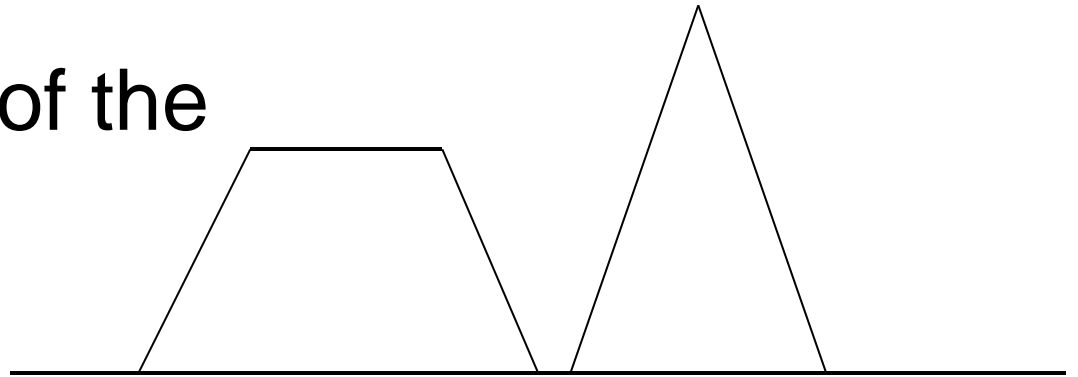


Mountain Weather

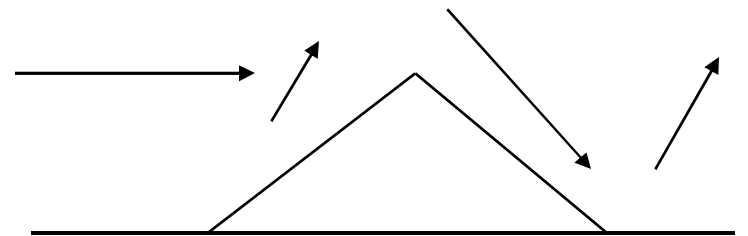
Ronald B. Smith
Geology and Geophysics
Yale University

Issues

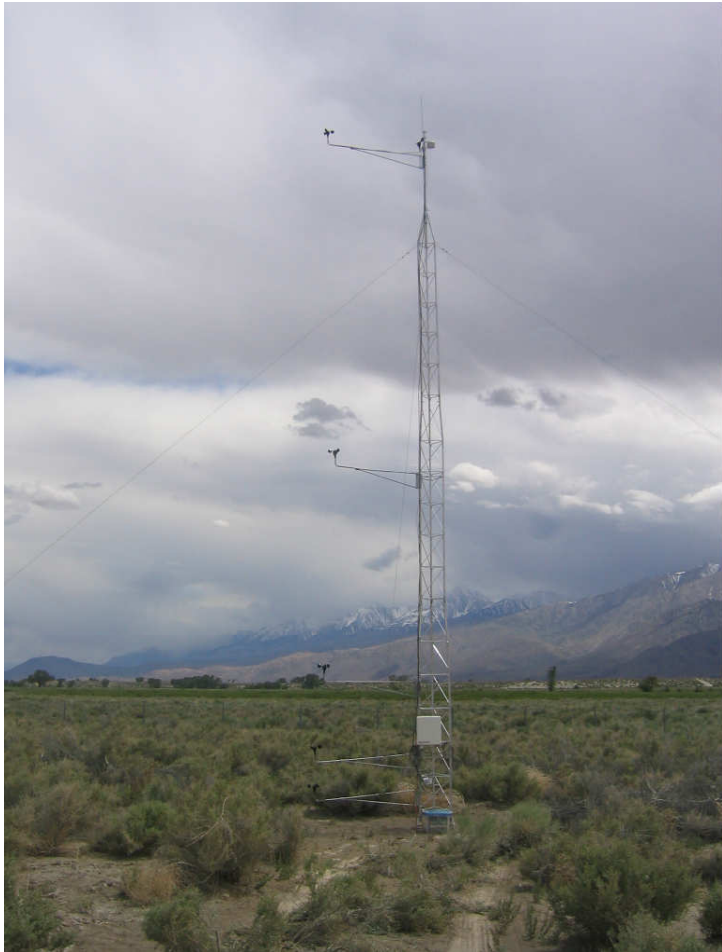
- Vertical structure of the free atmosphere



