

WEATHER AND CIRCULATION OF FEBRUARY 1975

Highly Variable and Wet

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1. Mean Circulation

The fast, low amplitude flow of January (Wagner, 1975) began to break down in February with greatest amplification observed over the Atlantic and Eurasia (Figs. 1, 2, and 3); elsewhere low amplitude flow continued.

Over most of the Northern Hemisphere, mean troughs and ridges were near their January locations. An exception was the east Pacific trough which built southward to Hawaii in February. Also, at high latitudes, the ridge north of Alaska and the trough over the Davis Strait both progressed to their February locations.

Although the wave pattern over the United States was similar to that during January, the western ridge weakened considerably. A deeper than normal mean trough remained anchored over the central United States for the fourth consecutive month.

Thermal gradients and average wind speeds remained strong over western portions of both the Atlantic and Pacific Oceans, but weakened in eastern portions (Fig. 3, 4).

2. Temperature

A strong mean ridge over northwestern Canada combined with a deep trough from Texas to the Great Lakes

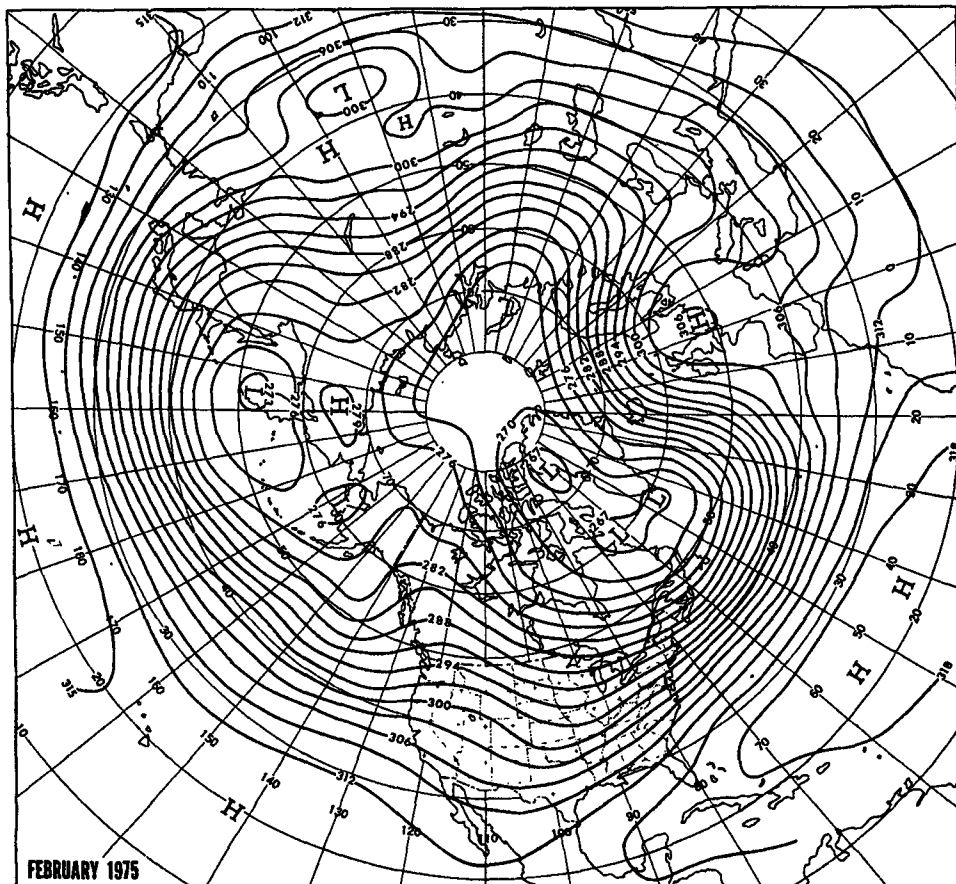


FIG. 1. Mean 700 mb height contours (dekameters) for February 1975.

