

Daily Rainfall Totals

This section gives daily rainfall totals for the raingage stations in the Copper-Nichel Region from April 1, 1976 to June 30, 1978. Values are in hundredths of inches; ^{the letter t indicates trace, i.e., less than .01 inches} The numbers at the top of each chart are the observation time of the station. All stations except the Hibbing airport operate on local legal time. The Hibbing airport data are based on Central Standard Time year round.

Daily Weather Radar Precipitation Echo Locations

This section ~~gives maps~~ charts, on a daily basis, the locations of precipitation echoes over the ~~Copper-Nobel Region~~ as observed by the Minneapolis - St. Paul weather radar. In some cases, echoes recorded outside of the Region where their continuity is important. When a sharp, straight cutoff appears, the echo was not charted. ~~There~~ ^{on days when} no echoes were observed, no data are included.

In essence, the shaded patterns on these maps ~~the echoes~~ ^{precipitation cells} give the location of ~~the~~ where the larger precipitation-bearing systems ~~are~~ appeared on each given day. In order for the Minneapolis - St. Paul radar to pick up the echoes, ~~the~~ ^{precipitation cells} must be quite high in altitude. ~~Echoes~~ Since the earth curves, ~~echoes~~ ^{precipitation cells} further from Minneapolis - St. Paul must be higher than those closer. Thus, cells in the southern part of the Region will appear more often than those in the north, which is further from Minneapolis - St. Paul.

Monthly Precipitation Charts

This section contains ~~the~~ monthly precipitation charts. Values plotted on the charts are in hundredths of inch, with isopleths of equal precipitation drawn for every 10 millimeters increment.

The monthly totals are true monthly totals, i.e., ~~where~~ ^{if the} rainfall ~~may have~~ ^{actually} occurred on the last day of the month, but was recorded by the observer on the first day of the next month, the value was incorporated into the month in which it actually fell. This was done by reference to other rainfall data and by reference to the weather radar.

The patterns herein are described in the ~~the~~ Precipitation Events section.

Maths prep class

105

122

40

69

82

14

1

Introduction

The general precipitation pattern ^{during} the Copper-Nickel project was one of ^{extremes} extreme dryness from July 1, 1976 to February 23, 1977 ~~was~~ followed by very ^{wet and} rainy weather for the remainder of 1977. The first half of 1978 was near normal in precipitation. The extreme dryness of the second half of 1976 was ~~followed by~~ preceded by a very wet June.

Table — gives monthly values of precipitation for all available operating rain gauges in the Copper-Nickel Region for all months from April 1976 to June 1978 where ~~monthly~~ ~~data~~ month-long readings were made. The most abundant data are from July 1976 to ~~November~~ October 1977, with scarce data before the beginning of the project and since January 1978. The data in the Table have been adjusted, ^{to midnight} ~~for~~ observation time so that ^{the} totals for each month are comparable between stations. The adjustments were made from use of the weather radar in determining precipitation times.

Table ^{calls out} ~~the~~ the [#] maximum and minimum observed precipitation, ~~at~~ by month, at the various stations. The table gives an idea of the variability of precipitation over the region in a months time. (Topeka and Wake are excluded due to the unreliability of the gauges).

The variability of precipitation arises from the ^{random} way in which precipitation-bearing clouds move and from the non-random, topographical effects. The heaviest ^{precipitation} ~~amounts~~ in most cases ~~are those~~ is found in the highlands between Lake Superior and the western plains of St. Louis County, the lightest amounts are generally near Lake Superior or on the plains.

Some caution is always present in ~~examining~~ examining extreme values, for observer bias frequently is a factor. The low winter values found four times at Virginia suggest that the observer may have a snow-measuring problem.

Clearly, the ~~of~~ table shows that the variability between the station with the most precipitation ~~is~~ and that with the least is of a ratio of about 3 to 1 over the region. This underscores the need for ^{taking} rainfall measurements ~~near~~ at or near a study site for almost every application.

Figures - to - ~~give~~ illustrate the ^{observed} ^{months} totals ^{during the project} for selected stations against normal values given in the climatology report.

[Figs will be supplied
upon formulation of format]