

THE COLDEST FEBRUARY

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After a succession of mild winter months, extreme arctic cold anchored itself over eastern interior Alaska during February 1979. On the 9th Northway bottomed out at -71°F , setting a new record for extreme cold in the United States during February. By month's end, most settlements in the Tanana and Upper Yukon Valleys had endured the coldest February ever. Average monthly temperatures of 25.3 degrees below zero at Fairbanks made it the coldest February since records began here during the Gold Rush Days of 1904. The previous record of 22.5 degrees below zero had been set back in February 1950. Northway, on the Alaska Highway near the

Canadian border, finished the month with a tenaciously cold February average temperature of 36.2 degrees below zero. Northway's previous record cold February (also set in 1950) had been thirteen degrees warmer!

Northerly flow aloft prevailed over eastern interior Alaska the entire month. Composite 500mb charts for February, broken down by week, are shown in Figures 1-4. This persistent northerly flow aloft reinforced, without interruption, the intense cold at ground level. As a result, every single day of the month at Fairbanks ended below normal. February 25th, the warmest day,

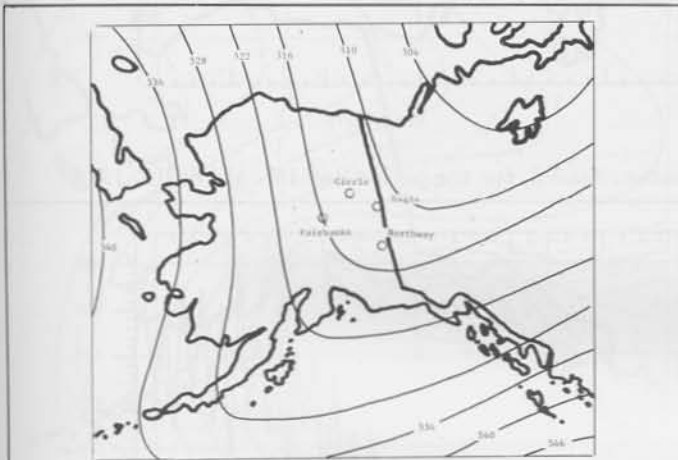


Figure 1. Mean 500 mb flow for the period Feb 1-7, 1979. Solid lines are contours of the height of the 500 mb pressure level. Heights are expressed in decameters. Contour interval 6 decameters. Intermediate contours are shown as dashed lines.

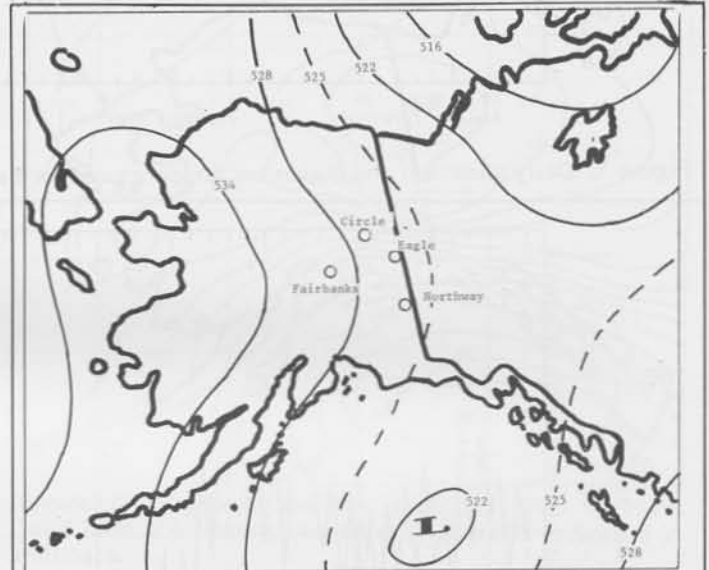


Figure 3. As Figure 1, but for the period Feb 15-21, 1979.