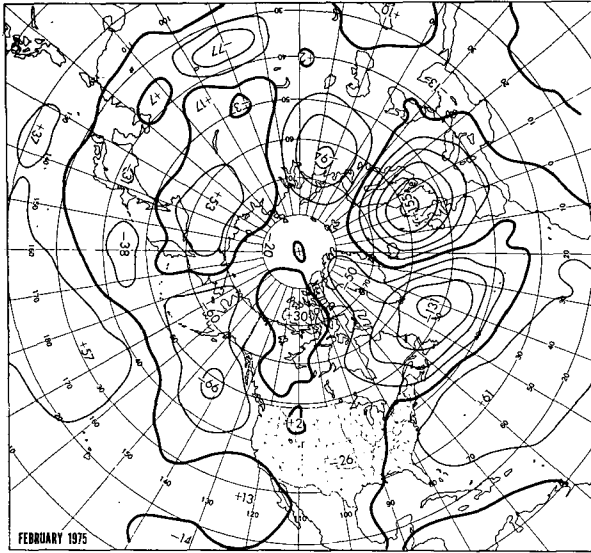


FIG. 2. Departure from normal of mean 700 mb height (m) for February 1975.

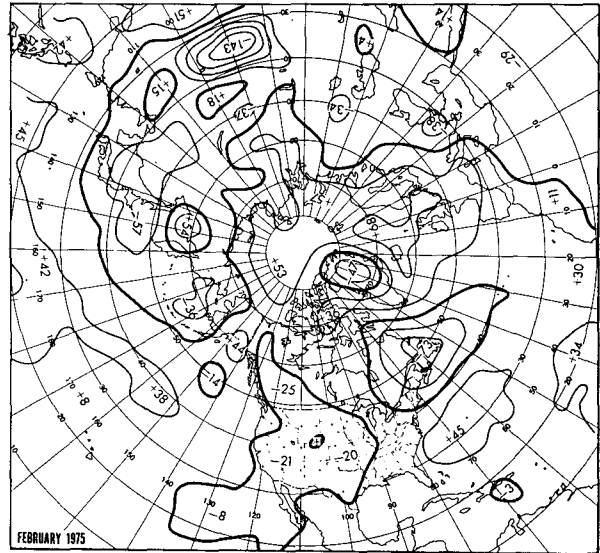


FIG. 4. Departure from normal of mean 1000 to 700 mb thickness (m) for February 1975.

to bring below normal temperatures to central and northwestern portions of the nation this month (Fig. 5). Stronger than normal southerly wind components between this trough and a strong Atlantic subtropical ridge kept mean temperatures above normal east of the Mississippi River.

Outside of the conterminous United States, a deep mean trough over western Alaska was accompanied by below normal temperatures over most of that state. To the south, the subtropical ridge was stronger than

normal near Hawaii and temperatures were a bit above normal.

Monthly average temperatures were among the coldest of record at Billings, Mont., Rapid City, S. D., and Sheridan, Wyo., and the warmest in several years over much of the eastern third of the country. Warm temperatures at Boston this month combined with earlier warmth to produce the seventh warmest winter in 104 years of records.

3. Precipitation

Storm systems and vorticity maxima, moving from the deep east Pacific trough across the western states to the central United States trough, and thence eastward or northeastward, produced above normal precipitation over most of the conterminous United States (Fig. 6). The interesting dry zone along the Gulf Coast

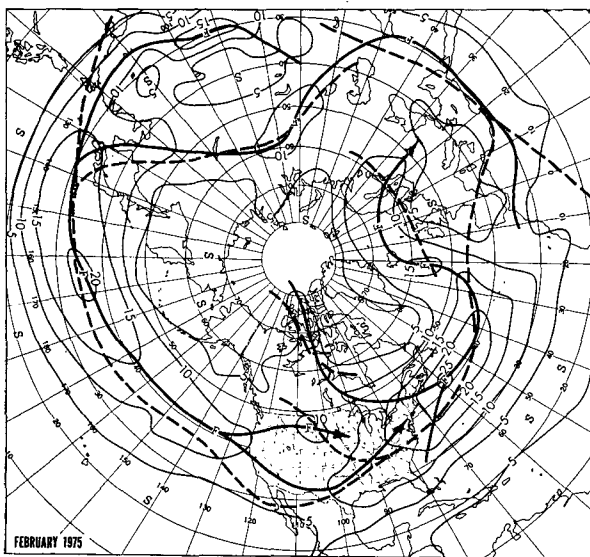


FIG. 3. Mean 700 mb geostrophic wind speed ($m s^{-1}$) for February 1975. Solid arrows are observed axes of maximum wind; dashed lines, the normal.

