CENTENNIAL PRESENTATION
2014-15

MOUNTAIN CLIMATOLOGY IN SEVERE ENVIRONMENTS:

THE WOMEN OF WIND RESEARCH IN ROCKY MOUNTAIN NATIONAL PARK

DAVE GLIDDEN

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WIND RESEARCH IN ROCKY MOUNTAIN NATIONAL PARK BEGAN DURING THE WINTER OF 1973-74, FOLLOWING THE DEVASTATING WIND STORM OF MAY 1973 IN HIDDEN VALLEY, AND CONTINUED DURING THE SUMMER AND WINTER OF 1980-81. WIND RESEARCH WAS MADE POSSIBLE THROUGH THE EFFORTS AND ASSISTANCE OF MANY INDIVIDUALS IN ROCKY MOUNTAIN NATIONAL PARK, BUT FIVE WOMEN PLAYED A SIGNIFICANT ROLE IN BOTH THE FIELD WORK AND DATA ANALYSIS FOR 1973-74 AND 1980-81, AND ARE DISCUSSED IN THIS PRESENTATION:

1980-81	1973-74
KIM MAHER CASEY	GINA MEYERS
JAN VAN SYCKLE	JUDY BELL
BETSY JEWET	

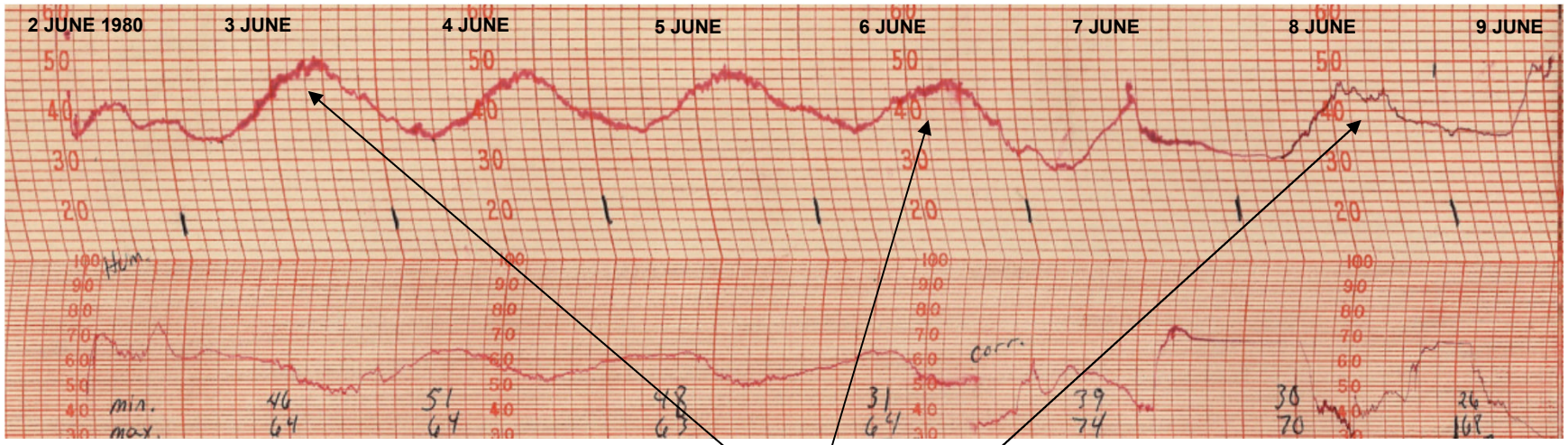
OTHER NPS WOMEN WHO WORKED ON SOME PART OF DATA REDUCTION ACQUIRED FROM THE THOUSANDS OF FEET OF INSTRUMENT CHARTS:

LISA WEBBEY	NANCY JACOBSON
DONAY HANSON	LISA BRUINSMA

Dave Glidden is a Field Specialist in Wind and Mountain Climatology, and has conducted wind studies for the National Park Service in Rocky Mountain National Park in Colorado, where he developed specialized wind instrumentation for severe environments. He has pursued field work on the variability of mountain winds and gust factors in Denali National Park in Alaska. A strong advocate of women in the sciences, he has been fortunate to have many share in the excitement and rewards of field work.

THE AVERAGE STRENGTH OF THE WIND SHAPES KRUMMHOLZ NEAR ROCK CABIN, 1973

HYGRO-THERMOGRAPH

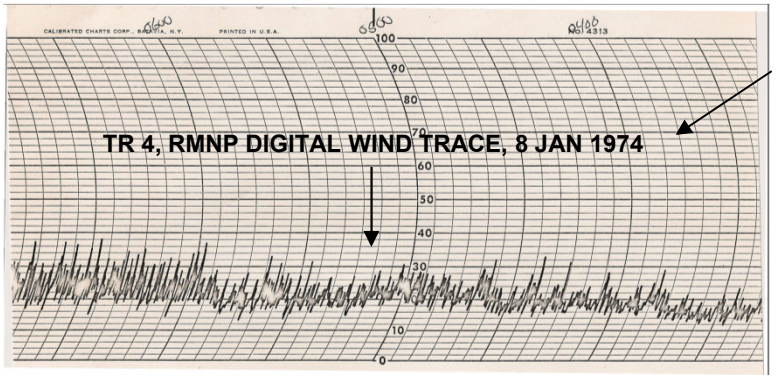


AFTER D. E. GLIDDEN

TR 10 (AVC) TEMPERATURE AND HUMIDITY PROFILE FOR JUNE 2-9, 1980

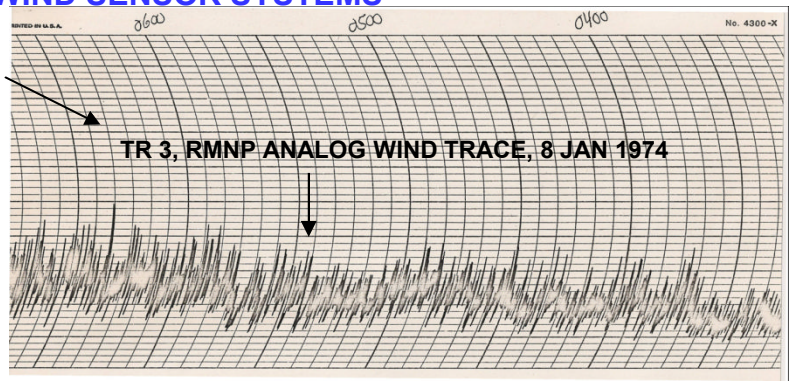
NOTE THAT THICKNESS OF TRACE INDICATES ***MODERATE WIND TURBULENCE*** (CA. 12:00-6:00 PM ON JUNE 3,4,5,6)
WHILE VERY THIN TRACE INDICATES ***LITTLE OR NO TURBULENCE*** (ON JUNE 8-9TH)