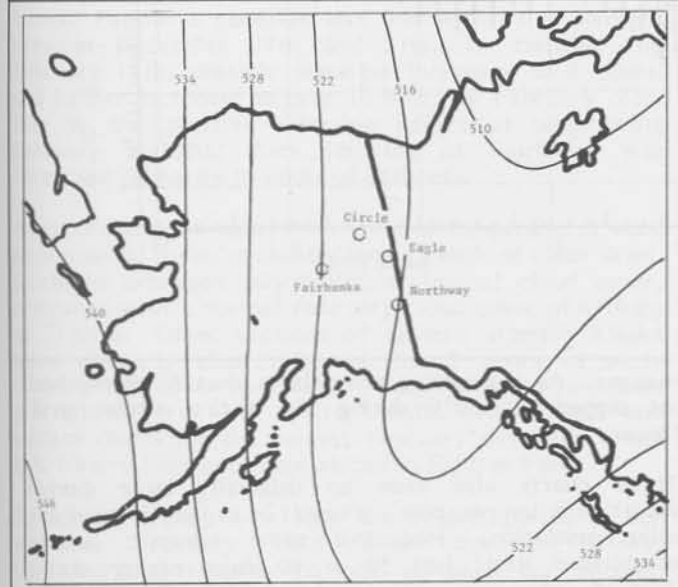


Figure 2. As Figure 1, but for the period Feb 8-14, 1979.

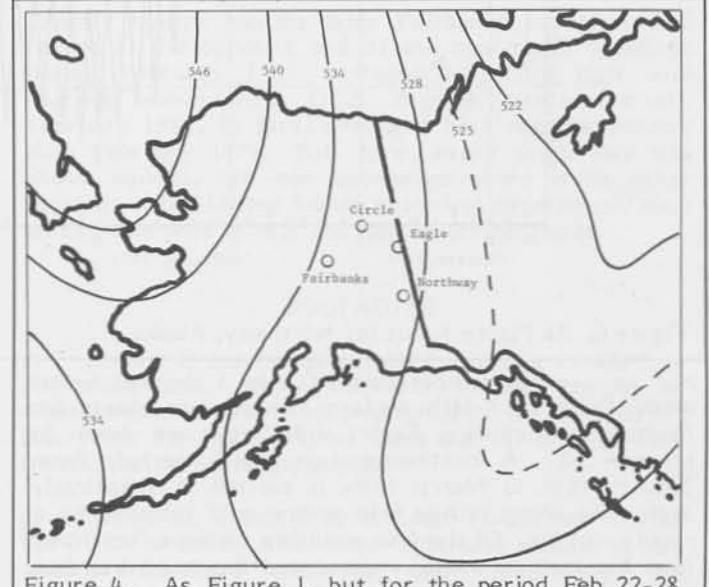


Figure 4. As Figure 1, but for the period Feb 22-28, 1979.

