WIND AND MOUNTAIN CLIMATOLOGY IN SEVERE ENVIRONMENTS:

MOUNT WASHINGTON TRENDS IN AVERAGE STATION PRESSURE AND ANNUAL WIND SPEED

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OCCASIONAL PAPER, APRIL 2016

INTRODUCTION

THE PLATFORM AND PROGRAMS FOR THESE MOUNT WASHINGTON DATA ANALYSES BEGAN DURING THE NEARLY TWO-DECADES OF WEEKEND SEMINARS IN MOUNTAIN CLIMATOLOGY EDUTRIPS (WHICH STARTED IN 1992), WHERE LIVELY DISCUSSIONS WERE HELD AMONG PARTICIPANTS. ACTIVE ENGAGEMENT FOCUSED ON INTERPRETING THE POTENTIAL SIGNIFICANCE OF COMPARATIVE TRENDS OF THE MANY MWO VARIABLES. OCCASIONAL PAPERS SERVE AS A SOURCE FOR UPDATING THE CURRENT TRENDS IN SELECTED MOUNT WASHINGTON DATA.

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DISCUSSION

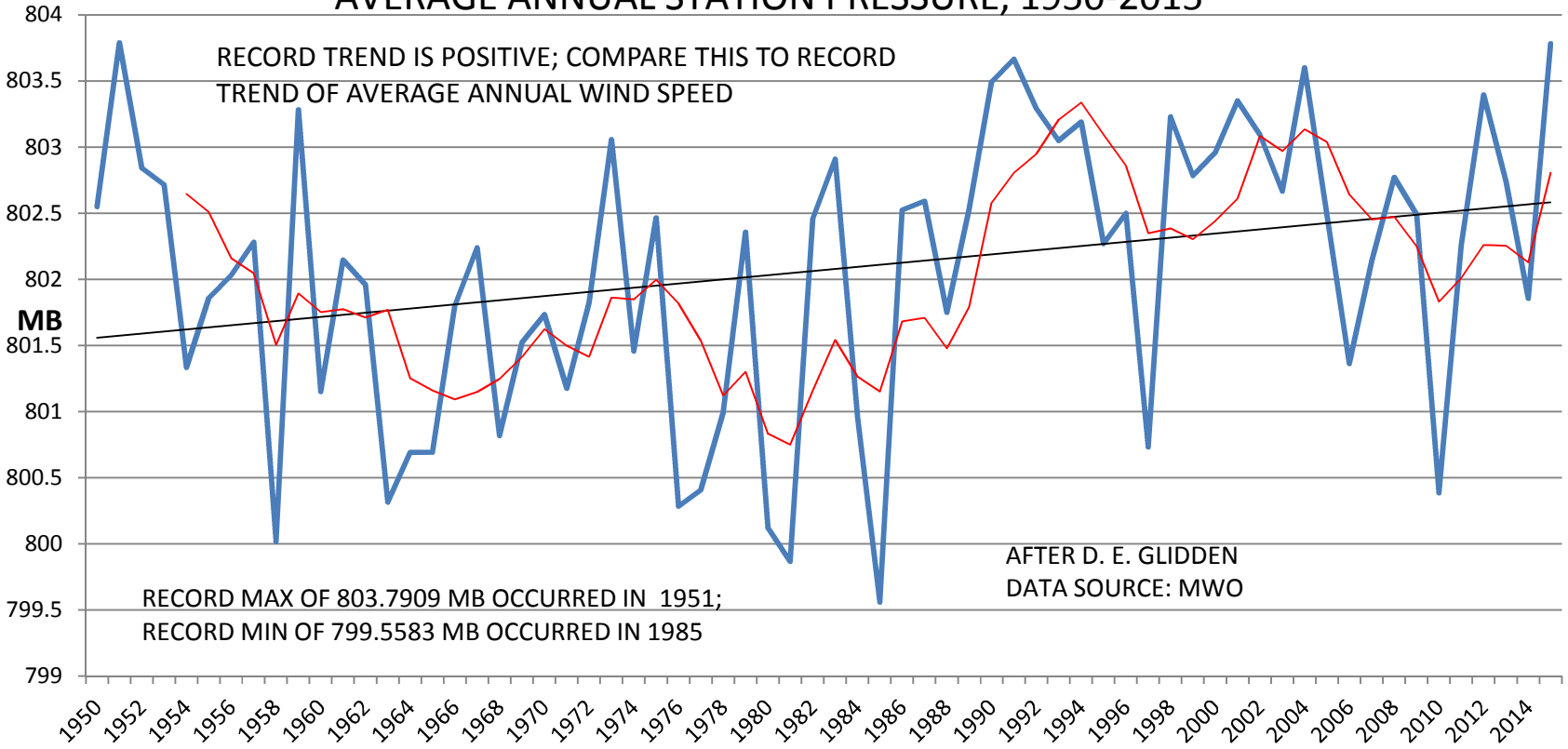
THE HISTORICAL, SUBSYNOPTIC RELATIONSHIP OF SURFACE PRESSURE AND WIND TENDENCIES IN MOUNTAIN ENVIRONMENTS IS OFTEN COMPLICATED, AND LONG-TERM, CONSISTENT DATA INVALUABLE IN ASSESSING CLIMATOLOGICAL CHANGE. MOUNT WASHINGTON HAS A UNIQUE RECORD IN THIS REGARD.