EARLY RESEARCH INCLUDED DIFFERENCES IN WIND SENSOR SYSTEMS



DIGITAL VS. ANALOG ANEMOMETRY

NOTE COMPRESSED RANGE OF GUSTINESS AT TR 4 (DIGITAL) VS. TR3 (ANALOG). NUMEROUS GUSTS > 40 MPH WERE RECORDED AT TR 3, AND NONE AT TR 4.



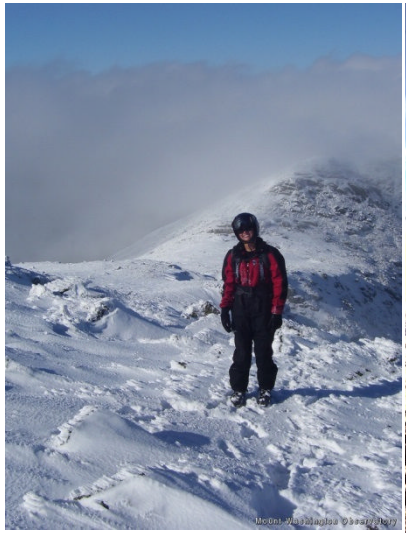
LAURA CAPELLE
DENALI, 1995
MT. WASHINGTON, 1994

JAN VAN SYCKLE, RMNP, 1980

KIM AND JAN AT AVC, RMNP, 1980

NPS RANGER AT HIDDEN
VALLEY, RMNP, 1973-74

KIM MAHER CASEY, RMNP, 1980



AUBREY PACE, MW,
2009

BETSY JEWET, RMNP, 1980

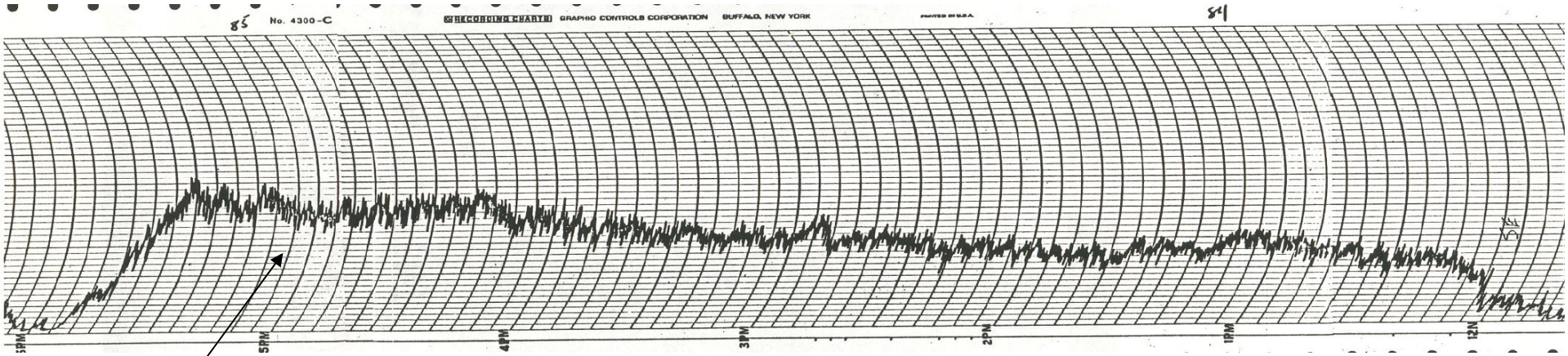
ANN POSEGATE, MW, 2006

GINA MEYERS,RMNP,1973-74

LIZ WILLEY, MT. WASHINGTON, 2005-2009

WOMEN IN MOUNTAIN CLIMATOLOGY
WITH DAVE GLIDDEN

KIM MAHER CASEY AND JAN VAN SYCKLE FINISHING TR 10 AVC SITE, JUNE 1980

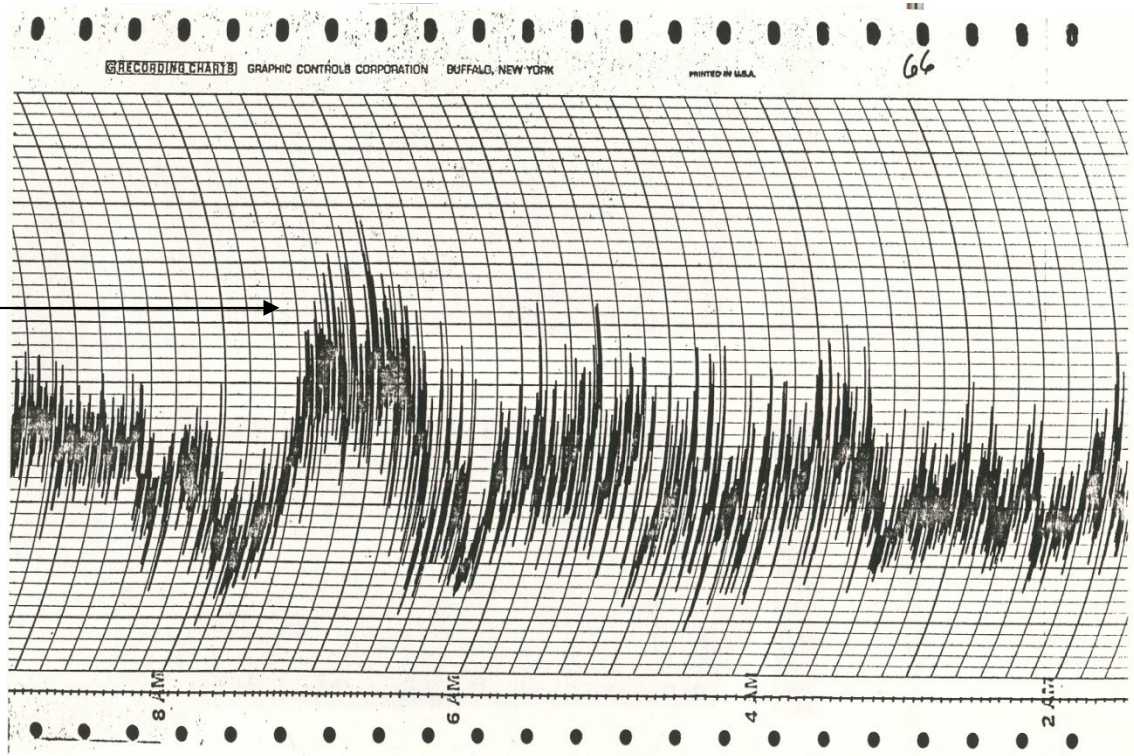


ANEMOGRAPH OF STRONG SUMMER UPSLOPE (SOUTHEAST) WIND AT THE ALPINE VISITORS' CENTER (TR 10), AUGUST 25, 1980. NOTE SUDDEN CESSATION OF FLOW FROM 5:30-6:00 PM. SCALE: 0-100 MPH.