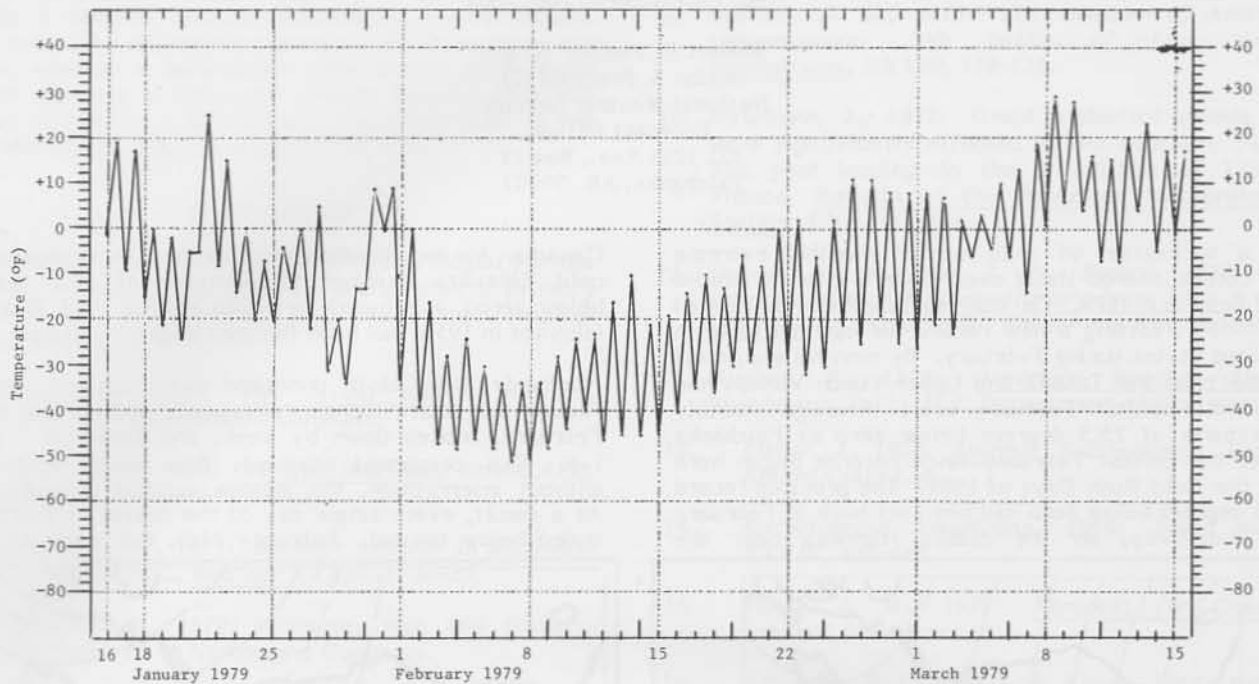


Figure 5. Daily minimum and maximum temperatures for Fairbanks, Alaska, for the period Jan 16 - March 15, 1979.

