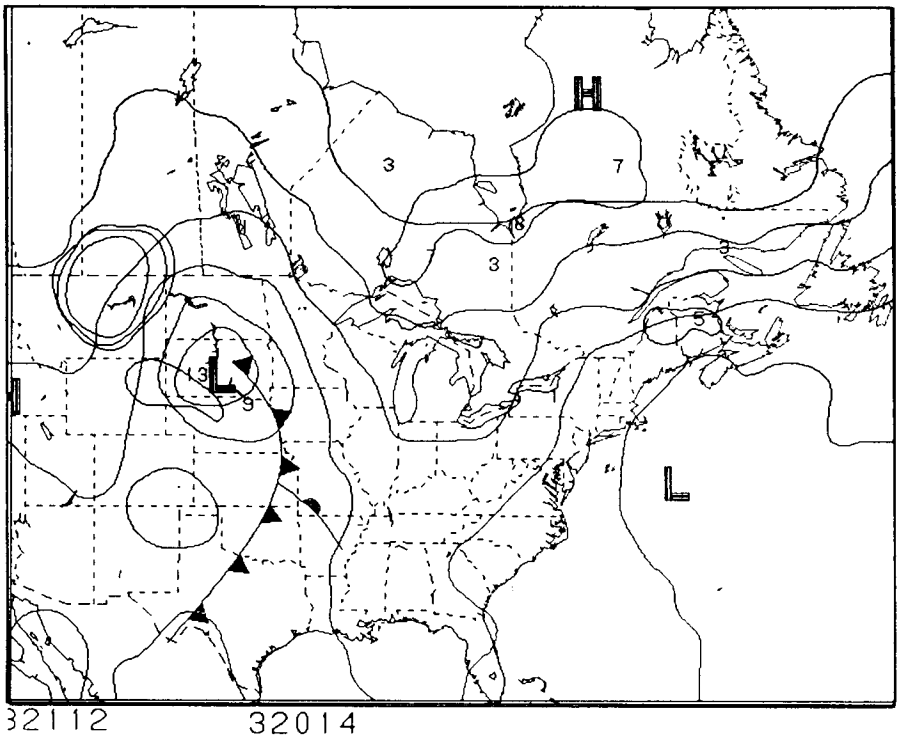

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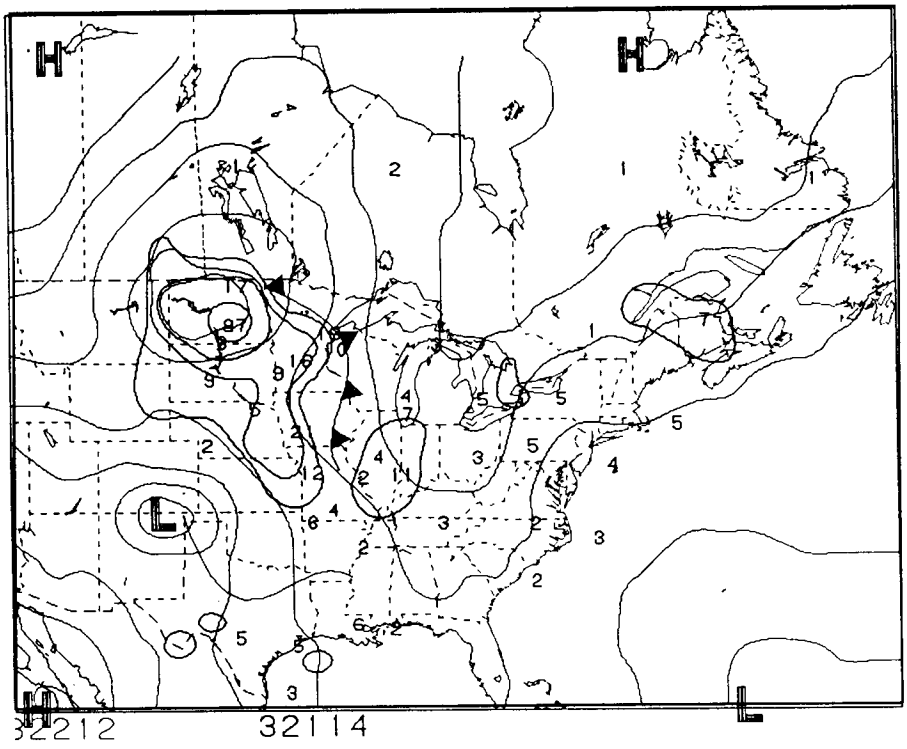