NOTE LOW TURBULENCE WITH UPSLOPE (EASTERLY) WINDS

CHARACTERISTICS OF UPSLOPE VS. DOWNSLOPE WINDS IN THE ALPINE

NOTE HIGH TURBULENCE WITH DOWNSLOPE (WESTERLY) WINDS

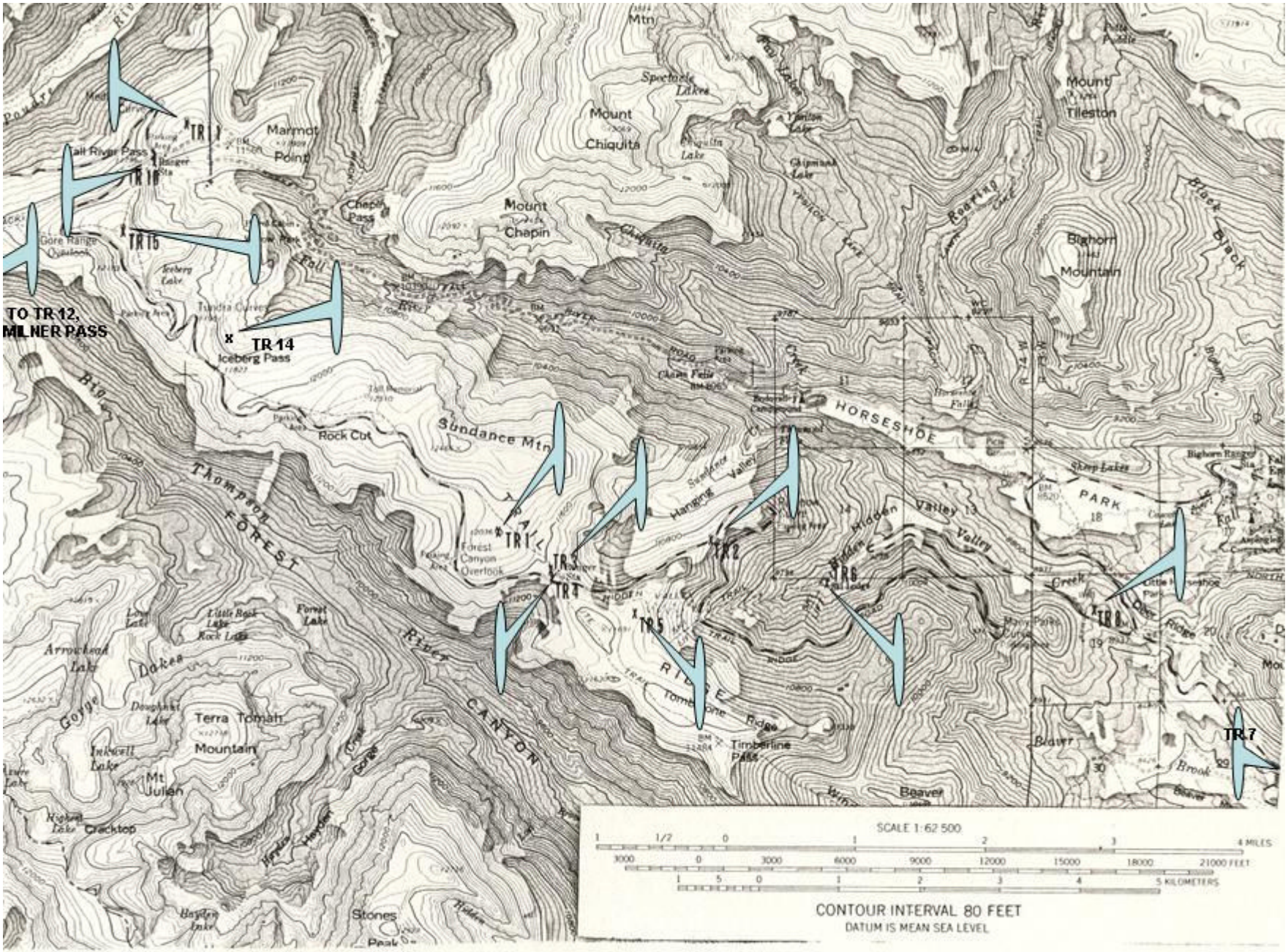


ANALOG ANEMOGRAPH OF STRONG WESTERLY WINDS WITH HIGH GFs AT THE AVC ON AUGUST 20, 1980 SCALE: 0-100 MPH

FIELD WORK IN MOUNTAIN CLIMATOLOGY IN THE EARLY SUMMER ALPINE ENVIRONMENT OF RMNP

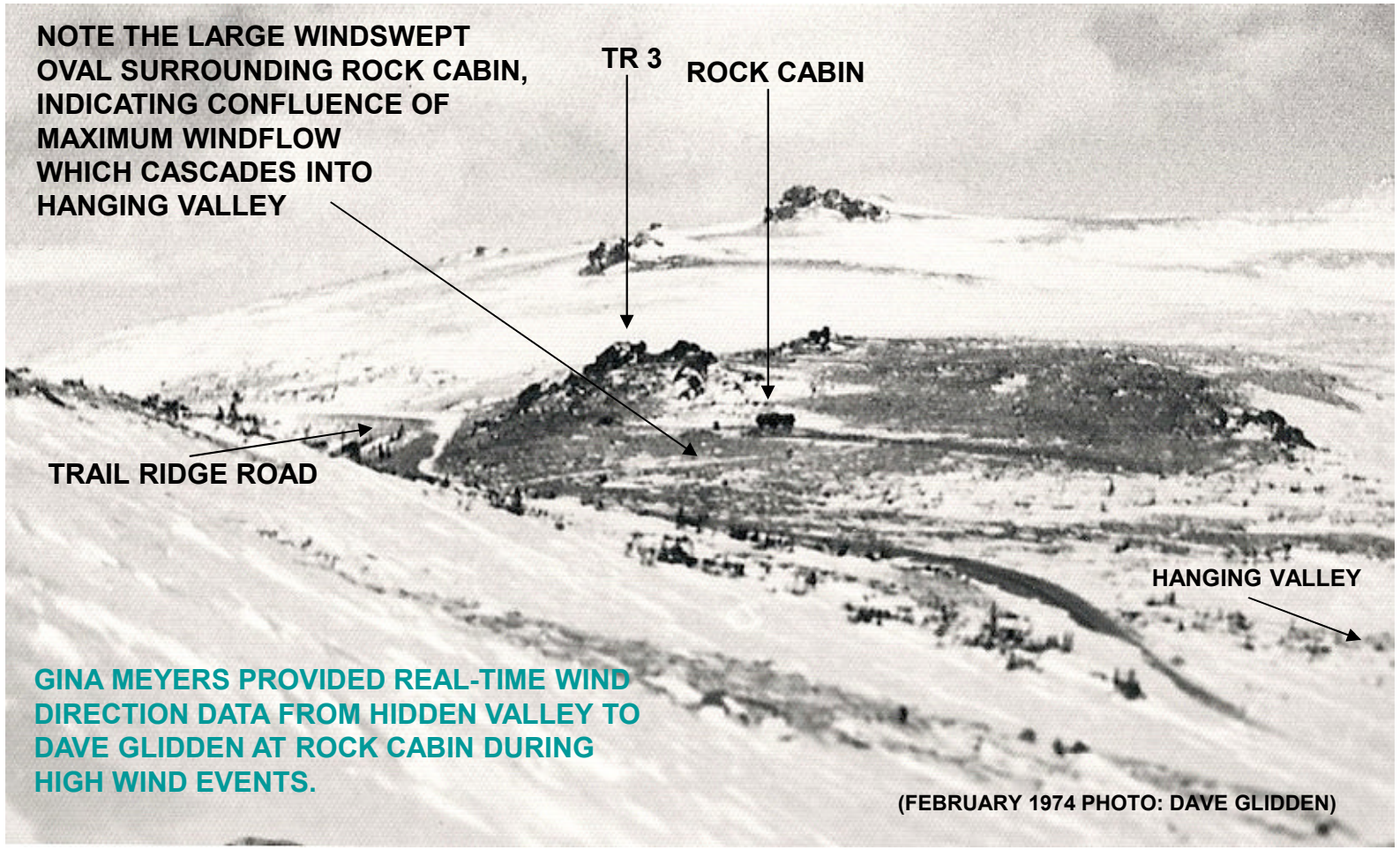
DAVE GLIDDEN AND KIM MAHER CASEY WORKING ON TR 11 WIND RESEARCH SITE (12,001 FEET) NEAR THE ALPINE VISITORS' CENTER, RMNP, SUMMER 1980

