WEATHER AND CIRCULATION OF MAY 1973

Warm in the West, Cold in the East

ROBERT R. DICKSON—*National Meteorological Center, National Weather Service, NOAA, Suitland, Md.*

1. MEAN CIRCULATION

Progression of mean circulation features over the Pacific and North America from April to May resulted in a moderately strong ridge over western North America and a deep trough from the Great Lakes to the Florida panhandle (figs. 1, 2). This wave movement occurred in a band of stronger than normal westerlies spanning the midlatitudes of the Pacific, the northwestern United States, and the Southeast (fig. 3).

In contrast to the progression elsewhere, the dominant circulation feature over the Atlantic Ocean, a strong blocking ridge, retrograded from the eastern Atlantic in April (Wagner 1973) to near the coast of Labrador in May. In its wake, a deep trough developed along the west coast of Europe and a ridge built over the continent, replacing a deep trough. The mean flow aloft over western Europe changed from northwesterly in April to southwesterly in May. In polar regions, a strong 700-mb High in April gave way to a deep Low in May as the prevailing storm track again moved north of Scandinavia.

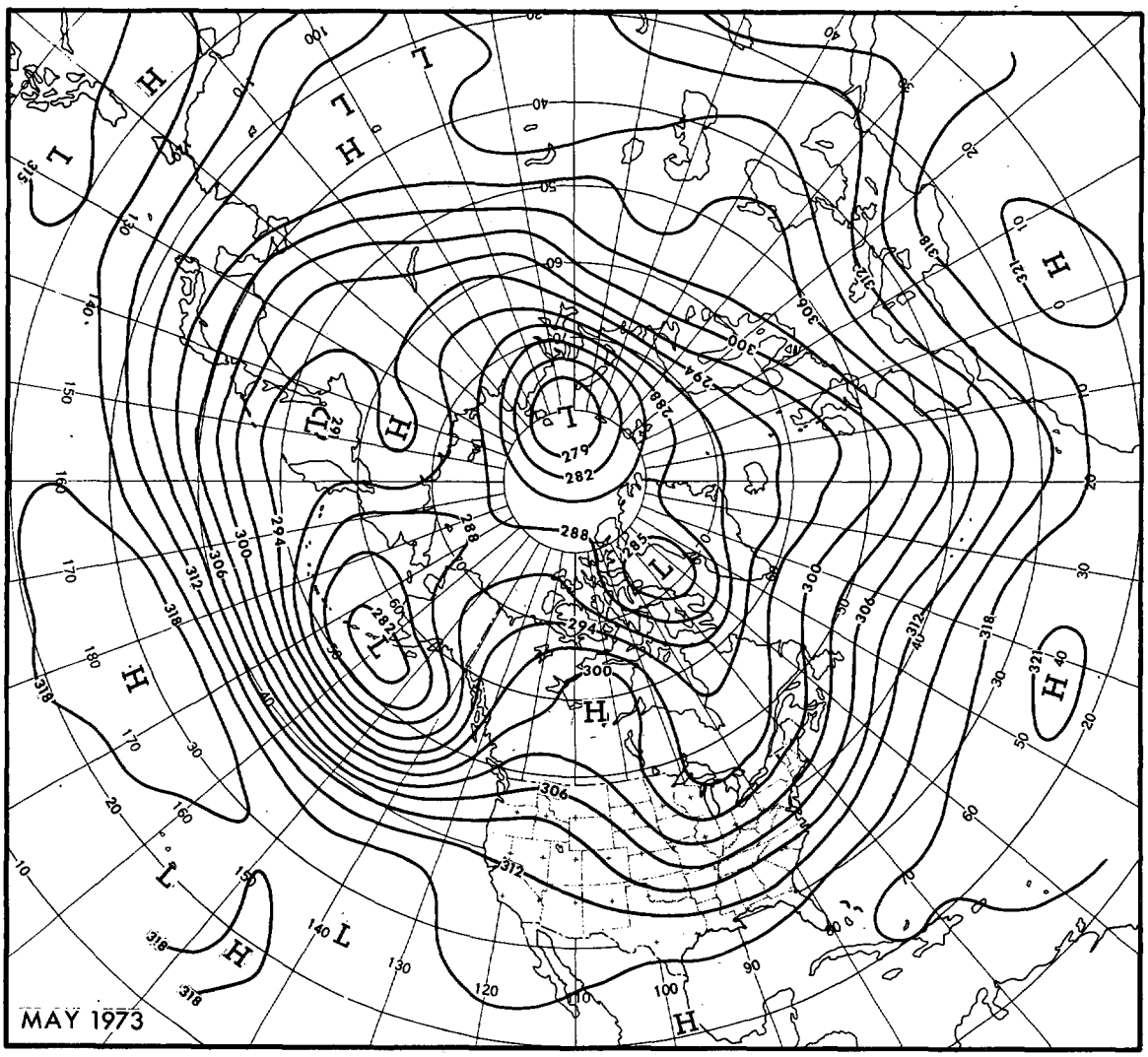


FIGURE 1.—Mean 700-mb height contours in dekameters (dam) for May 1973.

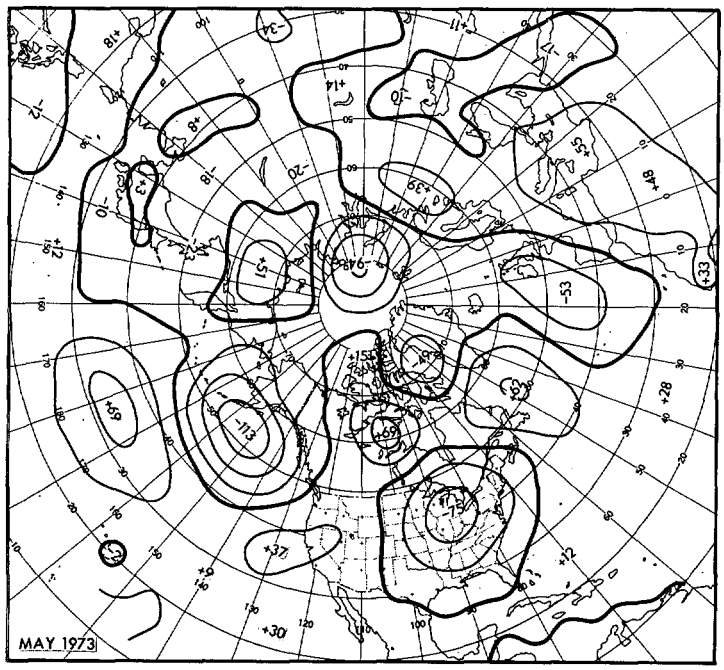


FIGURE 2.—Departure from normal of mean 700-mb height in meters (m) for May 1973.

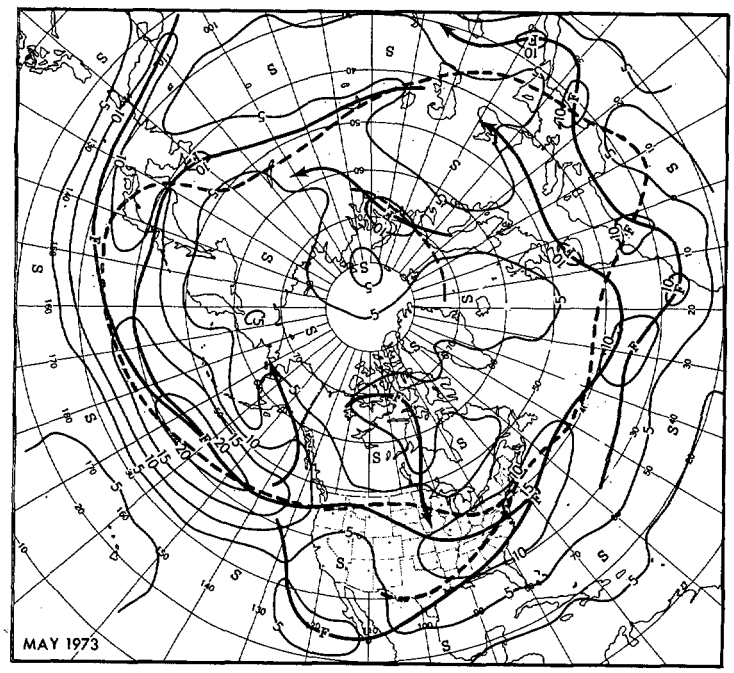


FIGURE 3.—Mean 700-mb geostrophic wind speed (m/s) for May 1973. Solid arrows show the observed axes of maximum wind speed, and dashed lines show the normal.