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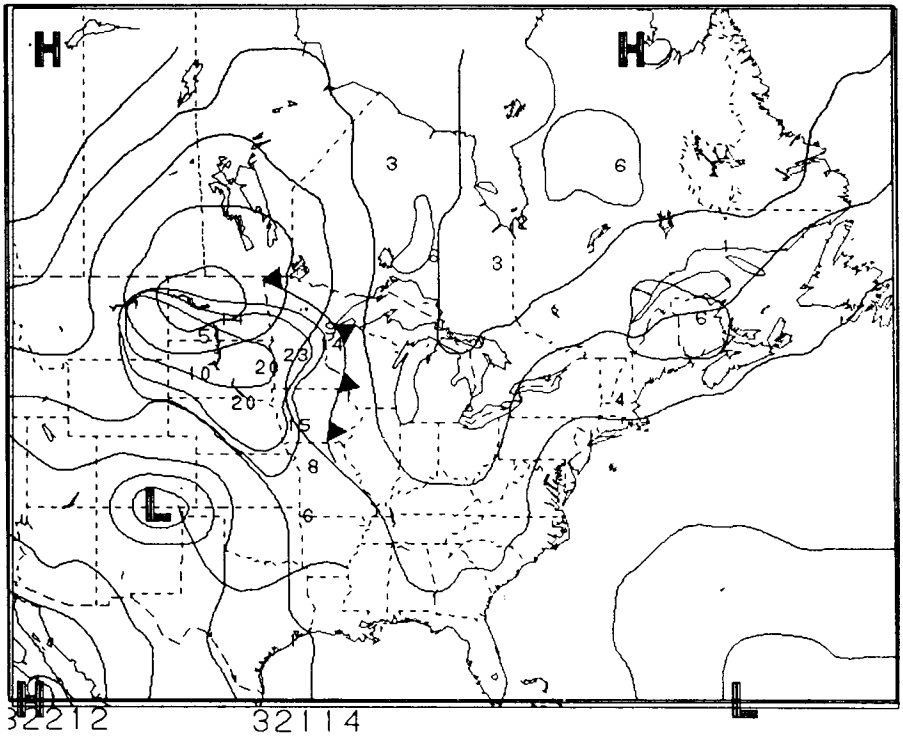

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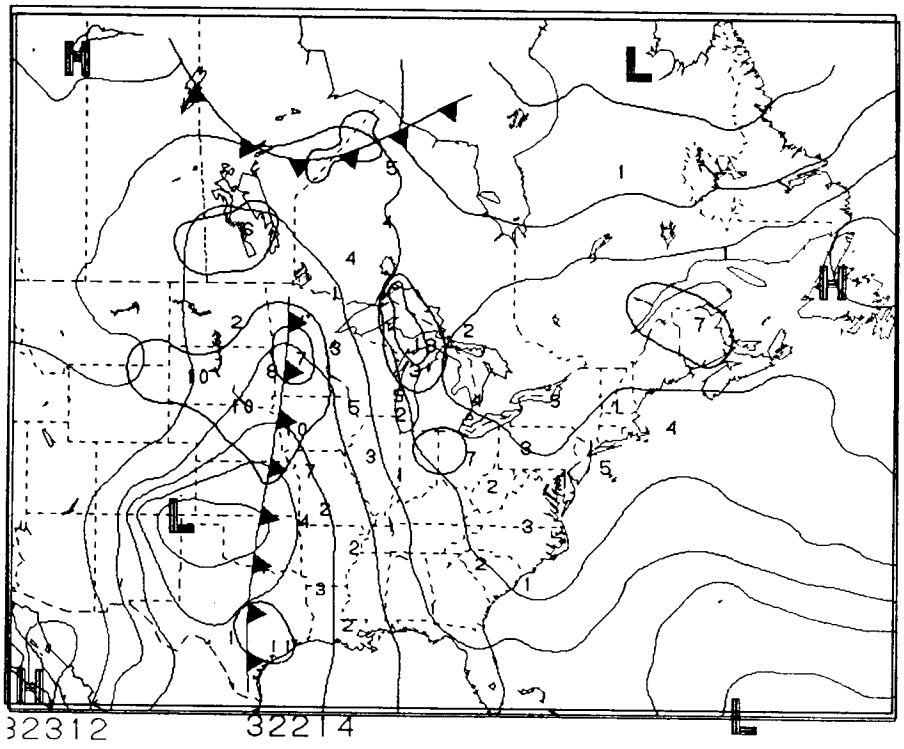

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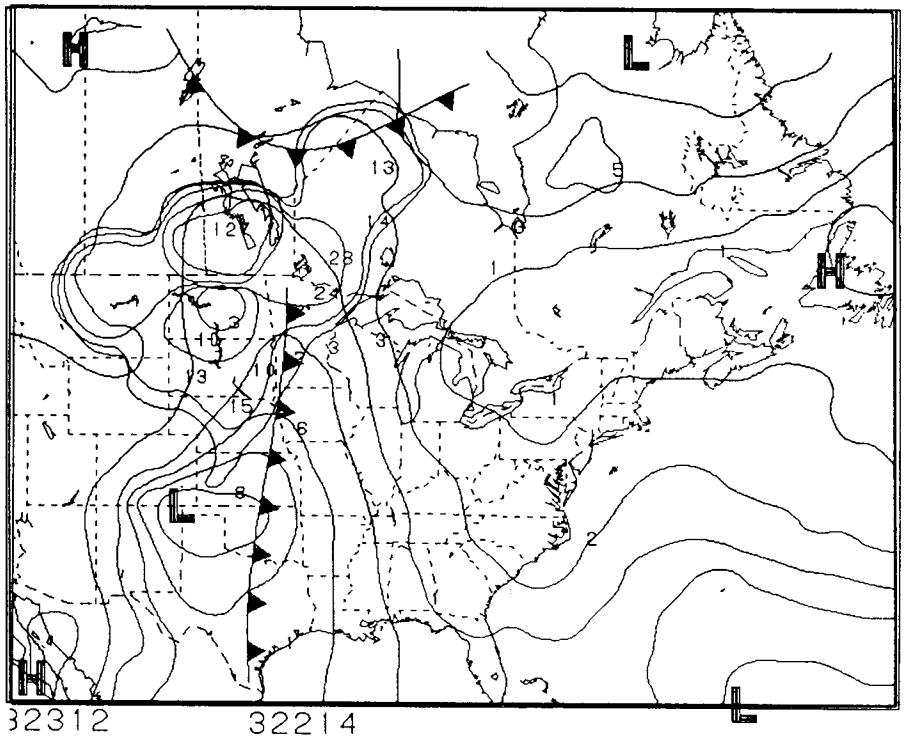