KIM AND JAN VAN SYCKLE AT TR 10 AVC WIND RESEARCH SITE, RMNP, SUMMER 1980

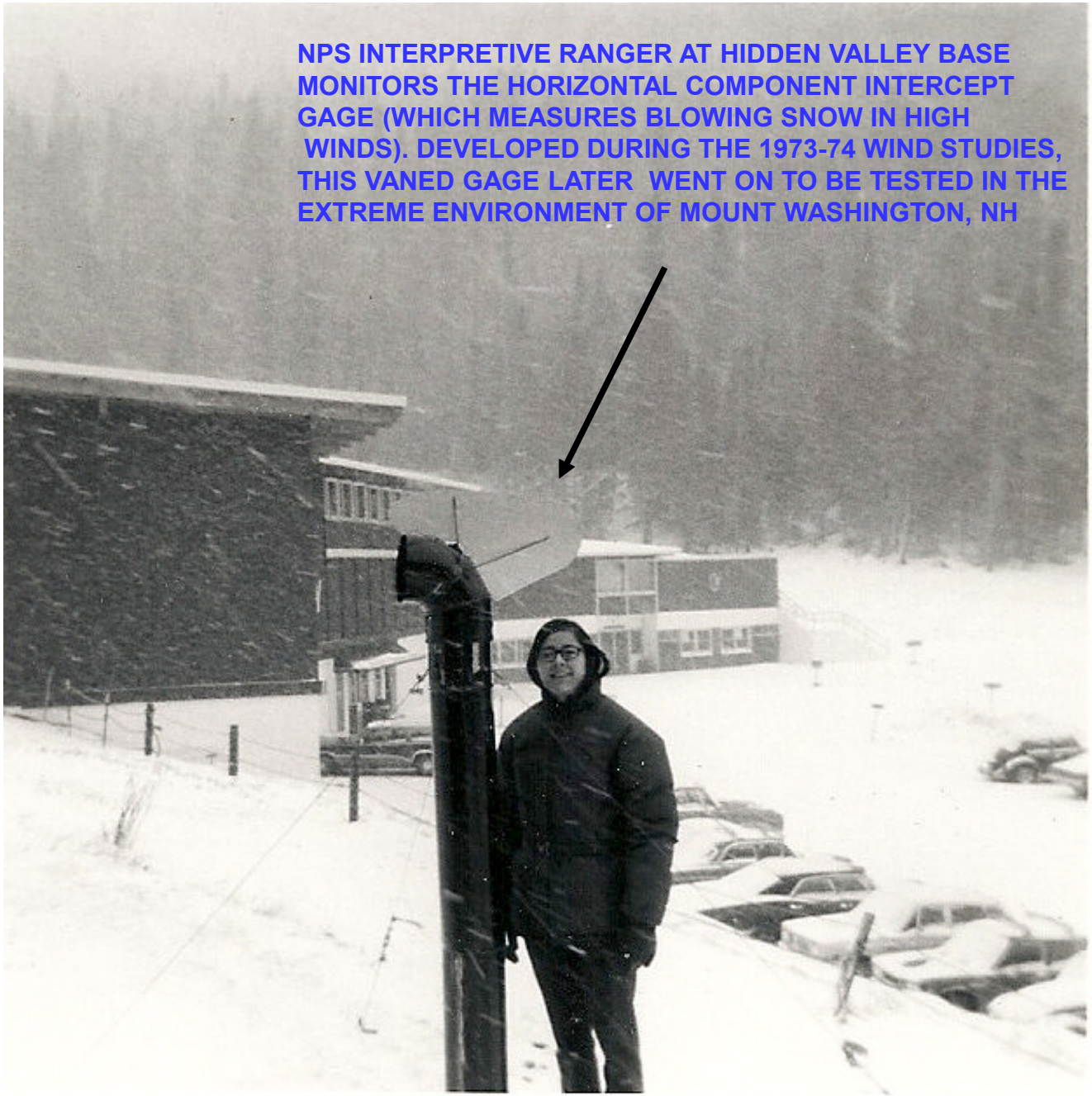


WIND RESEARCH SITES IN ROCKY MOUNTAIN NATIONAL PARK
(EXCLUDES LONGS PEAK LP 1 AND LP 2)

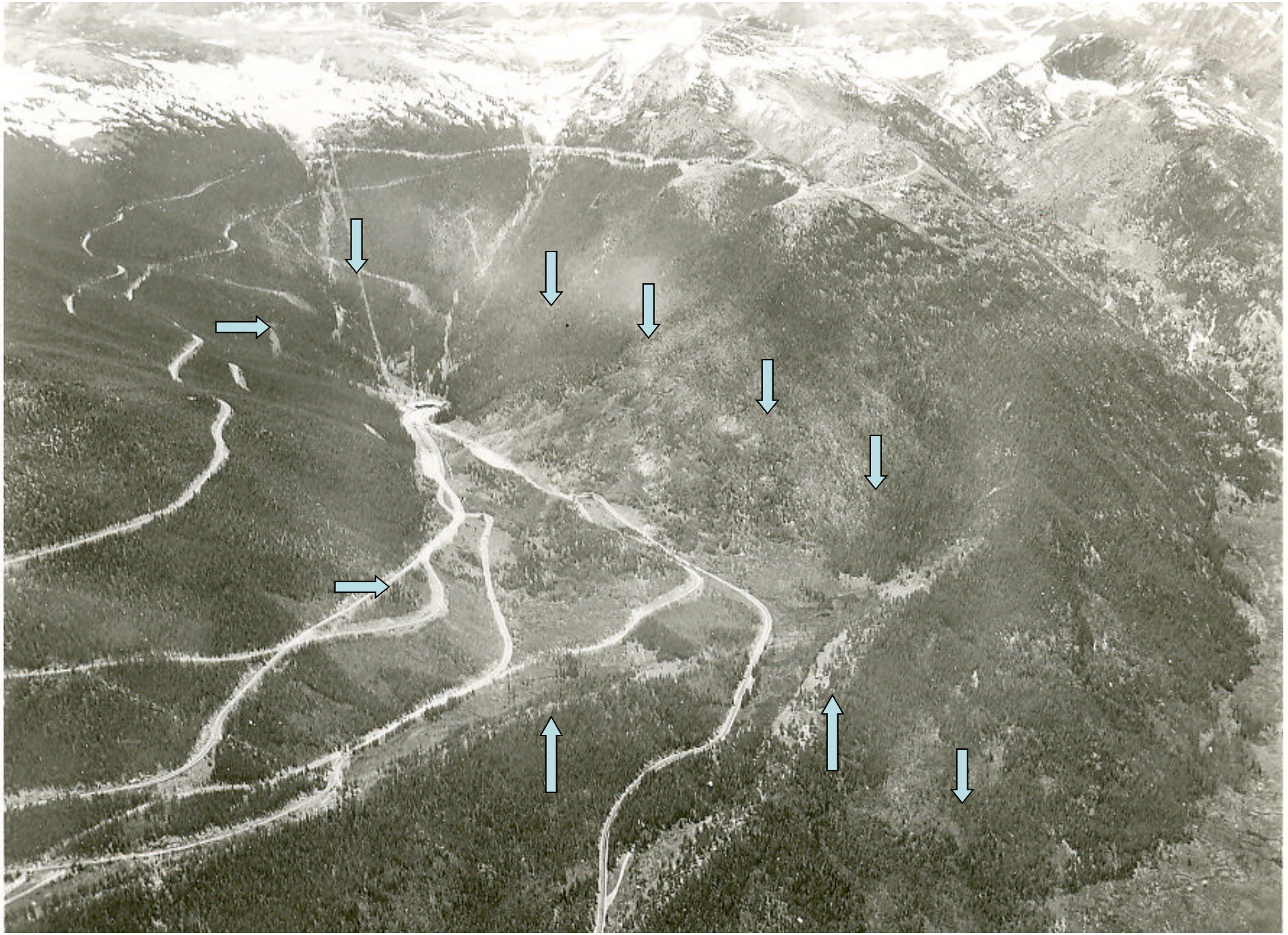
GINA MEYERS, HIDDEN VALLEY SKI PATROL 1973-74. MONITORS SLOPE BOUNDARY LAYER WIND DIRECTION AND RELAYS DATA BY RADIO TO DAVE GLIDDEN AT ROCK CABIN.