- The influence of mountains on the atmosphere

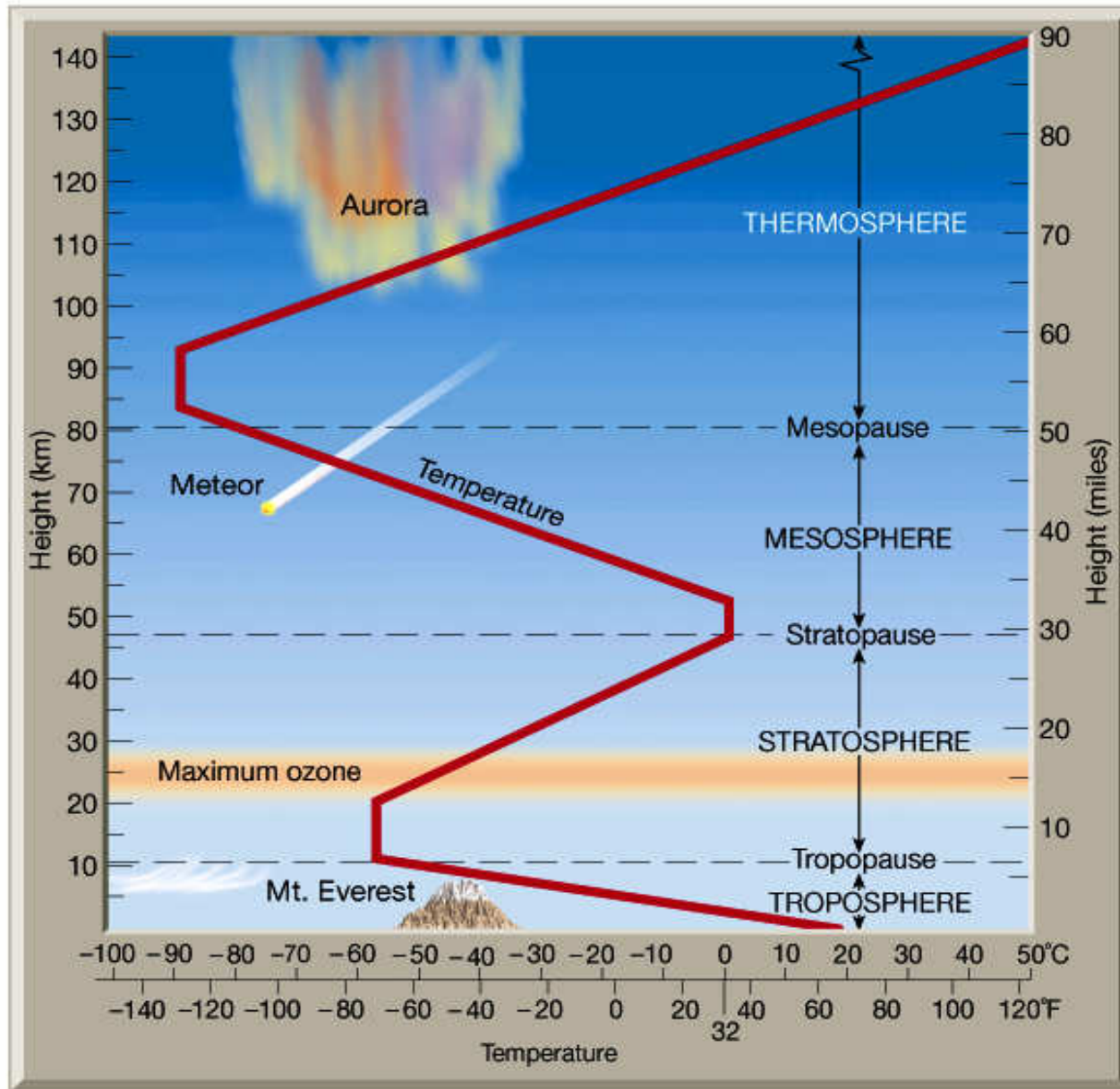


Elevation?