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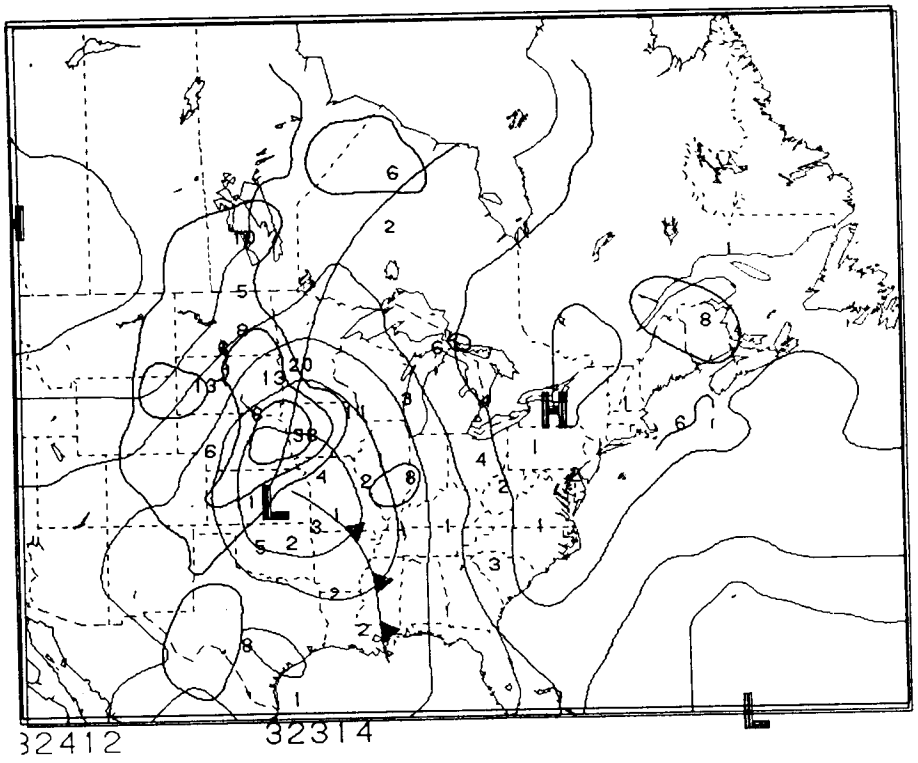

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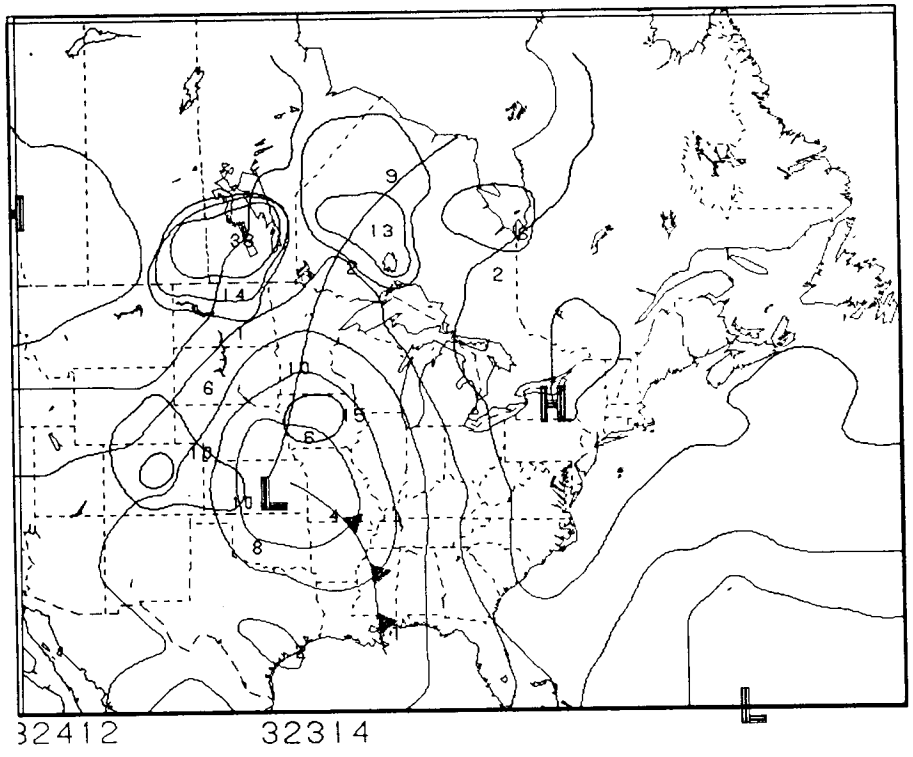