THE TOPOGRAPHY SHAPES THE EFFECTS OF PRESSURE AND WIND NEAR ROCK CABIN AND TRAIL RIDGE ROAD, RMNP, FEBRUARY 1974



SHE ALSO HELPED SERVICE PRESSURE AND WIND INSTRUMENTS AT THE FORMER LOWER HIDDEN VALLEY SKI AREA AND NPS SITE (TR 6).

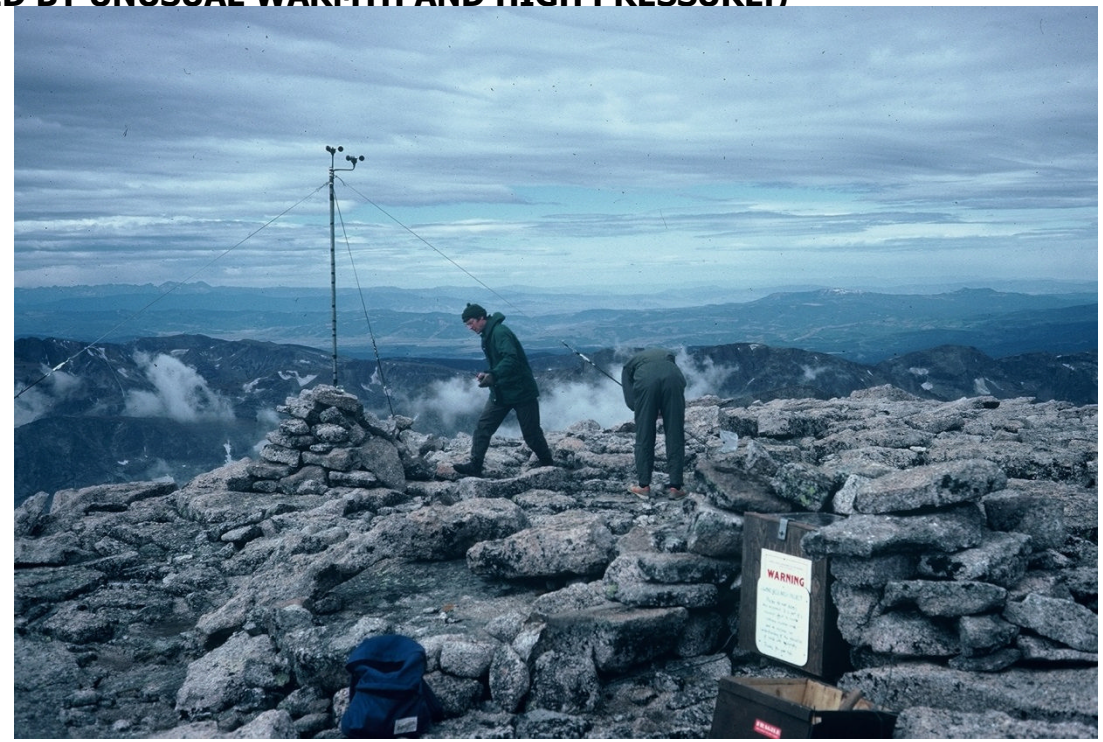


HIDDEN VALLEY BLOWDOWN, MAY 1973. NOTE WIDESPREAD AREAS OF DESTRUCTION INDICATED BY ARROWS.

SEVERAL IMPORTANT FINDINGS FROM WIND RESEARCH IN RMNP:

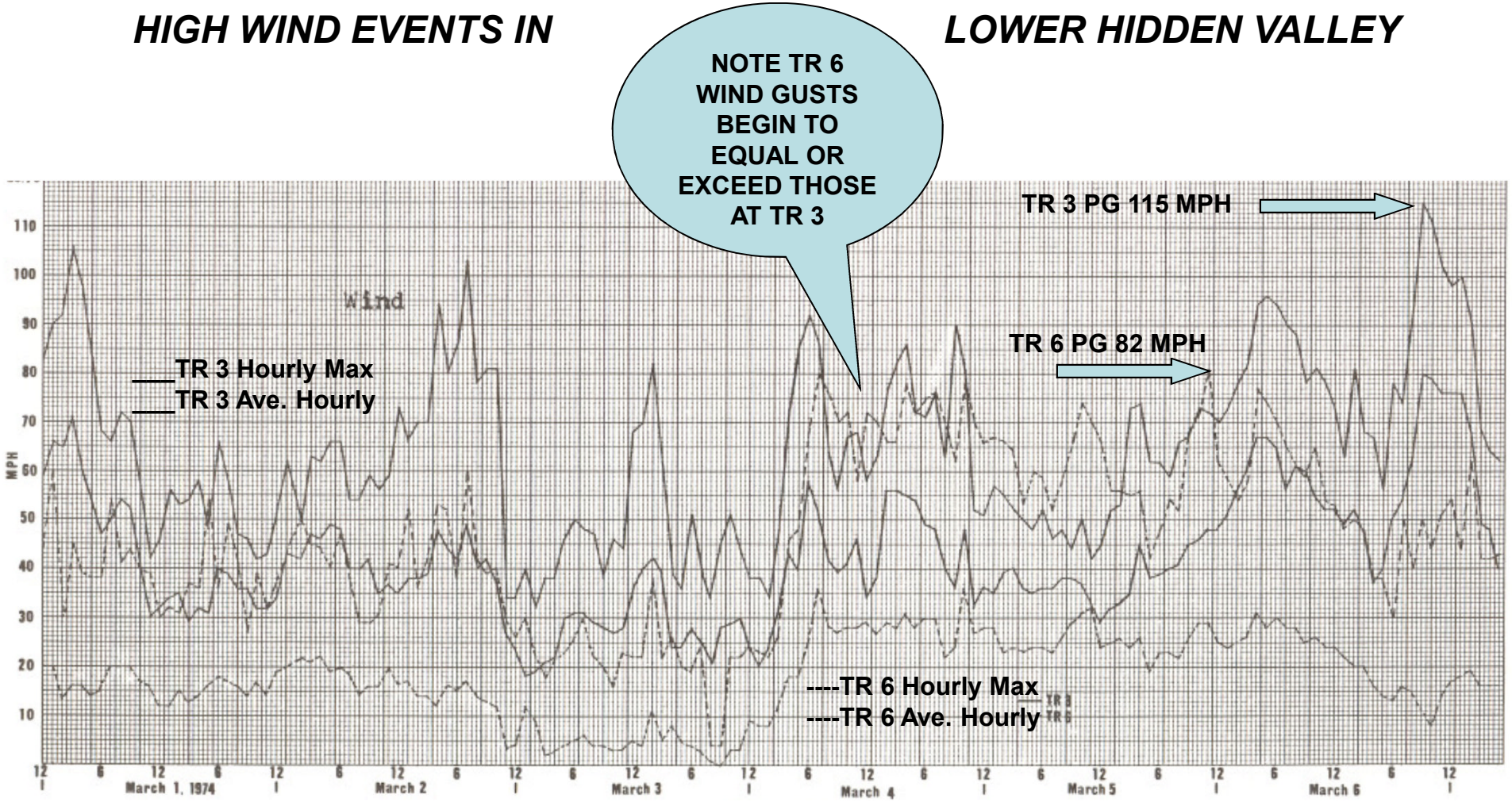
FROM THE WINTER STUDIES: **LOWER HIDDEN VALLEY (SUBALPINE) WIND GUSTS BEGIN TO EQUAL OR EXCEED UPPER HIDDEN VALLEY (ALPINE) WIND GUSTS AT THE BEGINNING OF MAJOR WIND EVENTS AT LOWER HIDDEN VALLEY. MAXIMUM WINTER WIND GUSTS OF 155 MPH WERE RECORDED ON TRAIL RIDGE ROAD (AT TR 1). LONGS PEAK: A MAXIMUM PEAK GUST OF 201 MPH WAS RECORDED FOR WINTER 1980-81 AT THE LP 2 SITE.**

***FROM THE SUMMER STUDIES*:** **UPSLOPE (SE-NE) WINDS WERE MUCH LESS GUSTY (WITH LOWER GUST FACTORS) THAN WESTERLIES (SW-NW). MAXIMUM SUMMER GUSTS OF 79 MPH WERE RECORDED AT THE ALPINE