Mt. Blanc



Exosphere

over ~500 km (300 mi)

Ionosphere

~50-500 km (30-300 mi)

F region

D Region

E Region

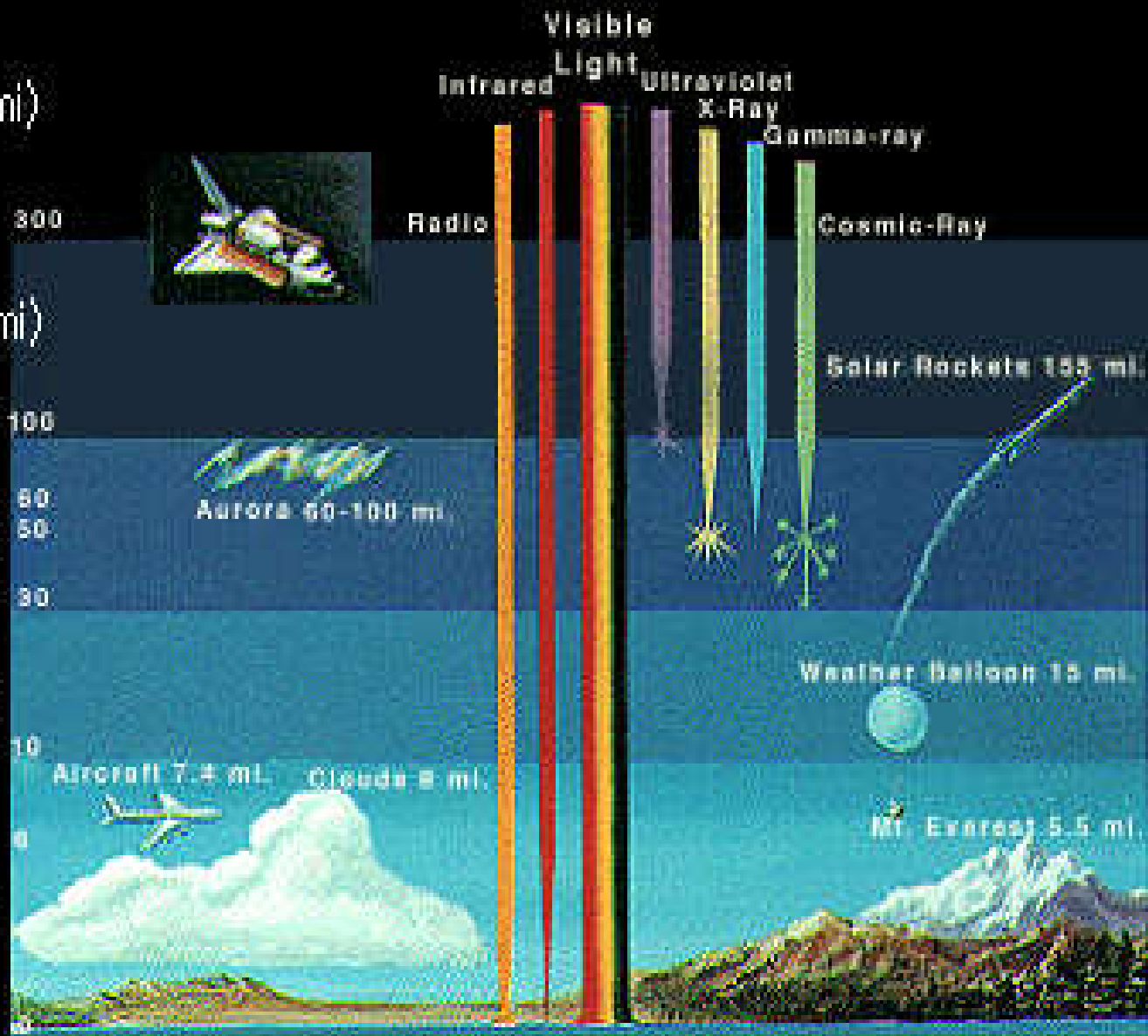
Stratosphere

16-50 km (10-30 mi)