THE MWO RECORD TREND IN AVERAGE ANNUAL STATION PRESSURE FROM 1950-2015 APPEARS TO BE POSITIVE BY ABOUT 1 MILLIBAR (G-8) . COMPARE THIS TO THE AVERAGE ANNUAL WIND SPEED TREND FOR THE SAME PERIOD (G-9), WHICH IS ALSO POSITIVE. NOTE THAT THE RED LINES FOR BOTH PRESSURE AND WIND SPEED REPRESENT THE 5-YEAR RUNNING AVERAGE.

FOR THE MWO CONTINUOUS TRACE IN AVERAGE MONTHLY STATION PRESSURE (G-10), THE 775-MONTH TREND LINE IS SLIGHTLY POSITIVE. COMPARE THIS TO THE TREND IN AVERAGE ANNUAL STATION PRESSURE (G-8), WHICH IS MORE PRONOUNCED. THE RED LINE REPRESENTS 10 PER MOVING AVERAGE. FOR THE 1950-2015 PERIOD, THIS INCLUDES SOME 775 MONTHS OF AVAILABLE DATA OUT OF A POSSIBLE 780 MONTHS.

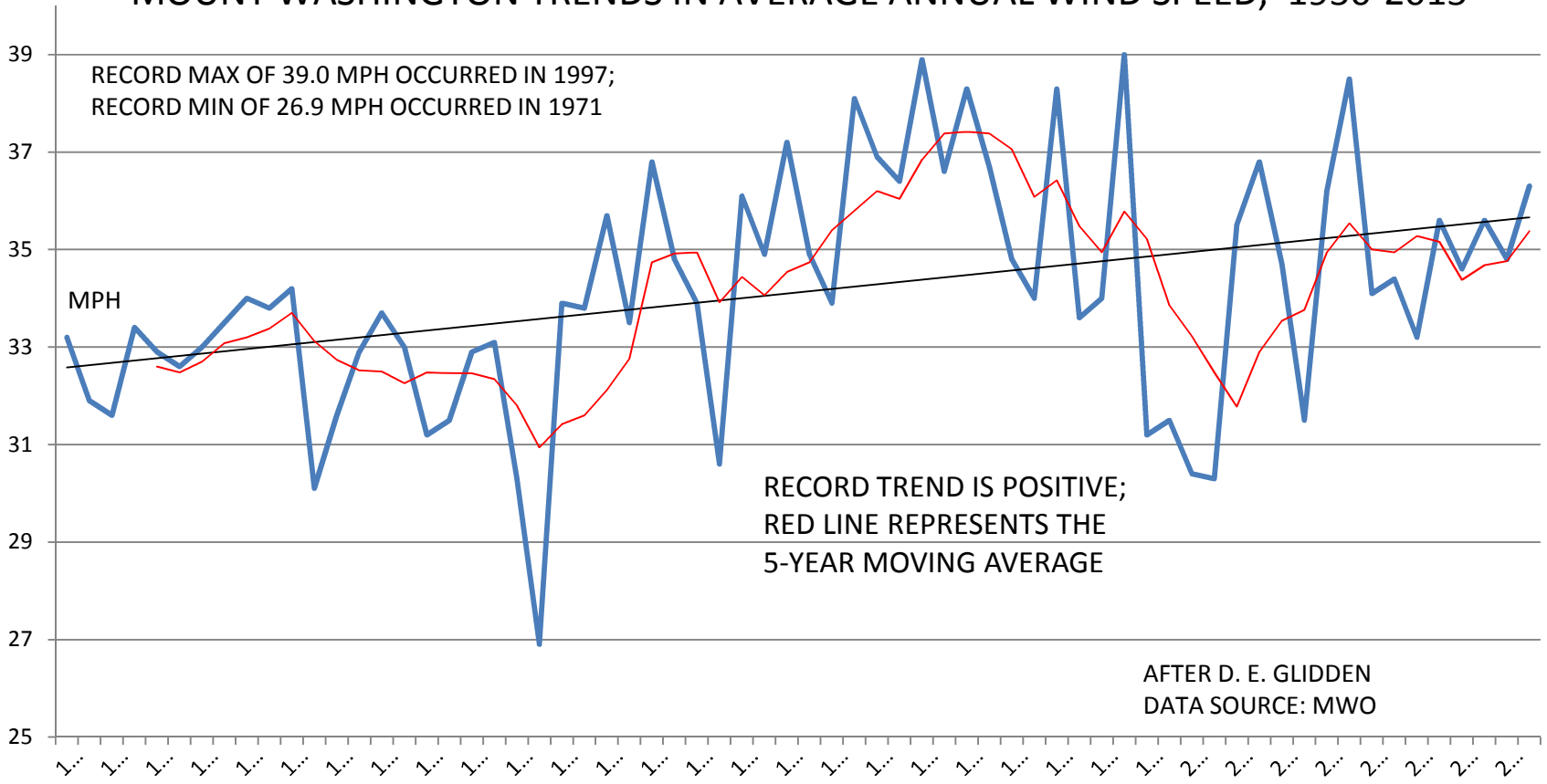
G-8

MOUNT WASHINGTON TRENDS IN AVERAGE ANNUAL STATION PRESSURE, 1950-2015



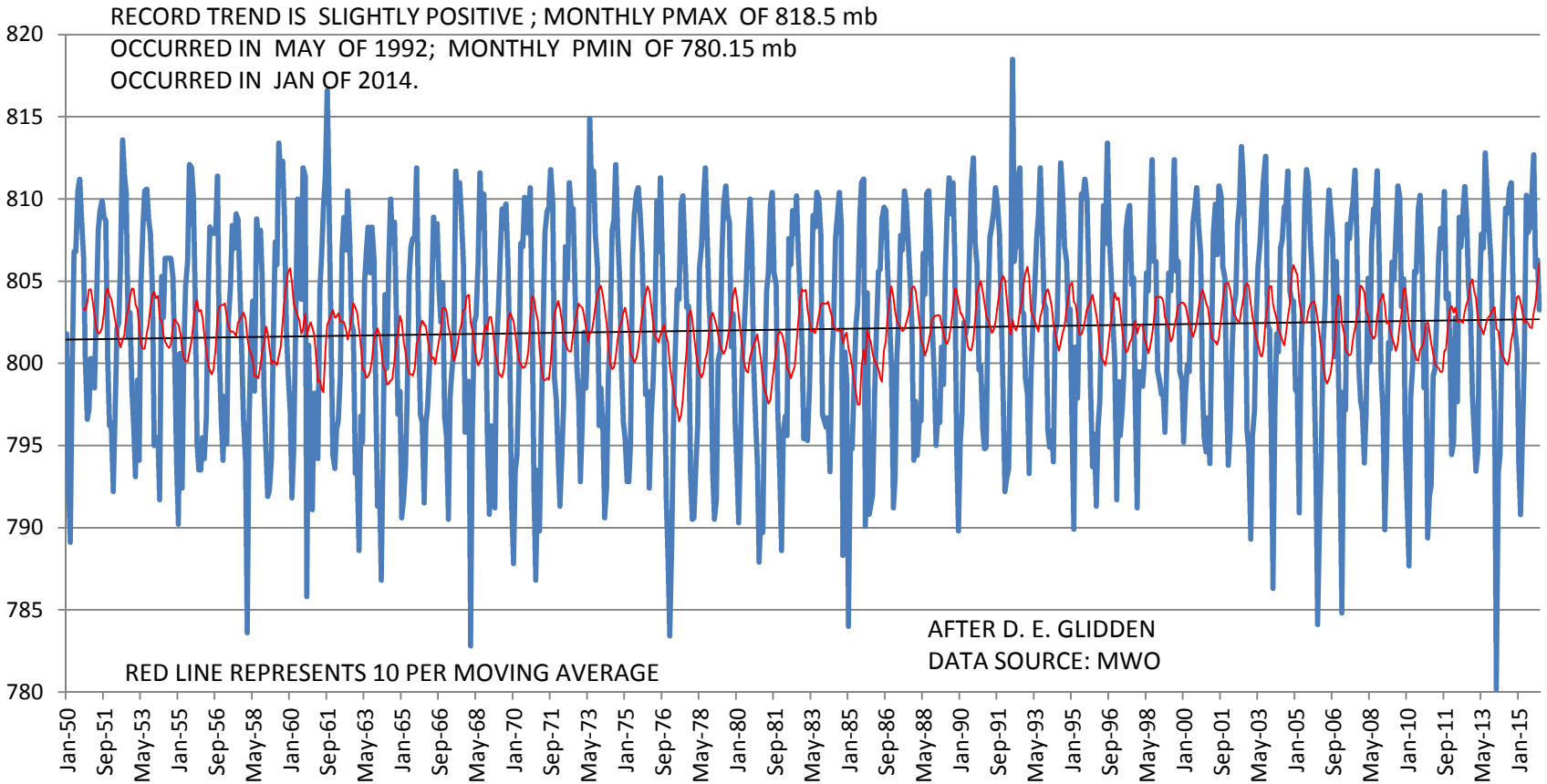
MISSING MONTHS OF MWO AVERAGE STATION PRESSURE DATA: OCT 1961, DEC 1983, MAY 2011, SEP 2013, NOV 2014
RED LINE IS THE 5-YEAR MOVING AVERAGE