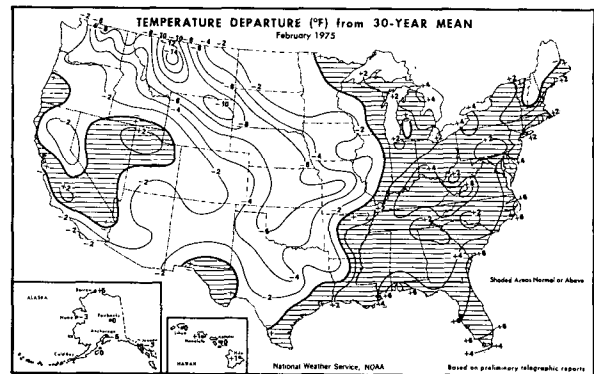


FIG. 5. Departure from normal of average surface air temperature ($^{\circ}F$) for February 1975 (from National Oceanic and Atmospheric Administration and Statistical Reporting Service, 1975).

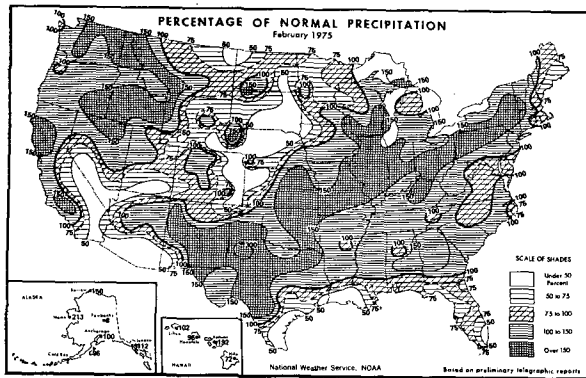


FIG. 6. Percentage of normal precipitation for February 1975 (from National Oceanic and Atmospheric Administration and Statistical Reporting Service, 1975).

that often accompanies widespread precipitation elsewhere east of the Mississippi River was present, as was a rain shadow east of the northern Rocky Mountains.

Although the interior of Alaska was dry this month, storm systems connected with the deep Bering Sea and east Pacific troughs brought more than normal precipitation to peripheral portions of the state.

4. Variability within the month

a. February 3-9

Amplification of the mean flow which began at the end of January (Wagner, 1975) reached extreme proportions early in February with closed 700 mb highs building over Alaska and the North Sea surrounding mean lows over the east Pacific and north Africa (Fig. 7). Strong northerly flow between the Alaska Ridge and a deep Hudson Bay trough drove extremely cold air to the Northern Rocky Mountains and the Great Plains. The mean ridge was far enough west that cold air penetrated to most of Washington state and northern Oregon. Substantial precipitation was limited to the Southeast, near the leading edge of the cold air, and along the West Coast, in advance of the deep mean trough.

b. February 10-16

The amplified circulation regime of the previous week proved very transient as both blocking highs weakened, four mean lows deepened near 60°N, and the mid-latitude westerlies increased over much of the Northern Hemisphere this week (Fig. 8).

The deepening Gulf of Alaska low, accompanied by increasing and northward-moving westerlies over the United States, brought moderating temperatures to the United States. The mean ridge over northern Canada remained strong enough, however, to provide cold air seepage across the northern half of the United States east of the Divide.