2. TEMPERATURE

In consonance with the progression of mean circulation features, the temperature pattern over the United States shifted eastward from April to May (fig. 4). Above-normal temperatures prevailed under the western ridge while temperatures averaged below normal east of the Rocky Mountains. The large area of low temperatures was a joint result of cold air advection between the strong western ridge and the deep eastern trough (figs. 1, 2),

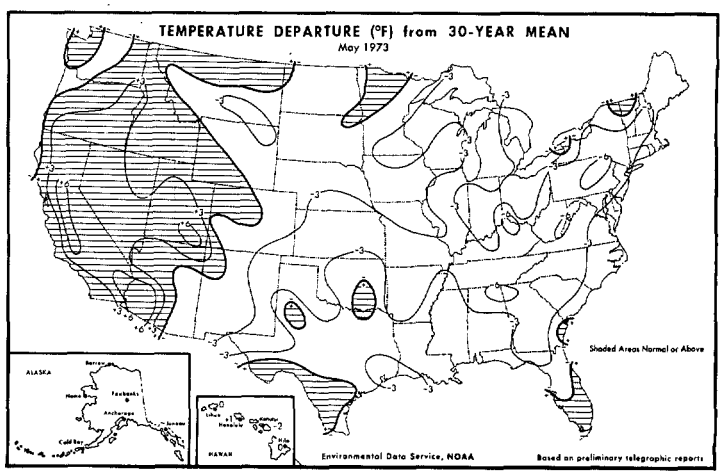


FIGURE 4.—Departure from normal of average surface temperature (°F) for May 1973 (from Environmental Data Service and Statistical Reporting Service 1973).

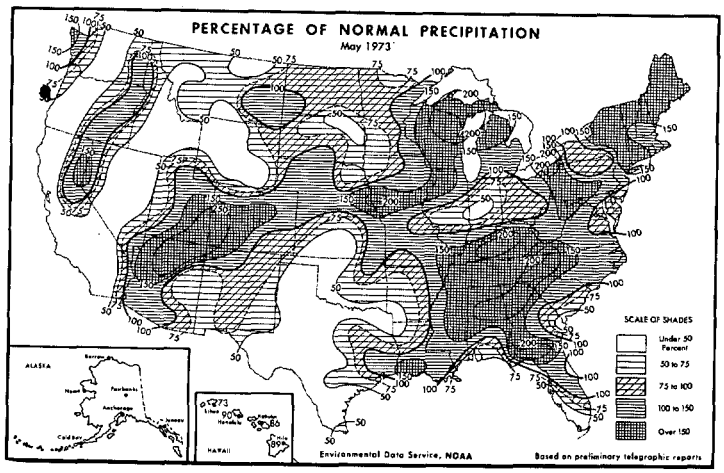
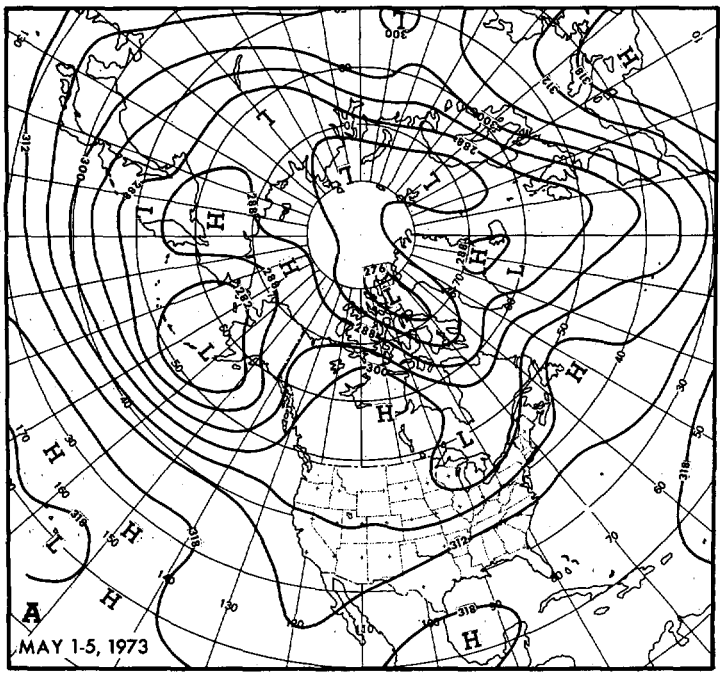