VISITORS' CENTER. GUST FACTORS AT AVC WERE TOO GREAT FOR THE VIABLE OPERATION OF A WIND TURBINE, AND SUCH DATA HAS IMPROVED OUR UNDERSTANDING OF WIND CHARACTERISTICS AS IT APPLIES TO VISITOR SAFETY, FIRE BEHAVIOR, AND ECOLOGICAL ALPINE RESEARCH. (SUMMER 1980 WAS CHARACTERIZED BY UNUSUAL WARMTH AND HIGH PRESSURE.)**



LONGS PEAK LP1 AND LP2 SITES, 14,256 FEET
NPS RANGERS BOB SEIBERT AND CHRIS REVELEY
RUSH TO COMPLETE SERVICING BEFORE INCOMING STORM

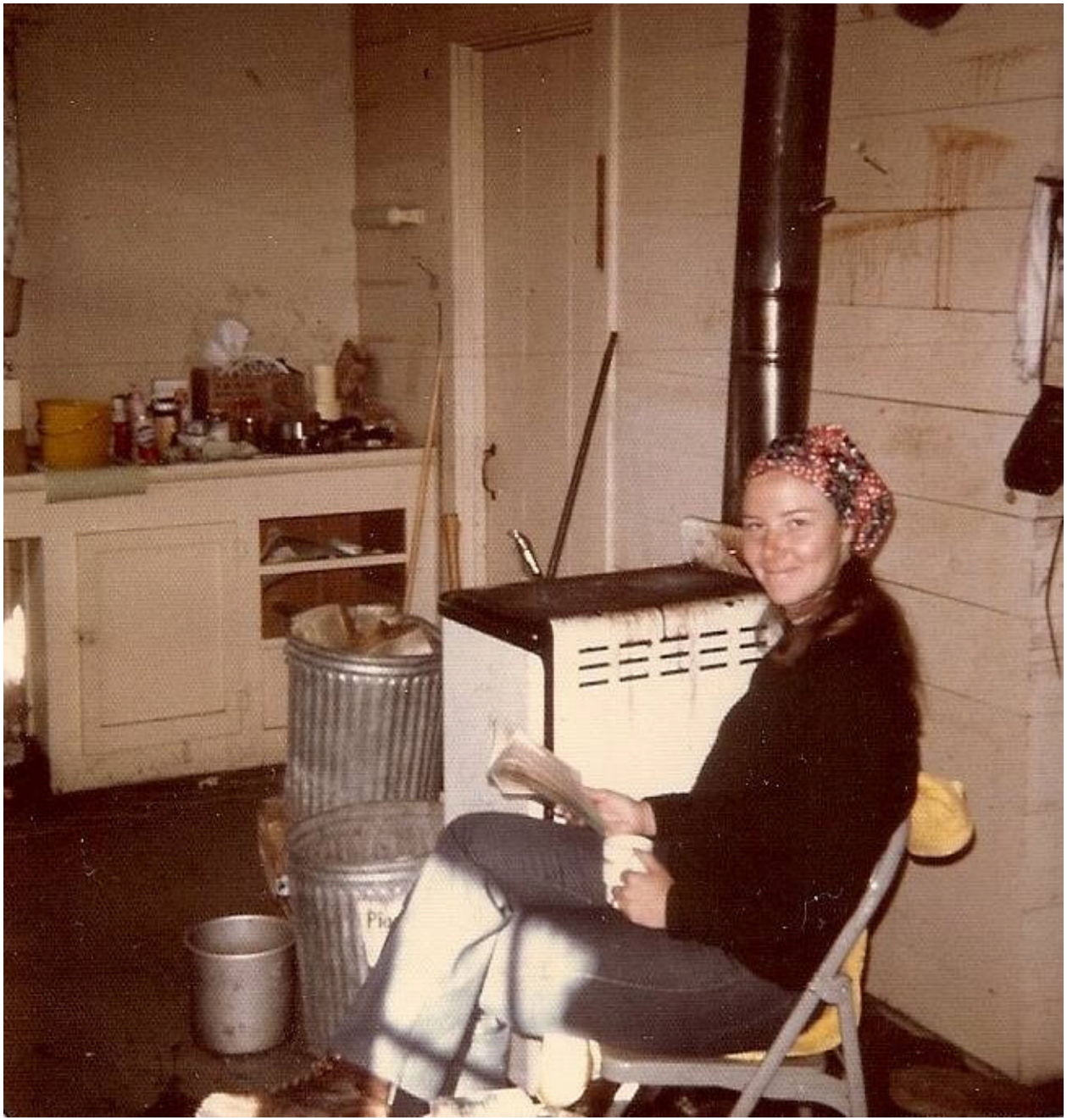
COMPARISON OF ALPINE AND SUBALPINE WINDS FOR ANTICIPATING HIGH WIND EVENTS IN LOWER HIDDEN VALLEY