Troposphere

0-16 km (0-10 mi)

Sea Level

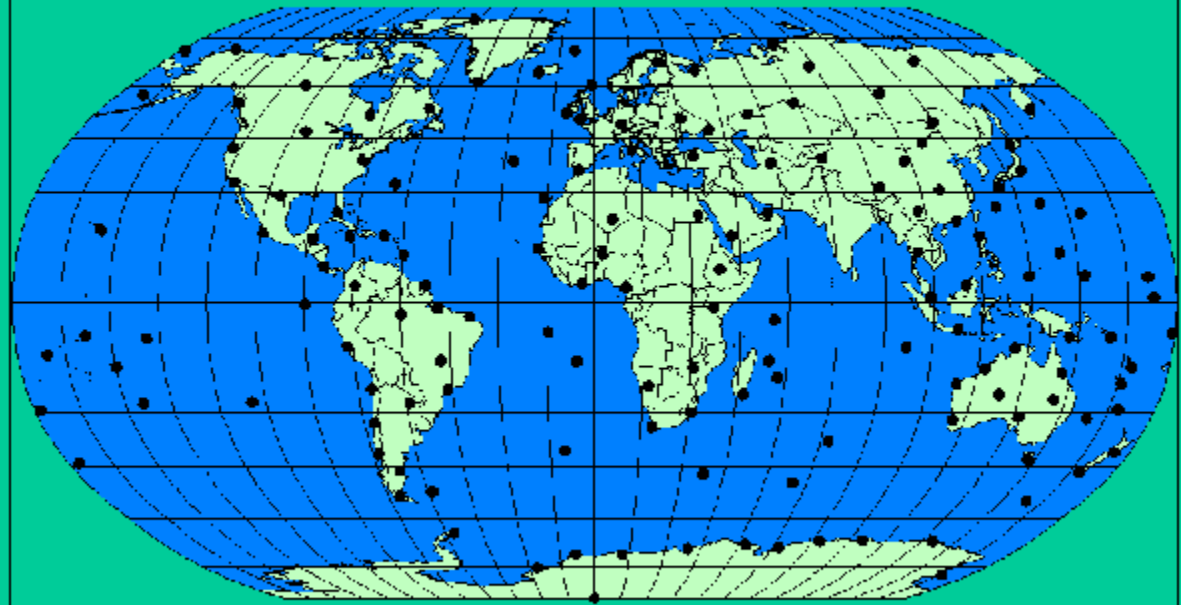


Free atmosphere concepts

- Density and pressure drop to 1/3 for every 8000meters of climb. All gases are well mixed.
- Temperature Lapse Rate
 - -6.5C/km in the free atmosphere
 - -3 to -5C/km on most mountain slopes
- Winds usually increase with height up to the tropopause.

GCOS Upper Air Network (GUAN)