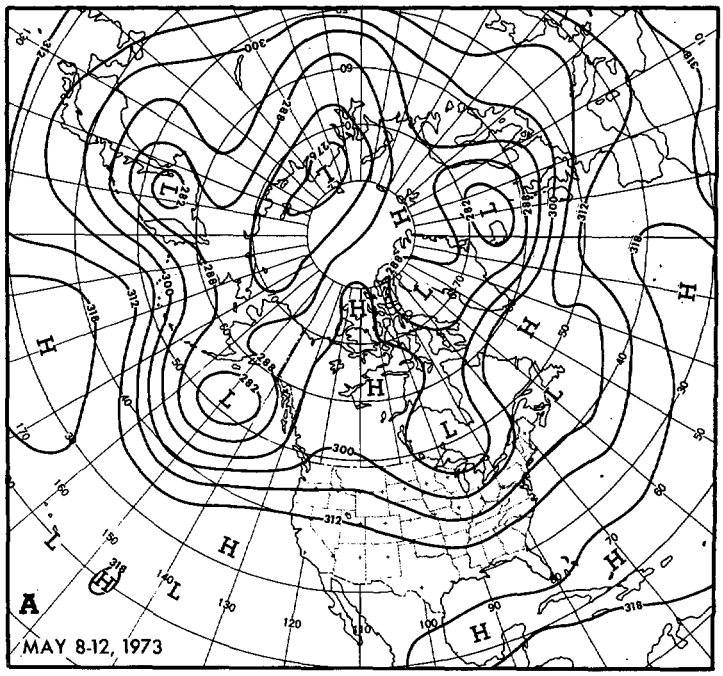
FIGURE 5.—Percentage of normal precipitation for May 1973 (from Environmental Data Service and Statistical Reporting Service 1973).

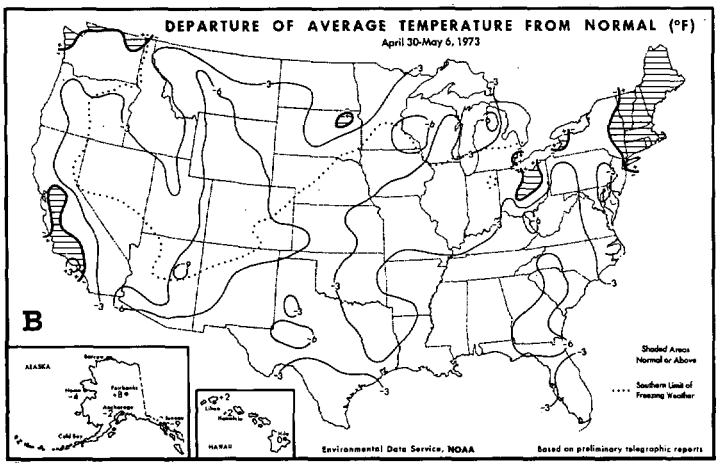
together with the effects of extensive cloudiness. Record low percent-possible sunshine was reported at Louisville, Ky., and Trenton, N.J. Stronger than normal southeasterly flow brought above-normal temperatures to most of Alaska this month; subnormal temperatures were largely confined to its rainy south coast.