G-9 MOUNT WASHINGTON TRENDS IN AVERAGE ANNUAL WIND SPEED, 1950-2015



G-10

MOUNT WASHINGTON AVERAGE MONTHLY STATION PRESSURE, 1950-2015

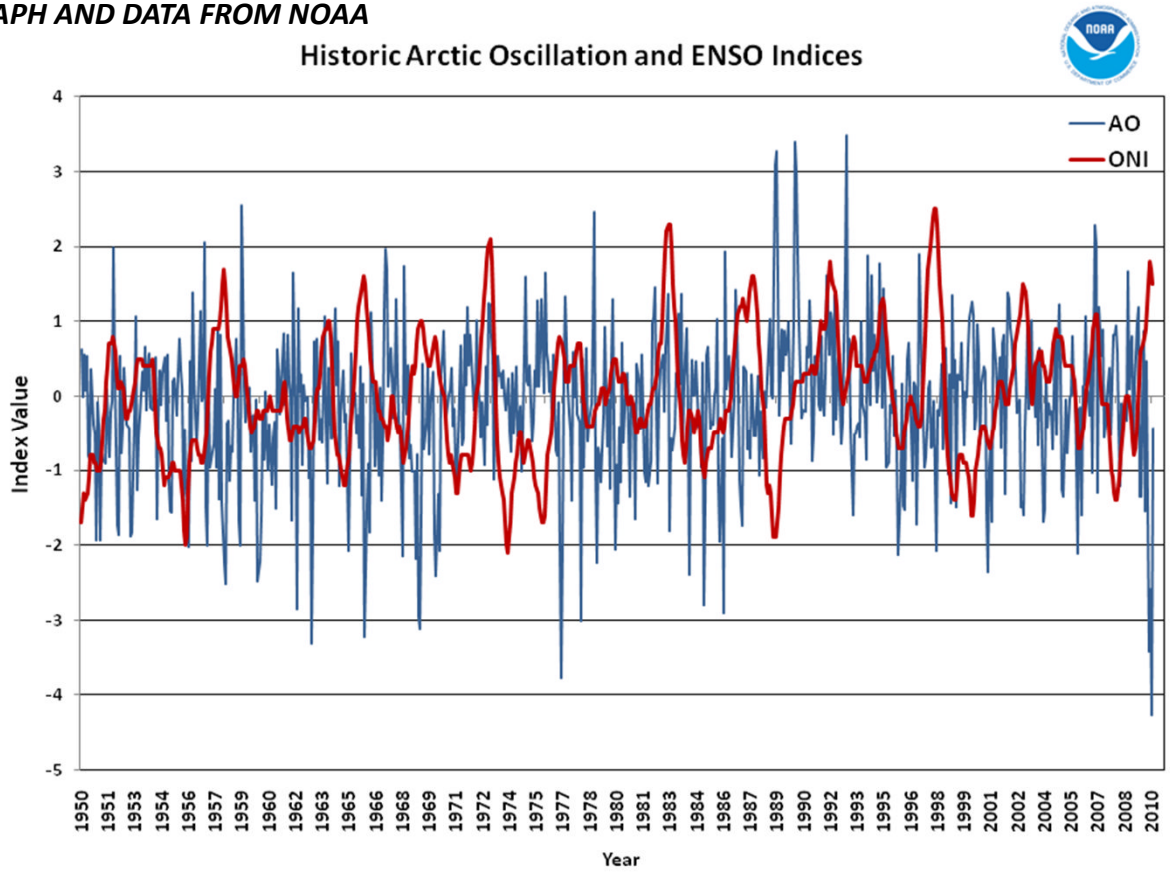


780 MONTHS OF POSSIBLE DATA; - 5 MONTHS OF MISSING AVERAGE STATION DATA = 775 MONTHS OF ACTUAL DATA

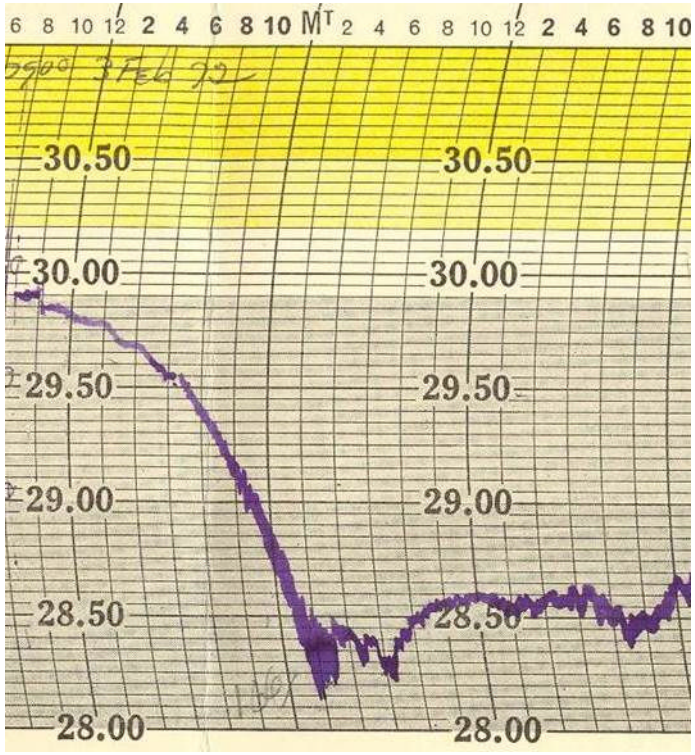
G-11

IT MAY BE WORTH PURSUING ANY GENERAL SIMILARITIES IN NOAA'S TRENDS OF THE ARCTIC OSCILLATION AND ENSO INDICES (AVAILABLE HERE FROM 1950-2010) TO PRESSURE AND WIND TRENDS ON MOUNT WASHINGTON.

GRAPH AND DATA FROM NOAA



PRESSURE ARCHIVE OF MEMORABLE STORMS



PRESSURE TRACE OF SEVERE STORM OF 3-4 FEB 1972 ON MOUNT WASHINGTON, RECORDED BY DAVE GLIDDEN AND LEE VINCENT IN TRANSMITTER BUILDING. THIS STORM RESULTED IN SIGNIFICANT DAMAGE TO SUMMIT FACILITIES. PEAK RECORDED WIND GUST AT MWO=166 MPH FROM THE EAST, BUT THE ACTUAL MAXIMUM IS SUSPECTED TO BE HIGHER.