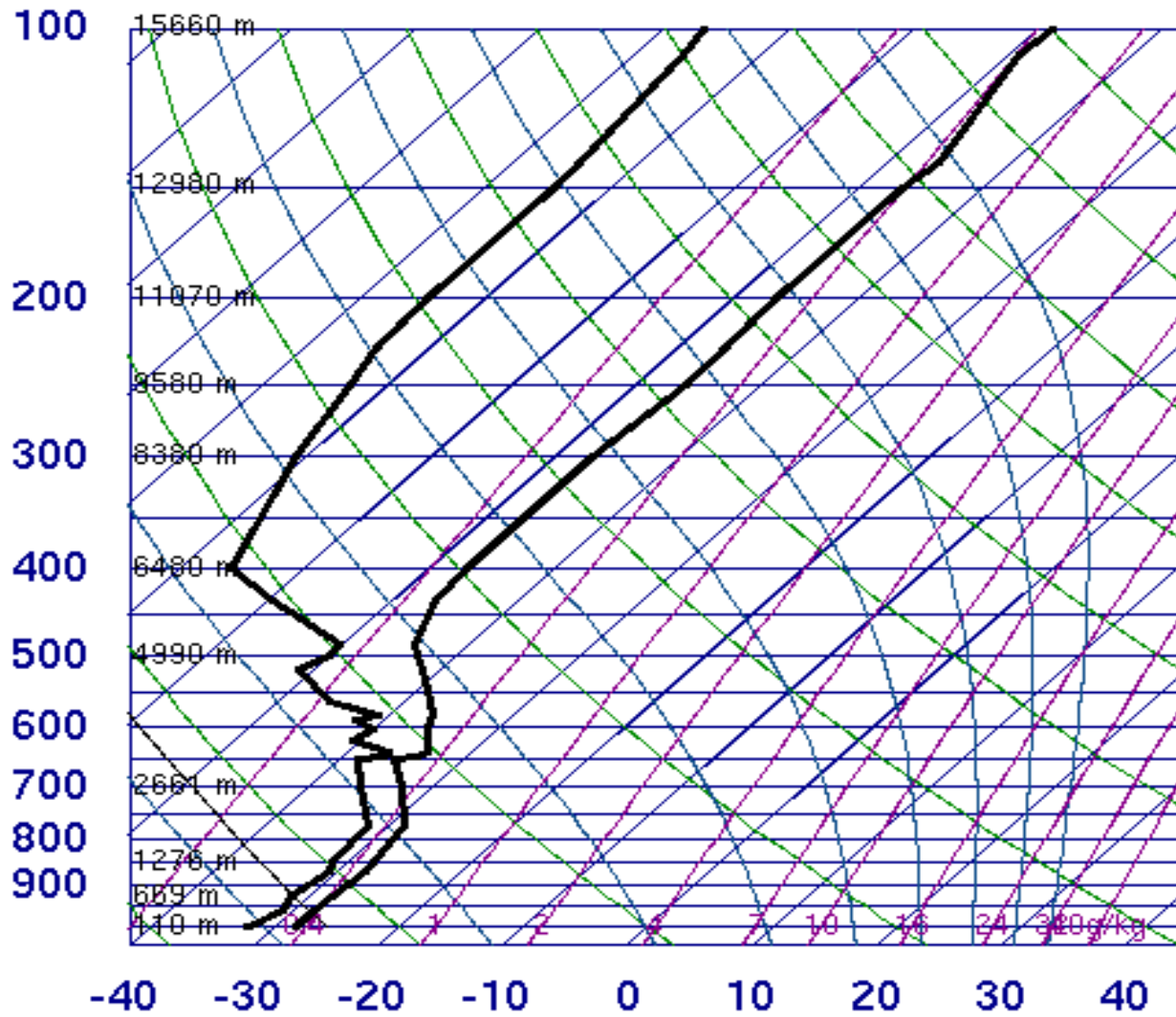
150 Stations



GCOS Secretariat: 21 April 1999



70231 PAMC Mcgrath



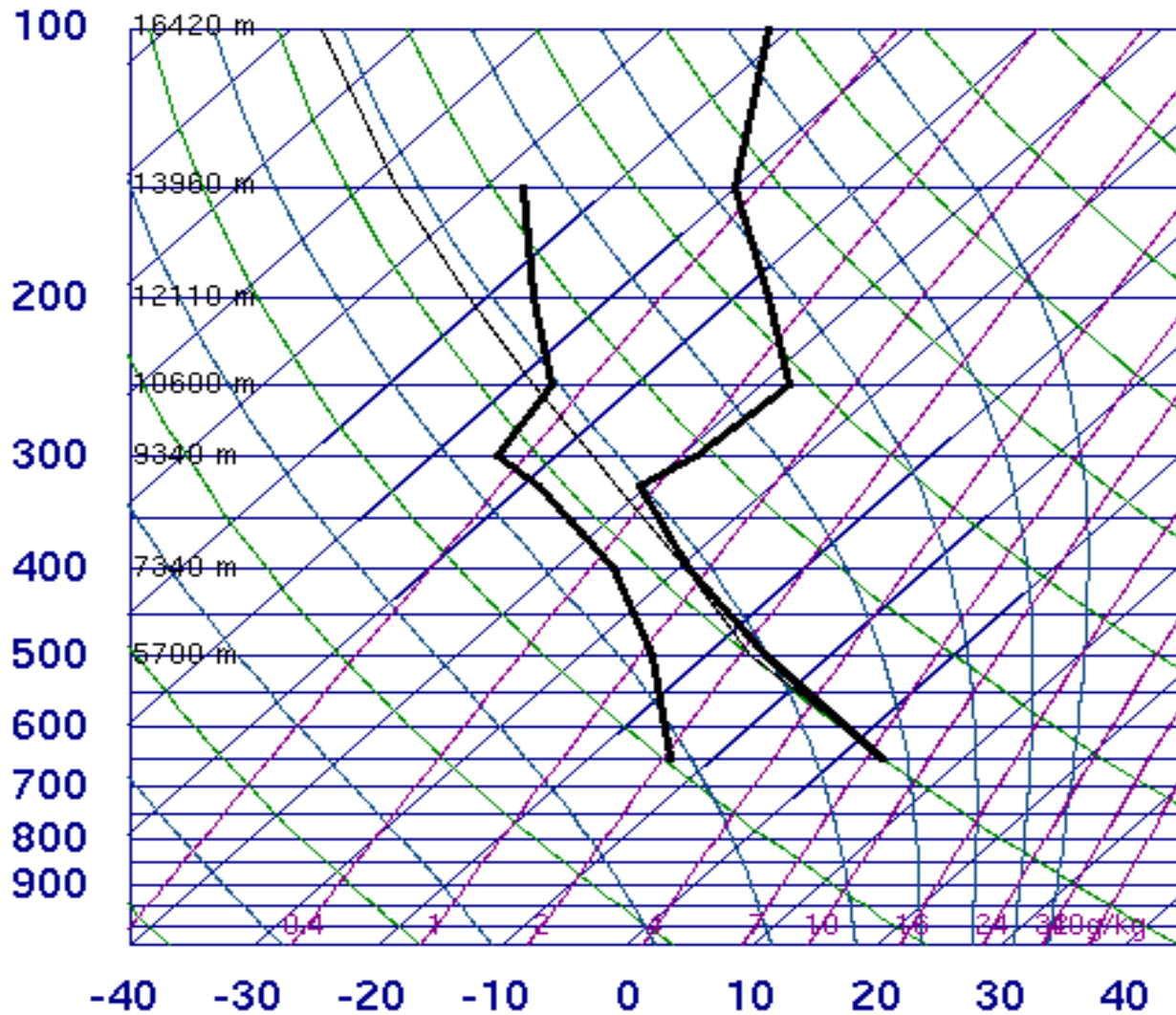
SLAT	62.96
SLON	-155.61
SELV	103.0
SHOW	18.54
LIFT	26.61
LFTV	26.62
SWET	20.98
KINX	-19.1
CTOT	12.00
VTOT	15.20
TOTL	27.20
CAPE	0.00
CAPV	0.00
CINS	0.00
CINV	0.00
EQLV	-9999
EQTV	-9999
LFCT	-9999
LFCV	-9999
BRCH	0.00
BRCV	0.00
LCLT	241.3
LCLP	919.9
MLTH	247.2
MLMR	0.29
THCK	4880.
PWAT	1.45