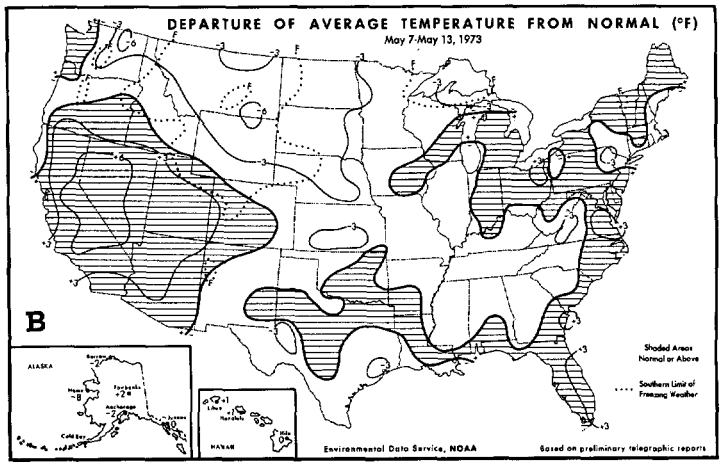
3. PRECIPITATION

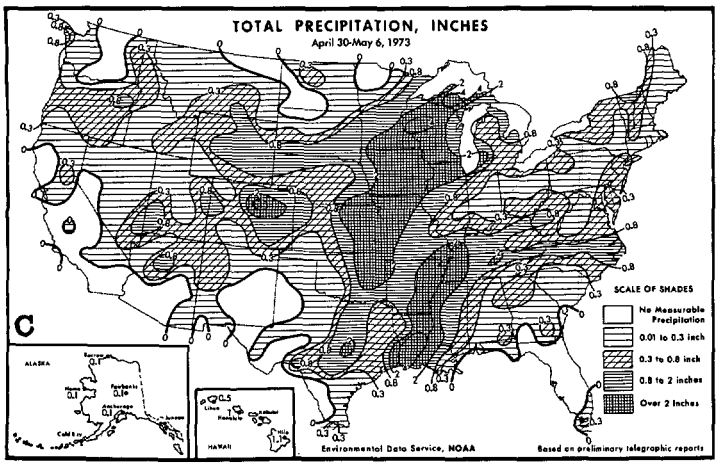
Precipitation over the Southern Great Plains dwindled (fig. 5) as the mean trough moved eastward to the southeastern states. Storm systems and upper troughs moving from the Central and Southern Plateau region to the Great Lakes, however, continued to produce a strip of heavier than normal precipitation along their track. Subnormal precipitation was generally observed in the mean ridge to the north of this storm track and in the strong ridge over California. Near and in advance of the eastern trough, precipitation generally exceeded normal. A notable exception was southern Florida, where the driest May in several years was reported. The deep mean Low over the eastern Aleutians and associated southerly flow over most











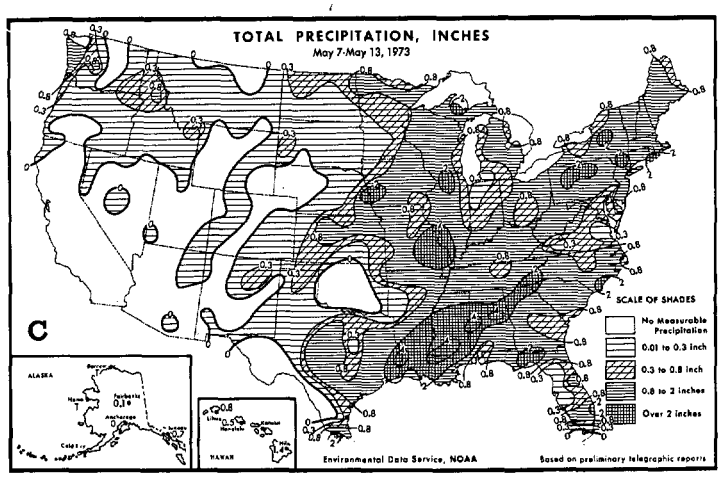


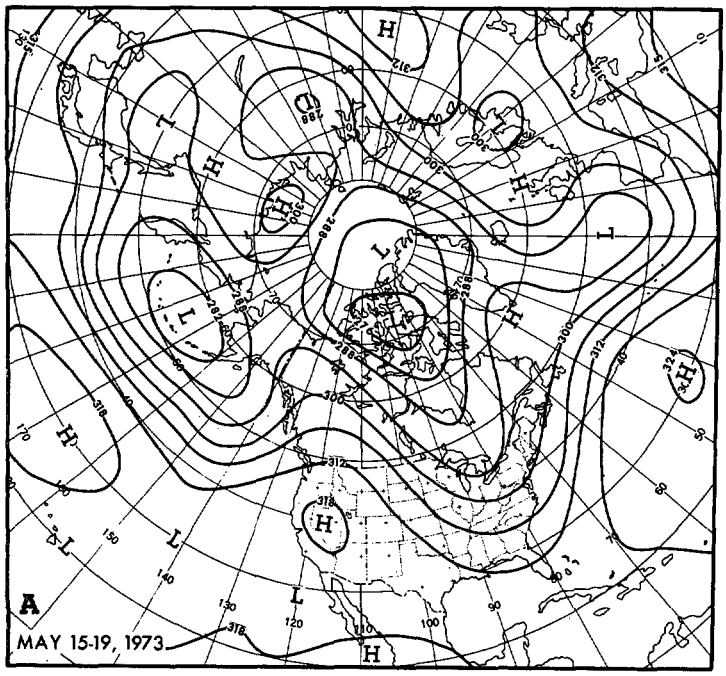
FIGURE 6.—(A) mean 700-mb height contours (dam) for May 1–5, 1973; (B) departure from normal of average surface temperature (°F) and (C) total precipitation (in.) for week of Apr. 30–May 6, 1973 (from Environmental Data Service and Statistical Reporting Service 1973).