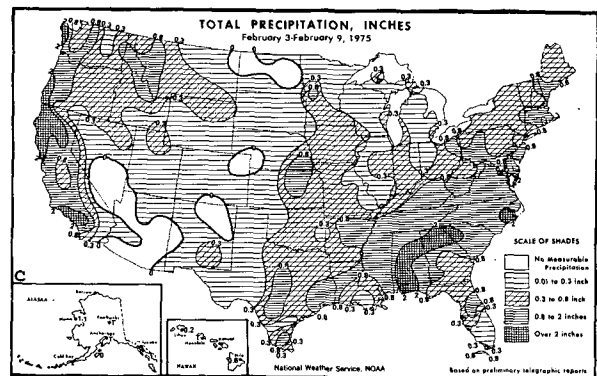
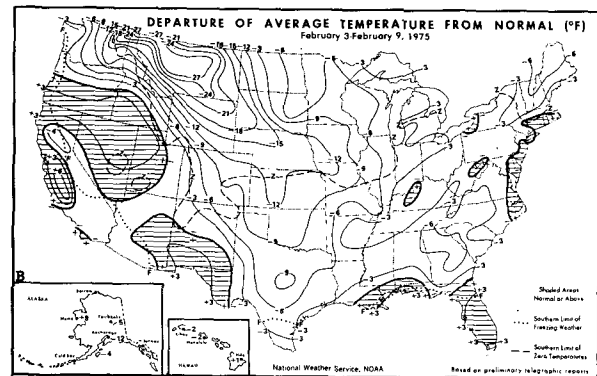
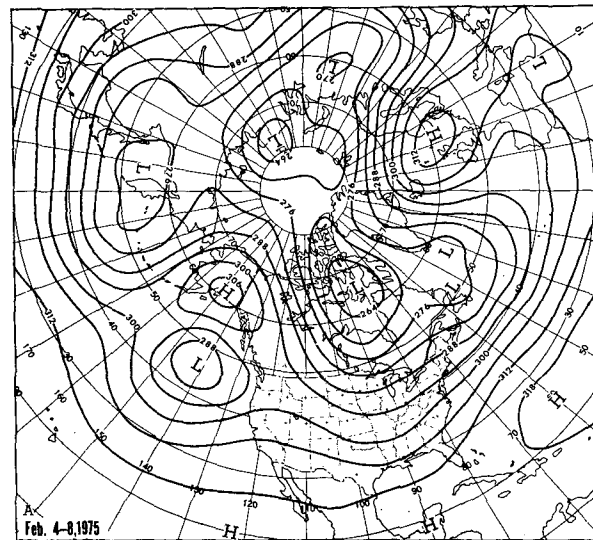


FIG. 7. (A) Mean 700 mb contours (dam) for 4-8 February 1975; (B) departure from normal of average surface temperature (°F); and (C) total precipitation (inches) for week of 3-9 February 1975 (from National Oceanic and Atmospheric Administration and Statistical Reporting Service, 1975).

Precipitation continued light in the area dominated by cold air, but exceeded two inches in parts of the Far West and Southeast.

This arrangement of mean circulation features brought cold air to the West and warm air to the East. Fast westerlies across southern Canada produced above normal mean temperatures over much of the northern Plains for the first week this month. Precipitation was relatively heavy east of the mean trough and along the northwest coast.