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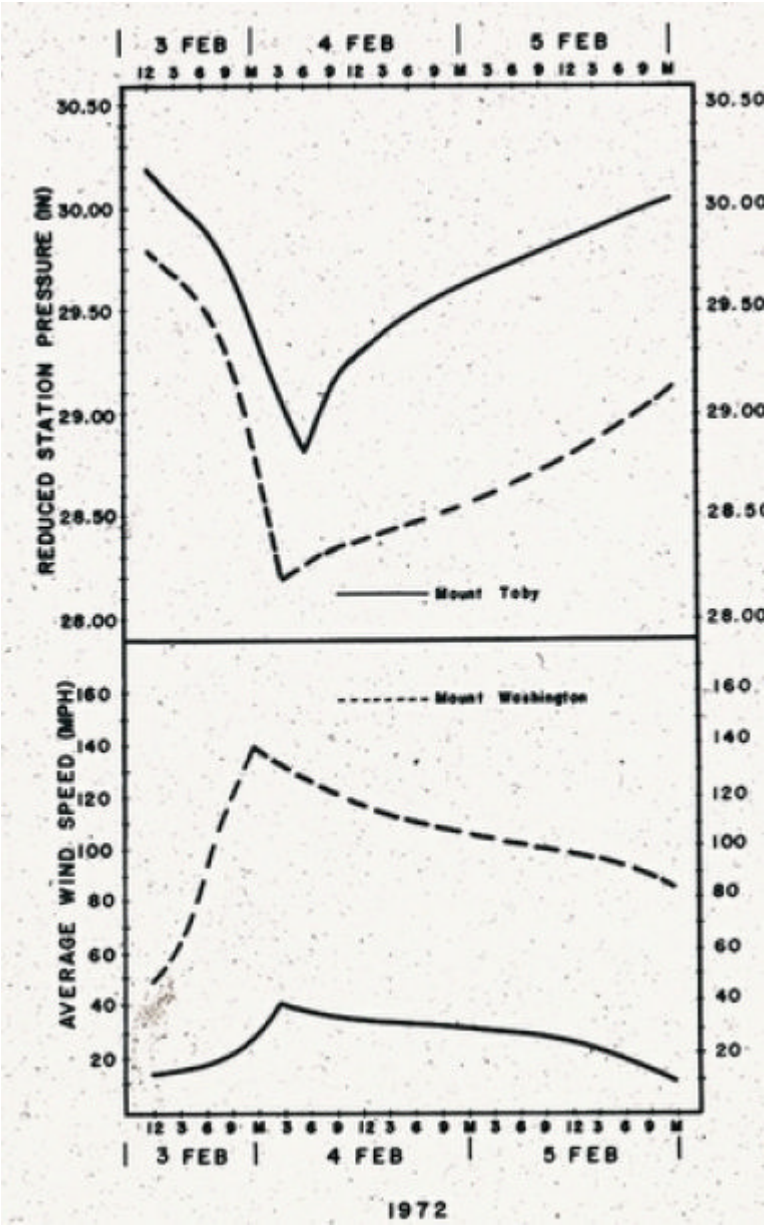