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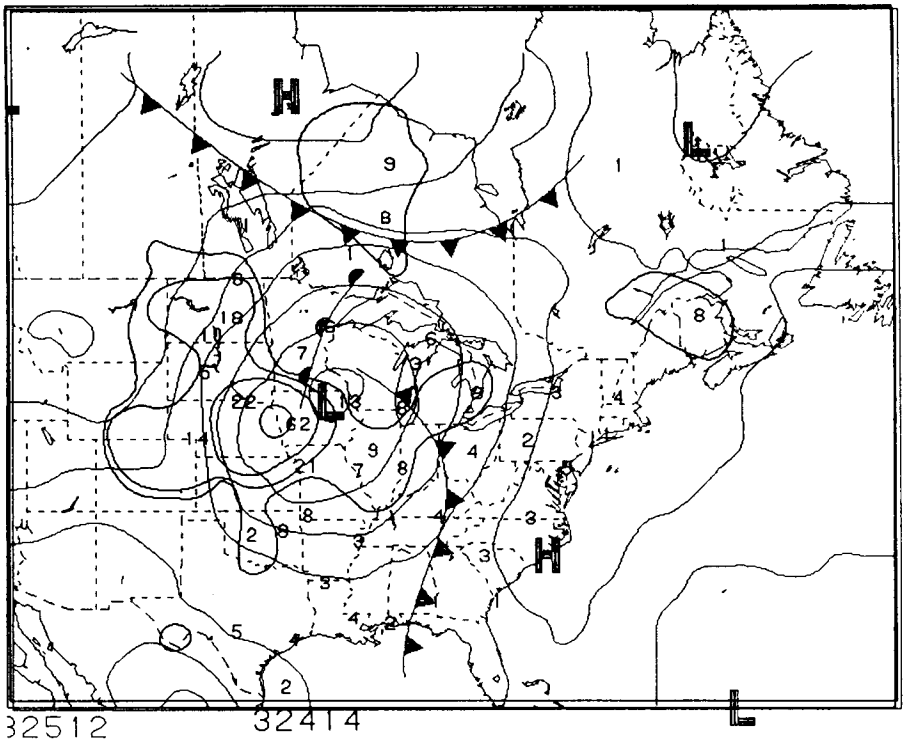

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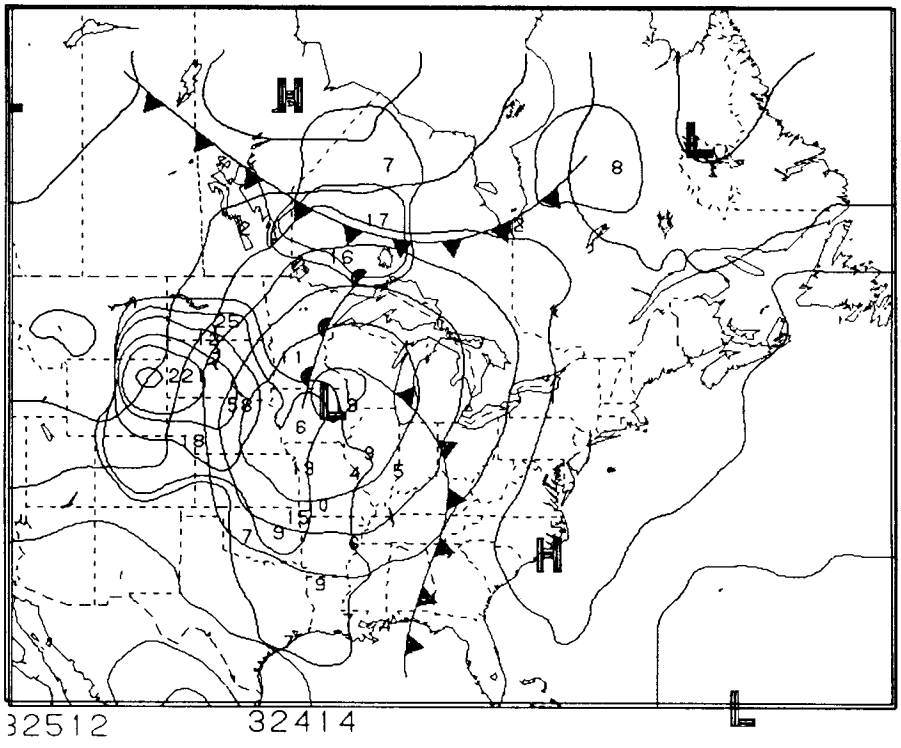