12Z 02 Feb 2009

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Skew-T logP Plot

55591 ZULS Lhasa

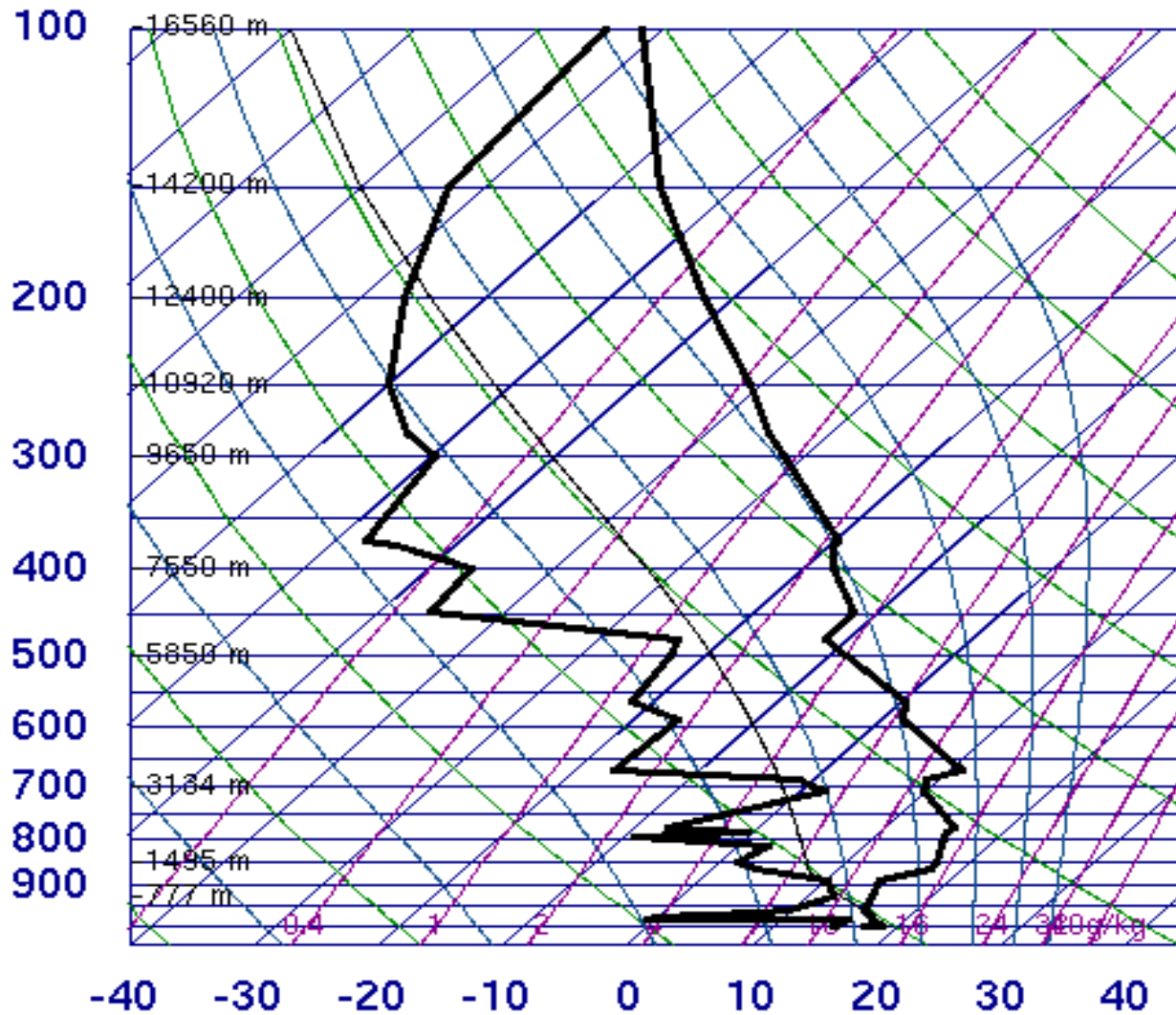


SLAT	29.66
SLON	91.13
SELV	3650.
SHOW	-9999
LIFT	1.48
LFTV	1.32
SWET	-9999
KINX	-9999
CTOT	-9999
VTOT	-9999
TOTL	-9999
CAPE	0.00
CAPV	0.00
CINS	0.00
CINV	0.00
EQLV	-9999
EQTV	-9999
LFCT	-9999
LFCV	-9999
BRCH	0.00
BRCV	0.00
LCLT	255.4
LCLP	489.6
MLTH	313.2
MLMR	1.96
THCK	-9999
PWAT	3.60