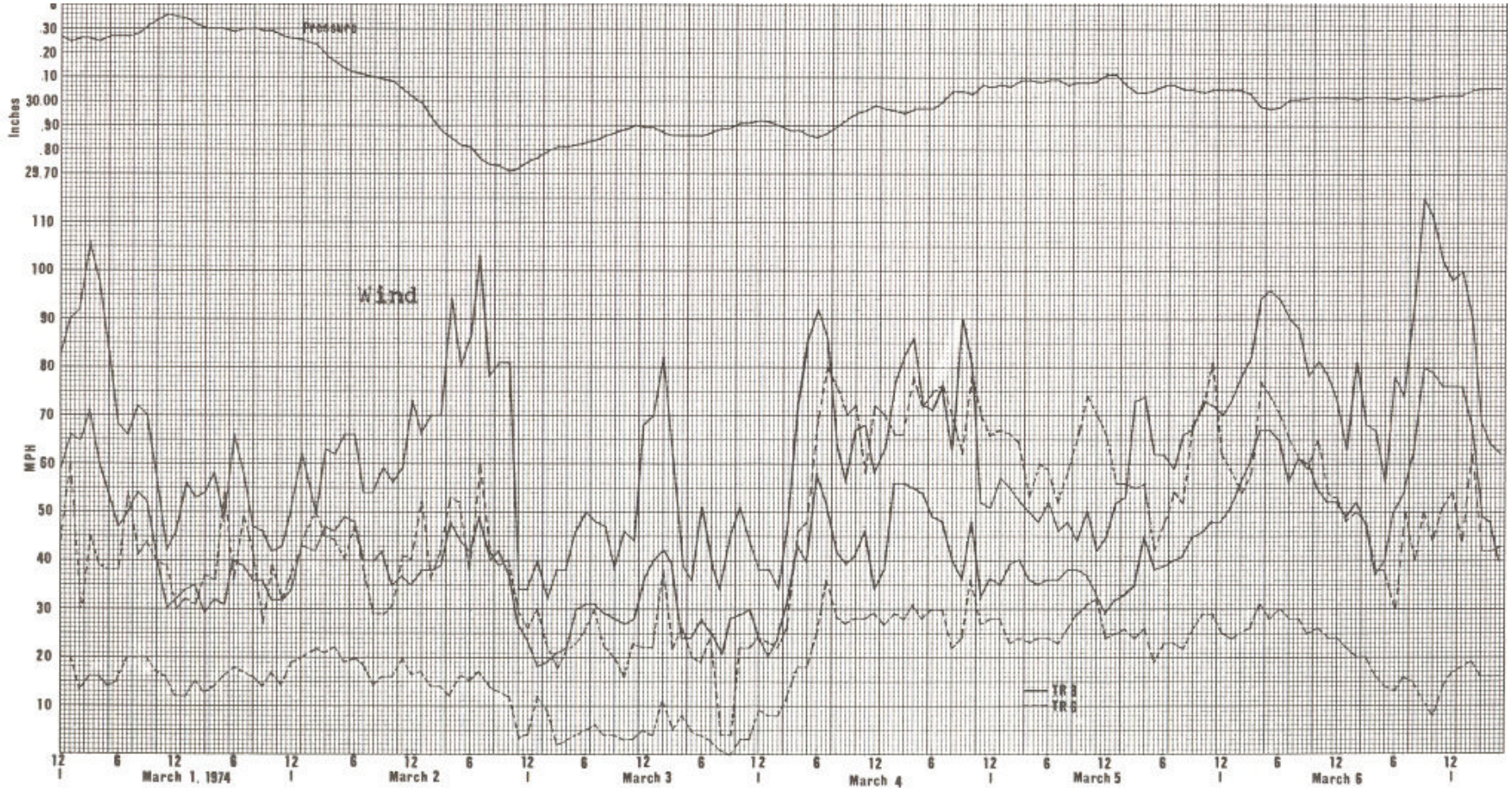
After D. E. Glidden, UMASS CLIMATOLOGICAL RESEARCH PROJECT, WMNF