AFTER D. E. GLIDDEN

HOURLY PEAK GUST AND HOURLY AVERAGE WIND SPEEDS FOR TR 3 (UPPER HV) AND TR 6 (LOWER HV) FOR MARCH 1-7TH, 1974

(SOLID LINES REPRESENT DATA AT TR 3 AND DASHED LINES AT TR 6)



JUDY BELL, PHYSICAL GEOGRAPHER FROM UMASS AMHERST, HELPED INSTALL WIND SENSORS ALONG TRAIL RIDGE, RMNP. VIEWED HERE IN ROCK CABIN, SEPTEMBER 1973

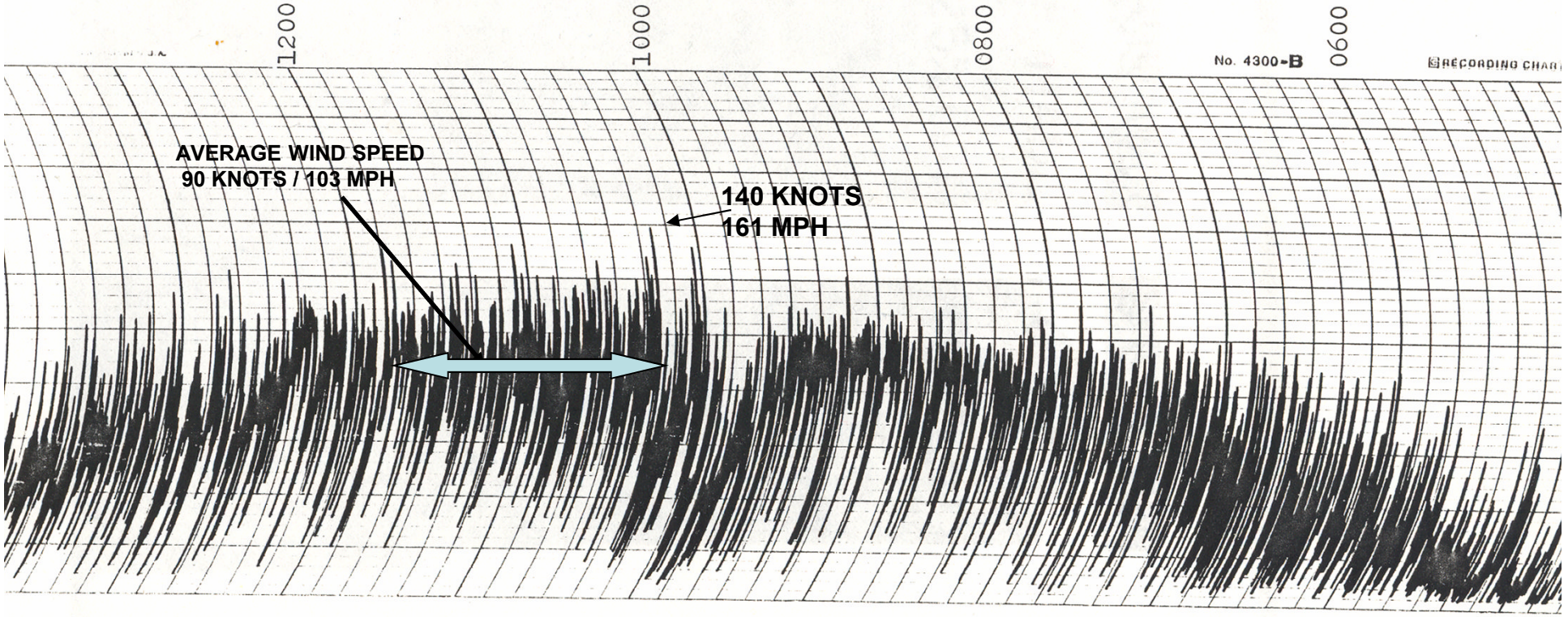
LONGS PEAK SUMMIT ON JANUARY 24, 1981

MAXIMUM RECORDED PEAK GUST = 161 MPH

MAXIMUM 5-MINUTE AVERAGE = 114 MPH

MAXIMUM 1-HOUR AVERAGE = 101 MPH

MAXIMUM PEAK GUST RECORDED FOR WINTER 1980-81= 201 MPH



After D. E. Glidden, *Winter Wind Studies in Rocky Mountain National Park*, **1982**

FIG. 14

Anemograph of severe winter storm on Longs Peak, January 24, 1981. Scale: 0-200 knots (uncorrected). Note the extreme range of turbulence.