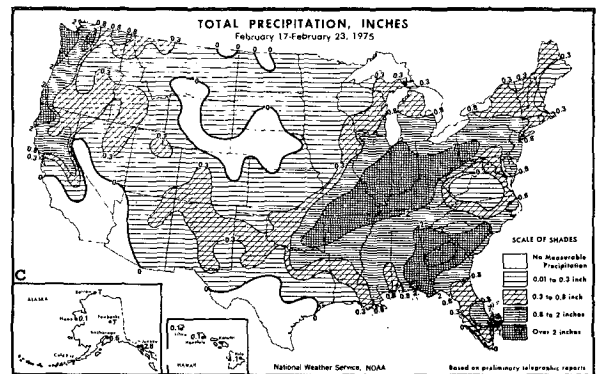
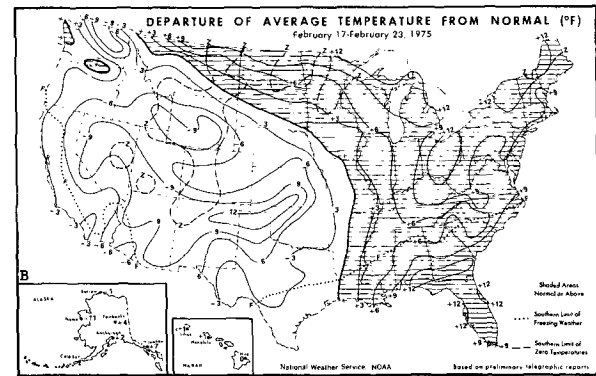
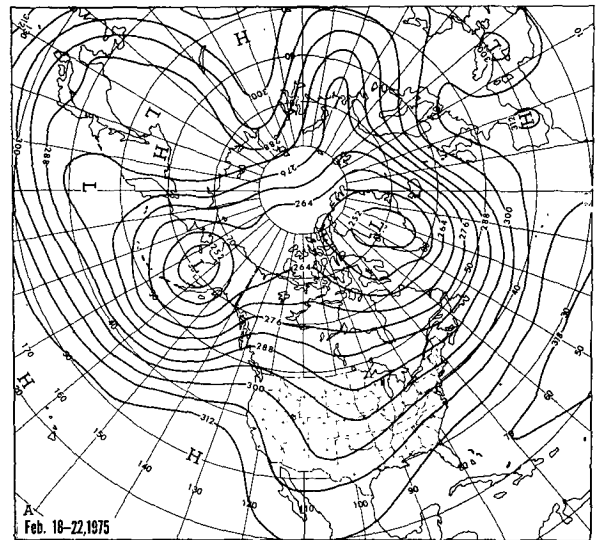
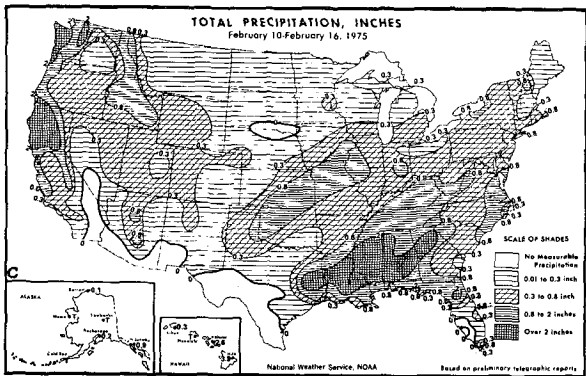
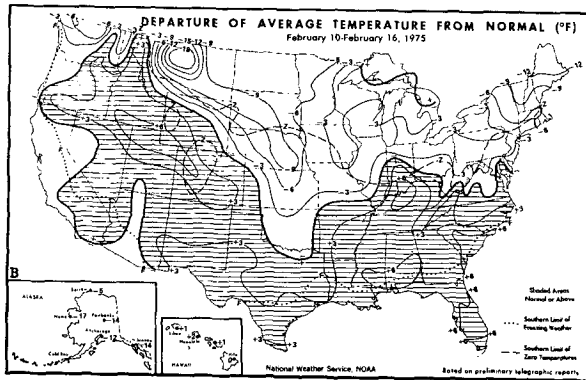
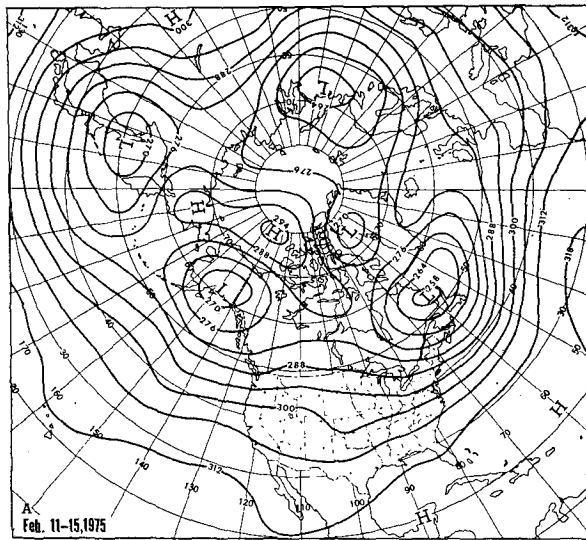


FIG. 8. Same as Fig. 7; (A) for 11-15 February 1975, (B) and (C) for week of 10-16 February 1975.

c. February 17-23

Middle latitude wave features generally moved eastward in the fairly fast westerlies that prevailed this week (Fig. 9). A mean ridge progressed to the West Coast, a trough to the central states, and a ridge to the East Coast.