SURFACE WIND AND PRESSURE FOR MOUNT WASHINGTON, NH AND MOUNT TOBY, MA DURING THE INTENSE STORM OF 3-4 FEBRUARY 1972. AFTER D. E. GLIDDEN, UMASS CLIMATOLOGICAL RESEARCH PROJECT, WMNF.

THE COMPLICATED RELATIONSHIP OF SURFACE PRESSURE TRENDS TO WIND MAXIMA AND AVERAGES IN A ROCKY MOUNTAIN ALPINE AND SUBALPINE ENVIRONMENT



HOURLY PEAK GUSTS AND AVERAGE WIND SPEEDS DURING THE FIRST WEEK OF MARCH 1974 FOR UPPER (TR 3) AND LOWER (TR 6) HIDDEN VALLEY, ROCKY MOUNTAIN NATIONAL PARK. FOR WIND, THE SOLID LINES REPRESENT DATA AT TR 3 AND THE DASHED LINES AT TR 6. NOT ALL WIND MAXIMA WERE ASSOCIATED WITH SIGNIFICANT PRESSURE FALLS OR RISES. ON MARCH 2, NOTE THAT WIND MAXIMA OCCURRED JUST PRIOR TO PRESSURE MINIMA, SIMILAR TO THE MWO FEB. 3-4, 1974 MAXIMA OF 166 MPH. HOWEVER, ON MARCH 6TH THE RMNP WIND MAXIMA OF 115 MPH OCCURRED WITH LITTLE PRESSURE CHANGE.

TR 3 IS AT 3536 METERS; TR 6 IS AT 2913 METERS
PRESSURE RECORDED AT TR 6

AFTER D. E. GLIDDEN,
WINTER WIND STUDIES IN ROCKY MOUNTAIN NATIONAL PARK, 1982

PRESSURE ARCHIVE OF MEMORABLE STORMS