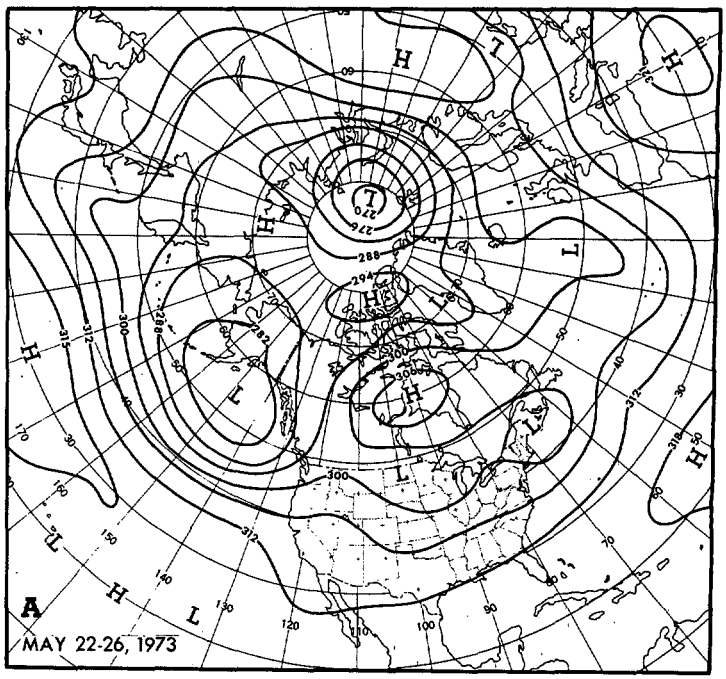
FIGURE 7.—Same as figure 6, (A) for May 8–12, 1973; (B) and (C) for week of May 7–13, 1973.

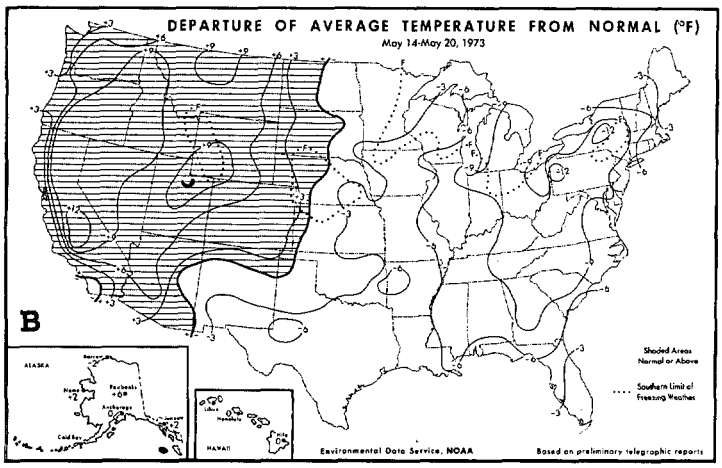
of Alaska brought above-normal precipitation to most of that State with greatest departures along the south coast.