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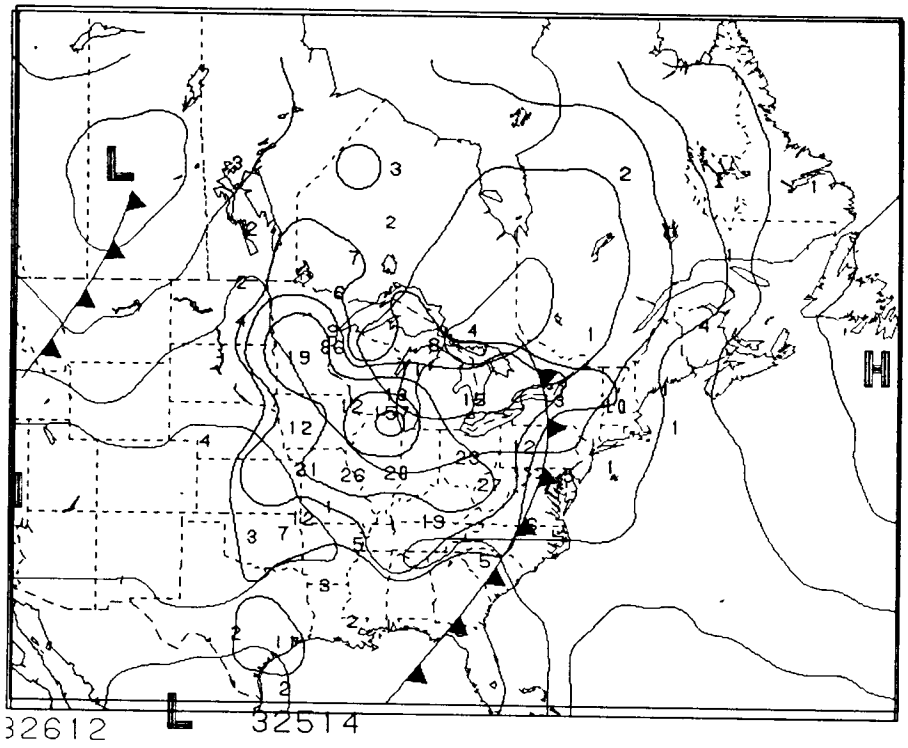

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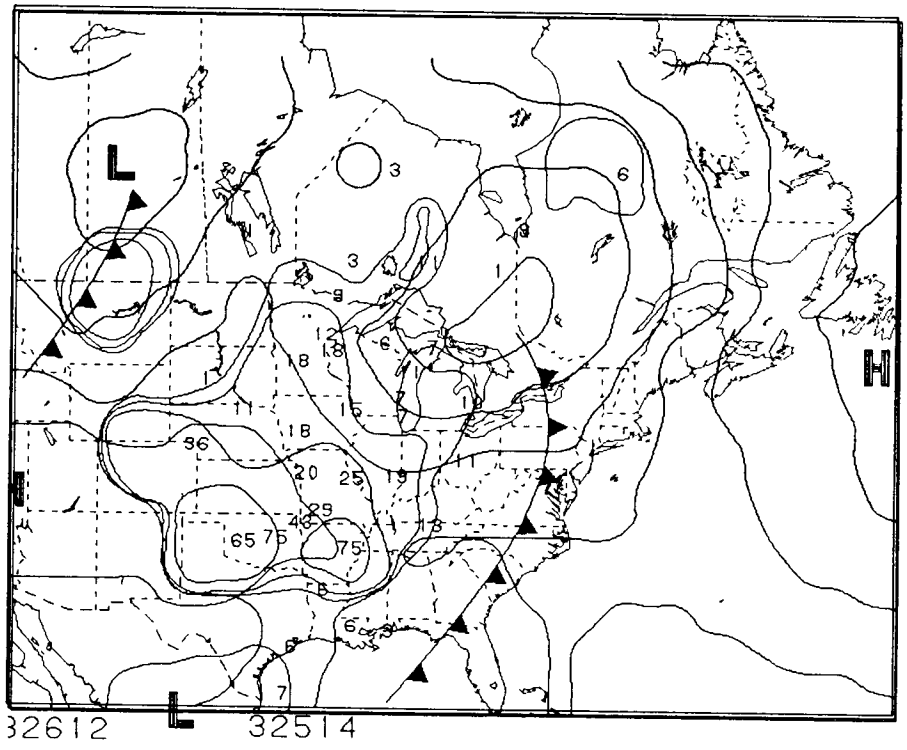

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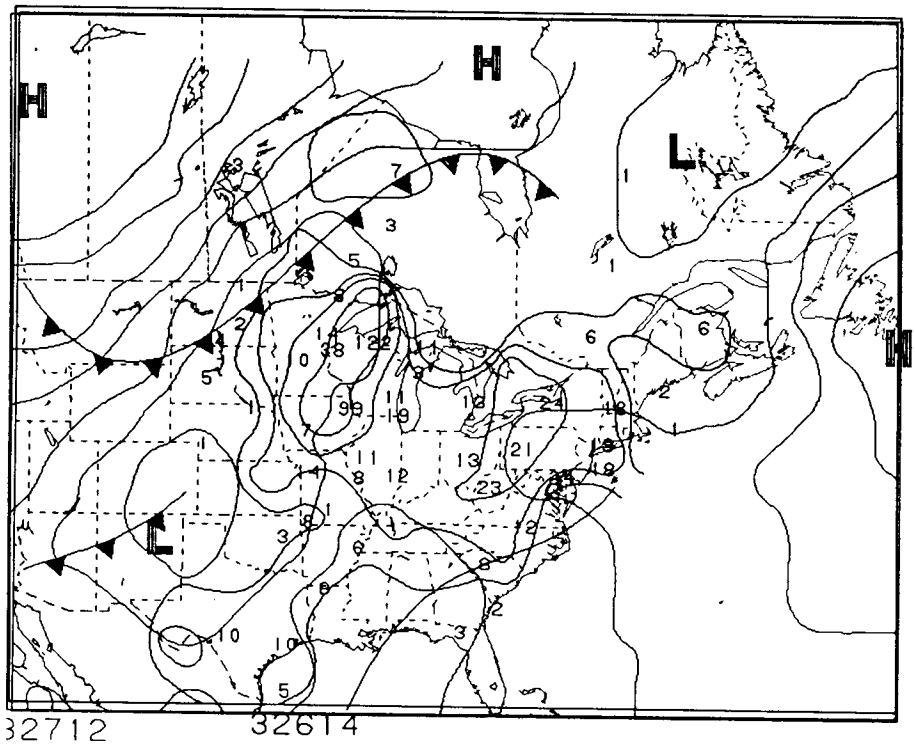