FIG. 9. Same as Fig. 7; (A) for 18-22 February 1975, (B) and (C) for week of 17-23 February 1975.

d. February 24-March 2

Mean circulation features continued to move eastward in the vicinity of North America this week (Fig.

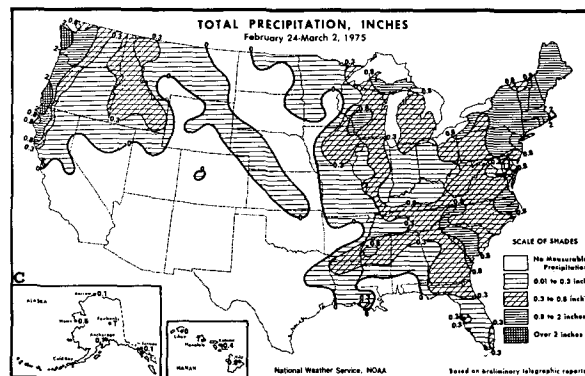
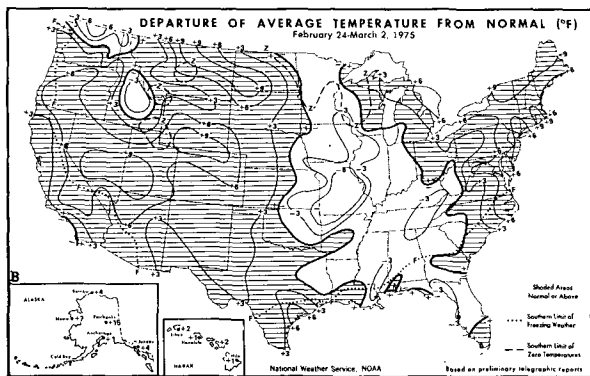
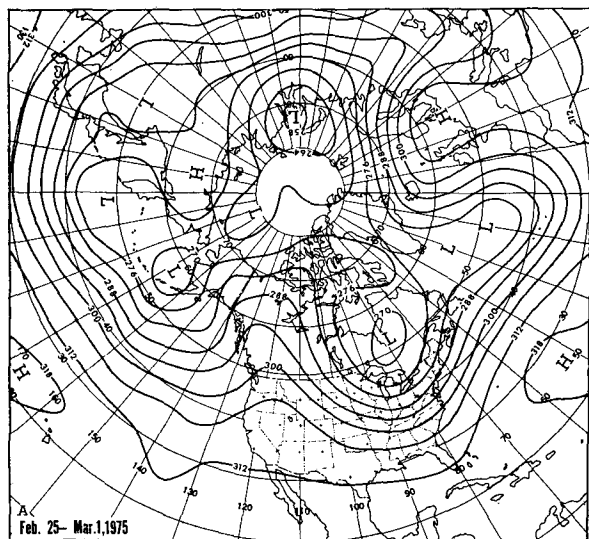


FIG. 10. Same as Fig. 7; (A) for 25 February–1 March 1975, (B) and (C) for 24 February–2 March 1975.

10). The western mean ridge progressed to the Intermountain Region while the trough to its east moved to a Great Lakes–Florida orientation.

The progressive mean circulation brought above normal temperatures eastward through the Great Plains and also to eastern areas in advance of the mean trough. Below normal temperatures were confined to a relatively small area west of the mean trough. This was the driest week of the month with significant precipitation confined to the eastern seaboard and the Northwest, while much of the southwestern quarter of the nation had no measureable precipitation.

REFERENCES

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- Wagner, A. James, 1975: Weather and circulation of January 1975—Predominantly mild but with a severe mid-month blizzard. *Mon. Wea. Rev.*, 103, 360–367.