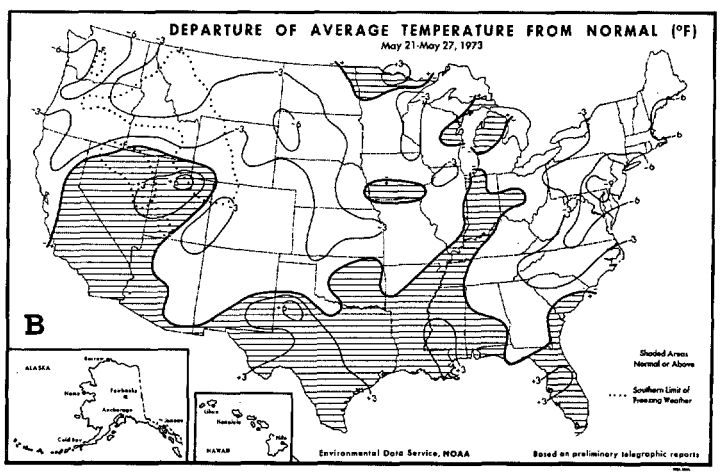
4. VARIABILITY WITHIN THE MONTH

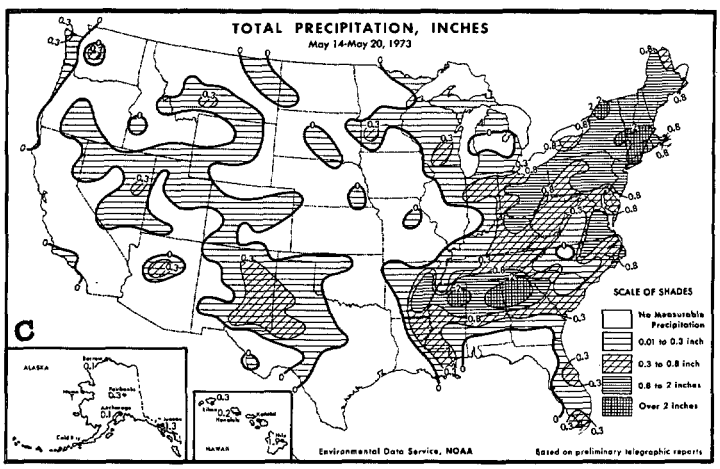
Weekly distributions of temperature and precipitation accompanied by appropriate 5-day mean 700-mb maps are shown in figures 6–10. The westerlies were split over











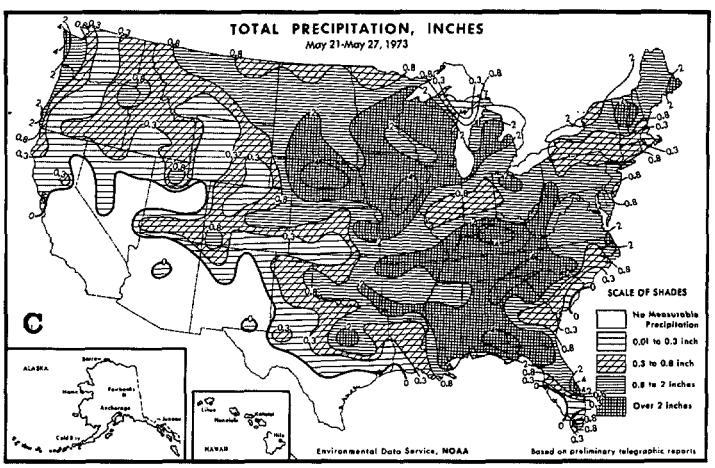


FIGURE 8.—Same as figure 6, (A) for May 15–19, 1973; (B) and (C) for week of May 14–20, 1973.

FIGURE 9.—Same as figure 6, (A) for May 22–26, 1973; (B) and (C) for week of May 21–27, 1973.

North America during most of the month with one band across northern Canada and another over the United States (figs. 6, 7, 9, 10). Only at midmonth (fig. 8) were the westerlies concentrated in a midlatitude wave with a strong ridge in the West and a deep trough in the East. This followed an amplification of the flow pattern over the Pacific (fig. 7).

Wave phase over the coterminous United States was fairly constant with mean troughs near the Great Lakes throughout the month and mean ridges in the West