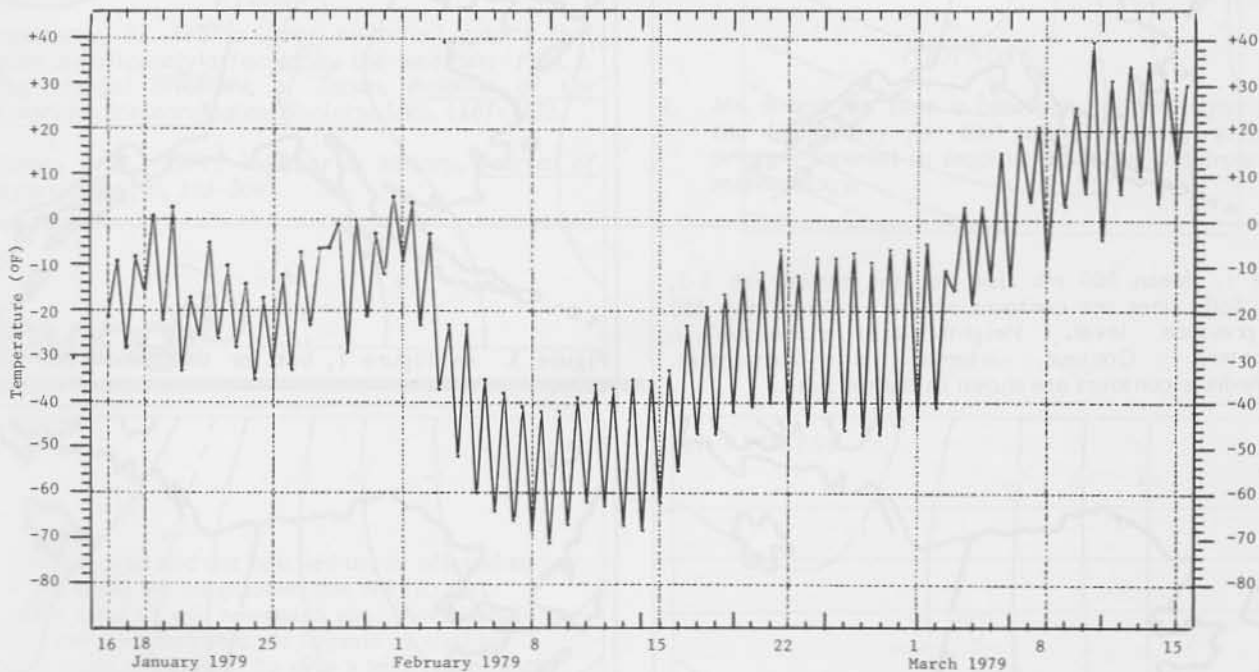


Figure 6. As Figure 5, but for Northway, Alaska.

had an average temperature of only 5 degrees below zero. Daily MAX-MIN surface temperature charts for Fairbanks, Northway, Eagle, and Circle are shown in Figures 5-8. A continuous two month period, from January 16th to March 15th, is plotted to graphically depict the sharp plunge into severe cold followed by a rapid recovery. Of the four available stations, Northway (also the farthest south) experienced the most dramatic

changes. An interesting anomaly is that Fairbanks had not dipped to -30°F during the entire winter until January 28th.

These charts also show an unusually large diurnal variation in temperature - a result of rapidly intensifying solar insolation. Had this same synoptic pattern established itself just 30 or 60 days earlier during Alaska's low sun period, the prolonged very cold temperatures would have plunged to even more extreme

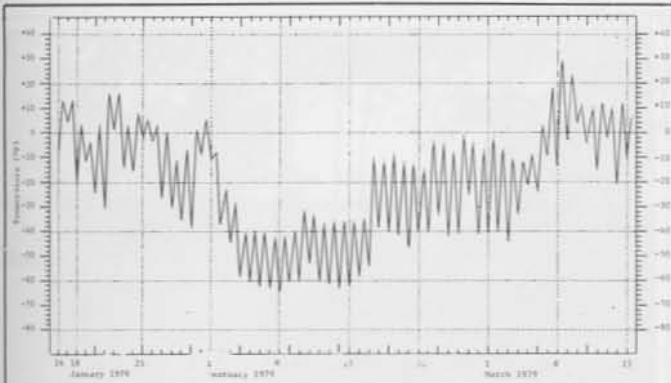


Figure 7. As Figure 5, but for Eagle, Alaska.

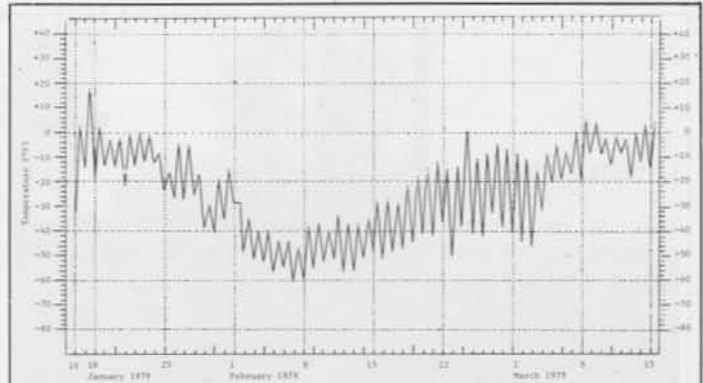


Figure 8. As Figure 5, but for Circle, Alaska.