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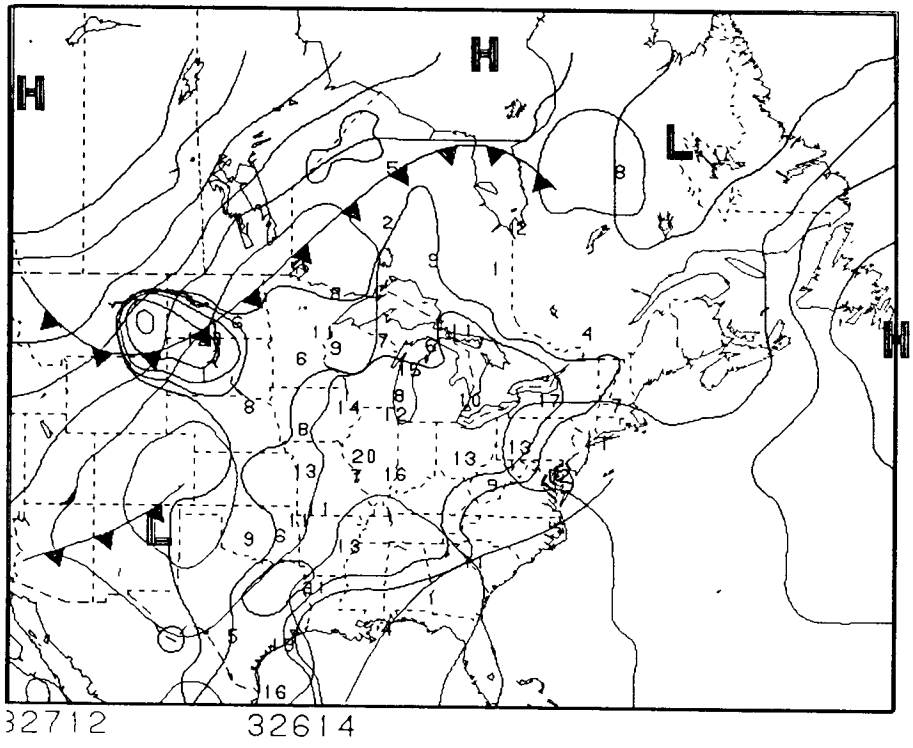

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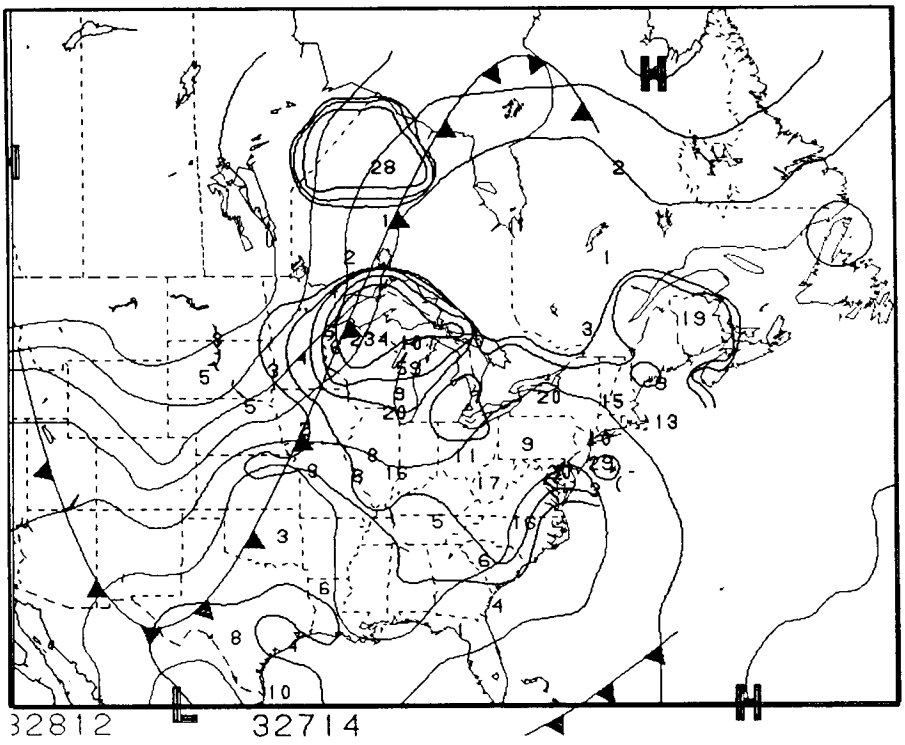