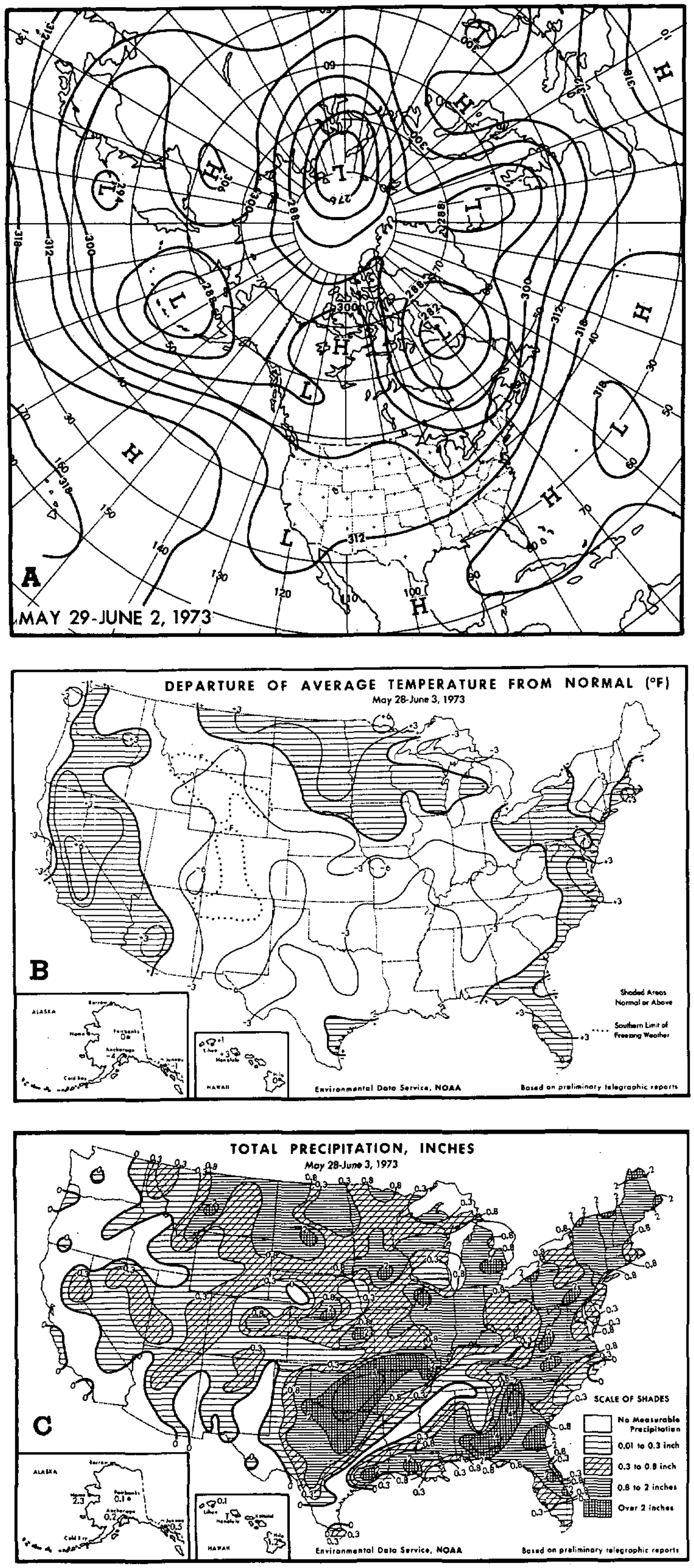


FIGURE 10.—Same as figure 6, (A) for May 29–June 2, 1973; (B) and (C) for week of May 28–June 3, 1973.

most of the month. The deep Aleutian Islands-Gulf of Alaska Low and the amplified ridge over western or central Canada were a prominent couplet during May (figs. 6–10). The frequent advection of vorticity maxima east of this ridge appears to have been a factor in the weakening of the Atlantic block that had retrograded to near Newfoundland early in the month. The major change in the circulation pattern over Europe occurred during the first week of the month (fig. 6) as the retrograde position of the Atlantic block brought a deep trough to the west coast of Europe and a strong ridge to Europe.

Precipitation and low temperatures were most widespread at the beginning and end of the month (figs. 6, 9, 10). During these periods, the 700-mb flow over the United States was of low amplitude, storms were slow moving, and the Canadian ridge-Great Lakes trough combination provided ample cold air advection. As the western ridge amplified, the West became warmer and dryer (figs. 7, 8). The highly amplified flow pattern of midmonth (fig. 8) produced the most extreme temperature anomalies of the month—very warm in the West and very cool in the East. Lowest temperatures for so late in the season were observed during this week in parts of the Carolinas, Tennessee, West Virginia, Texas, and Minnesota. Increasing northwesterly flow over the Nation's midsection during this week gave a welcome dry spell to that flood-plagued area. Heaviest precipitation throughout the month occurred in the vicinity of the mean trough. A deep, slow-moving Low, moving out of the Central Great Plains on May 26, produced at least 195 tornadoes, mostly in the South and in Illinois and Indiana, between May 26 and 29 (Environmental Data Service and Statistical Reporting Service 1973).

REFERENCES

Environmental Data Service, NOAA, U.S. Department of Commerce, and Statistical Reporting Service, U.S. Department of Agriculture, *Weekly Weather and Crop Bulletin*, Vol. 60, Nos. 19–24, May 7, 14, 21, 28, and June 4 and 11, **1973**.

Wagner, A. James, "Weather and Circulation of April 1973—A stormy month with widespread flooding." *Monthly Weather Review*, Vol. 101, No. 7, July **1973**, pp. 597–602.