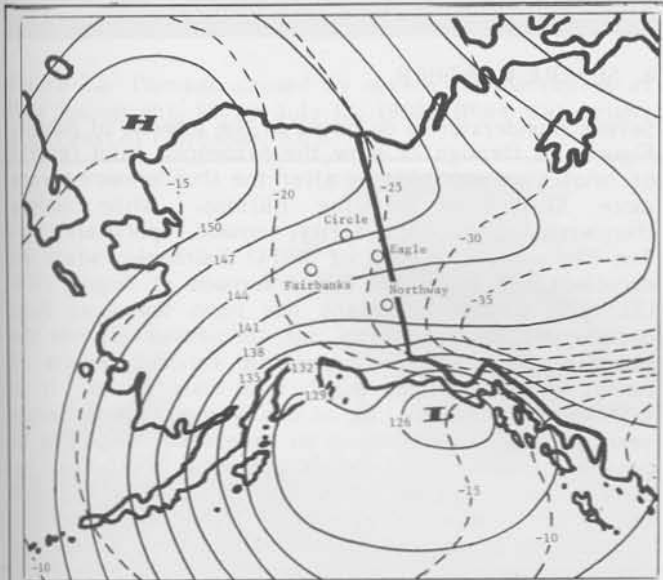


Figure 9. 850 mb analysis, 1200GMT, Feb 9, 1979. Solid lines are contours of the height of the 850 mb pressure level. Heights are expressed in decameters. Dashed lines are isotherms. Temperatures are expressed in degrees Celsius.

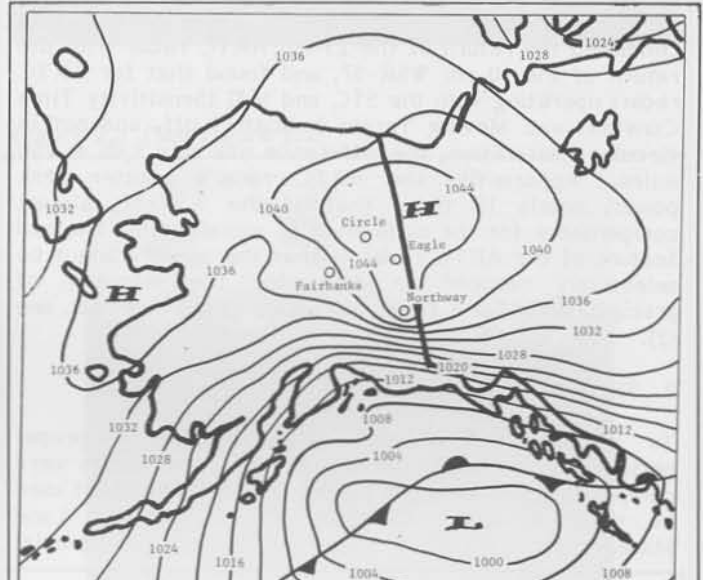


Figure 10. Surface analysis, 1800GMT, Feb 9, 1979. Solid lines are isobars; sea level pressure is indicated in millibars.

levels. Fairbanks receives less than 4 hours of sunlight between December 11th and 31st. In contrast, by February 11th, possible sunshine increases to 8 hours, and further increases to over 10 hours by February 28th. Due to the positive warming effect of lengthening February daylight, thick ice fog at Fairbanks was restricted primarily to hours of darkness.

As is normally the case, the very cold temperatures were accompanied by an unusually long stretch of clear skies. Fairbanks averaged only 1/10th or less of cloud cover, compared with a normal February cloud cover of 6/10ths to 7/10ths. Other sections of eastern interior Alaska were similarly clear. Except for 2 hours of early morning light snow on February 1st, Fairbanks remained precipitation-free the entire month. The 850mb and surface charts for the coldest February day in recorded U.S. history have been reproduced in Figures 9 and 10.

It is hard to say how long the return period is for extreme February cold over interior Alaska. Climatological records do not go back far enough. Fairbanks residents, long accustomed to prolonged cold, were nevertheless glad to see February 1979 end.

Exactly twelve months later Fairbanks experienced a record at the opposite end of the spectrum. Readings during February 1980 averaged a record high 16.0 degrees above zero (18.5 degrees above normal). February 1980, in fact, averaged 41.3 degrees warmer than February 1979. This time, every single day was above normal. To our knowledge there is no other location in the United States which has experienced such an extreme year to year contrast in temperatures.

FOOTNOTES

1. Robert E. Fischer is a Lead Forecaster at WSFO in Fairbanks, AK. Major interests include studies of Alaskan weather and cloud photography. He received his B.S. from the University of Utah and his M.S. in 1969 from Colorado State University.
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