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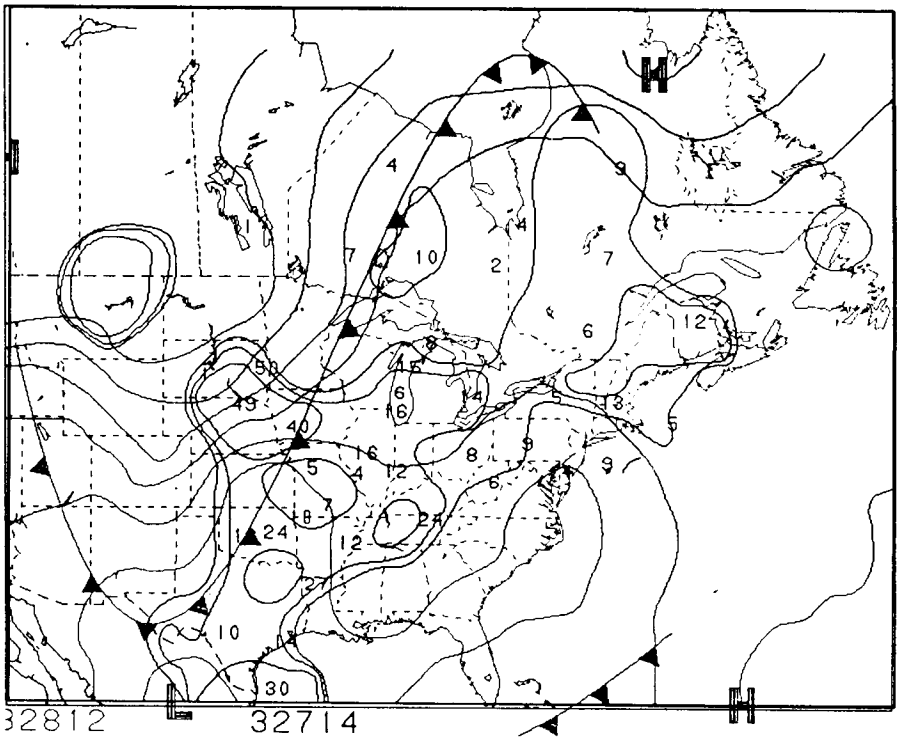

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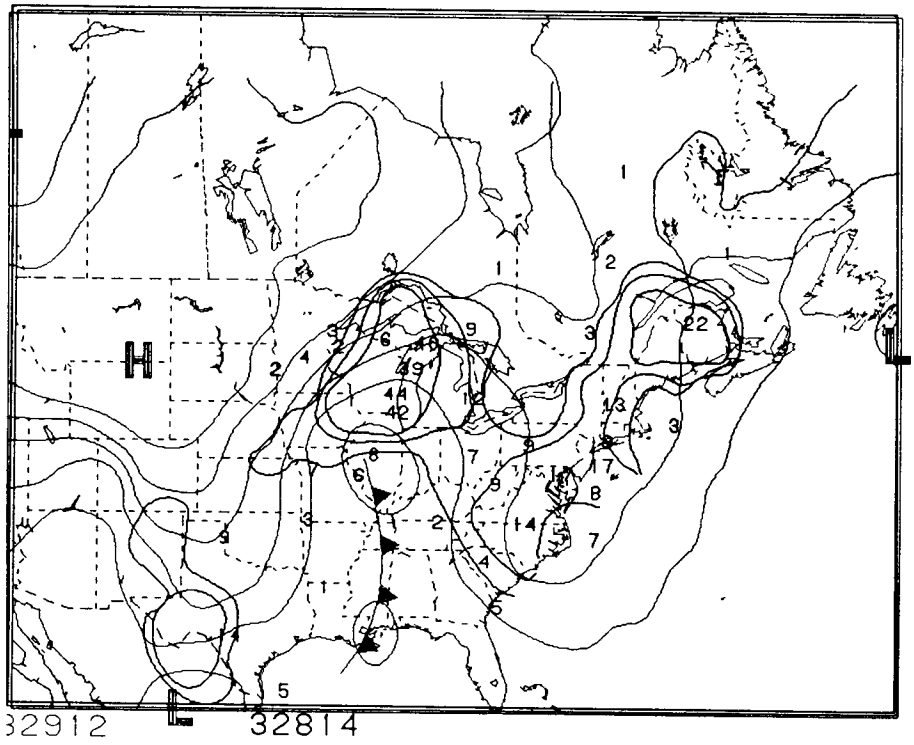
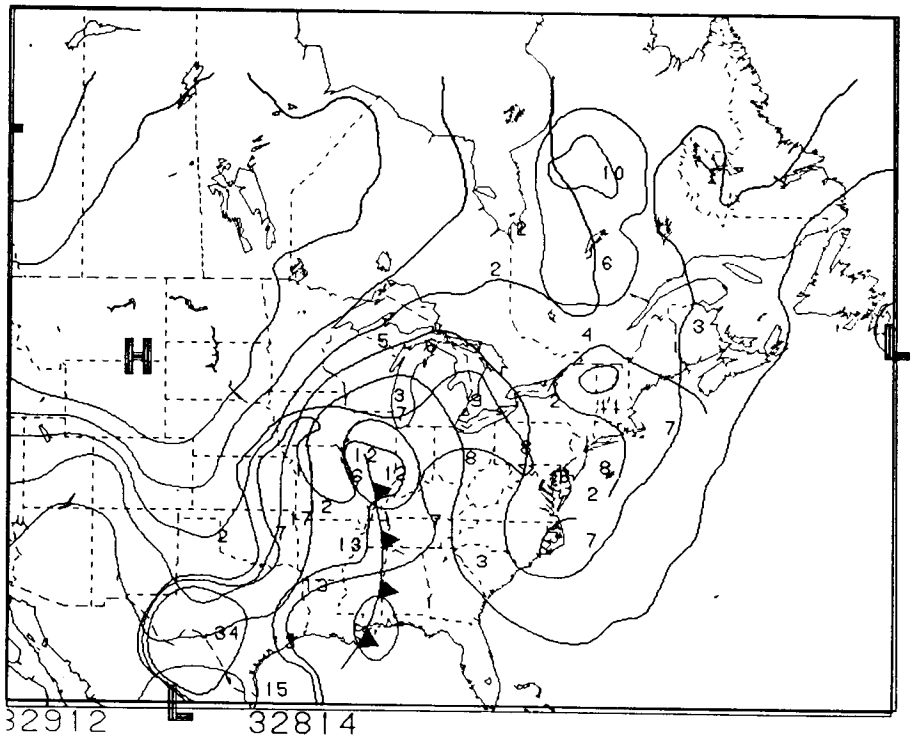
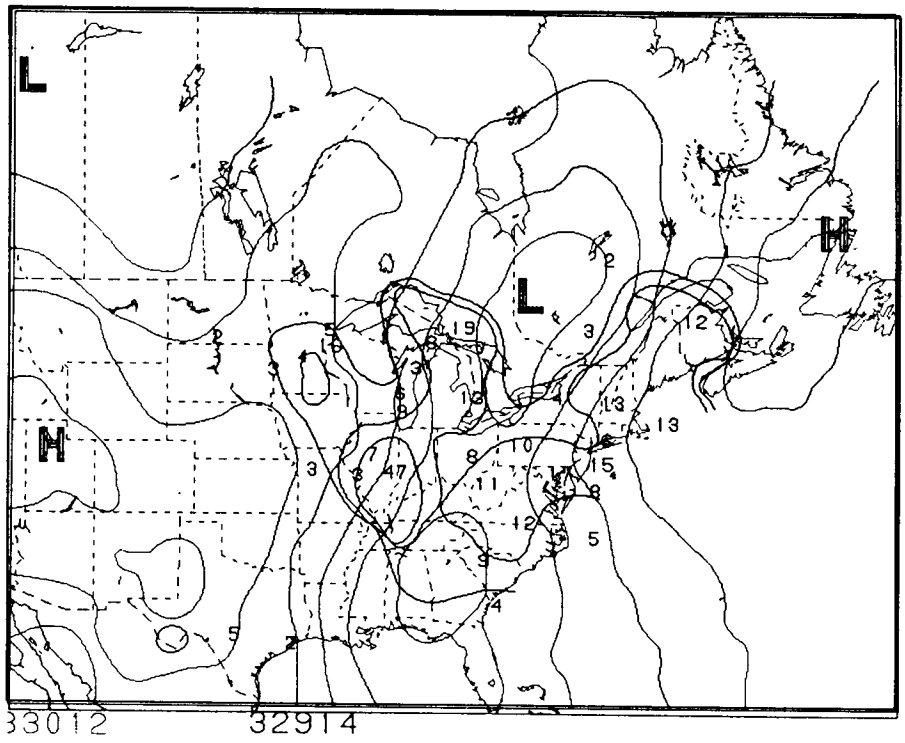


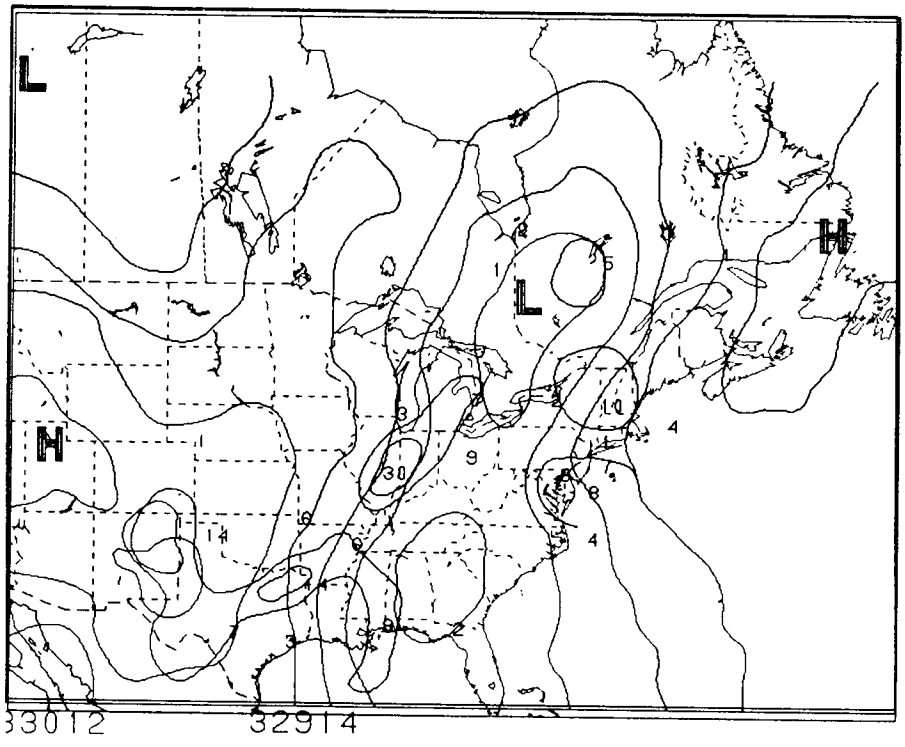
GLASGOW, MONTANA



ST. CLOUD, MINNESOTA



GLASGOW, MONTANA



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