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85442 SCFA Antofagasta

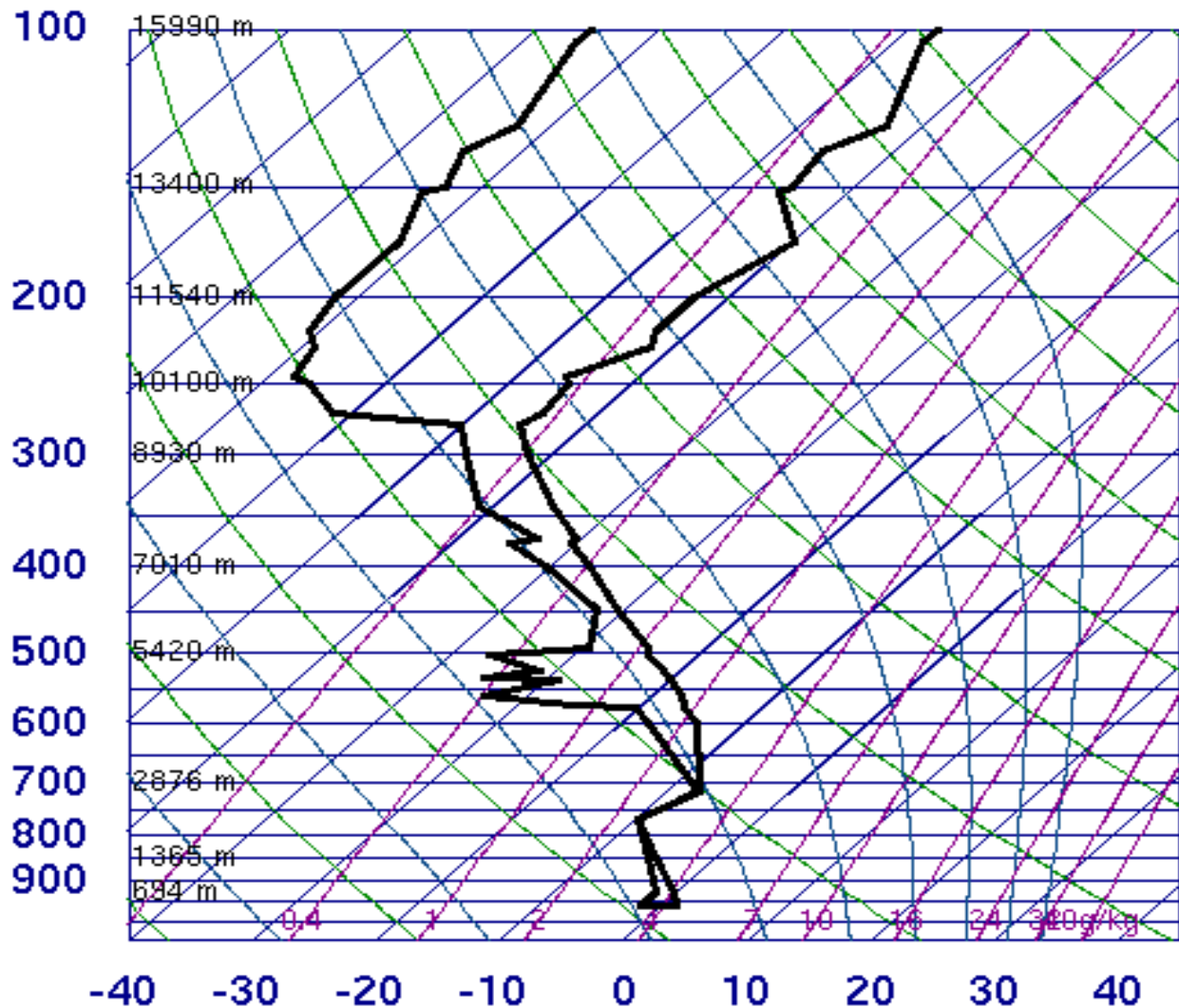


SLAT	-23.43
SLON	-70.45
SELV	137.0
SHOW	7.84
LIFT	10.64
LFTV	10.58
SWET	39.80
KINX	18.50
CTOT	10.10
VTOT	26.10
TOTL	36.20
CAPE	0.00
CAPV	0.00
CINS	0.00
CINV	0.00
EQLV	-9999
EQTV	-9999
LFCT	-9999
LFCV	-9999
BRCH	0.00
BRCV	0.00
LCLT	281.2
LCLP	873.7
MLTH	292.3
MLMR	8.21
THCK	5713.
PWAT	23.76

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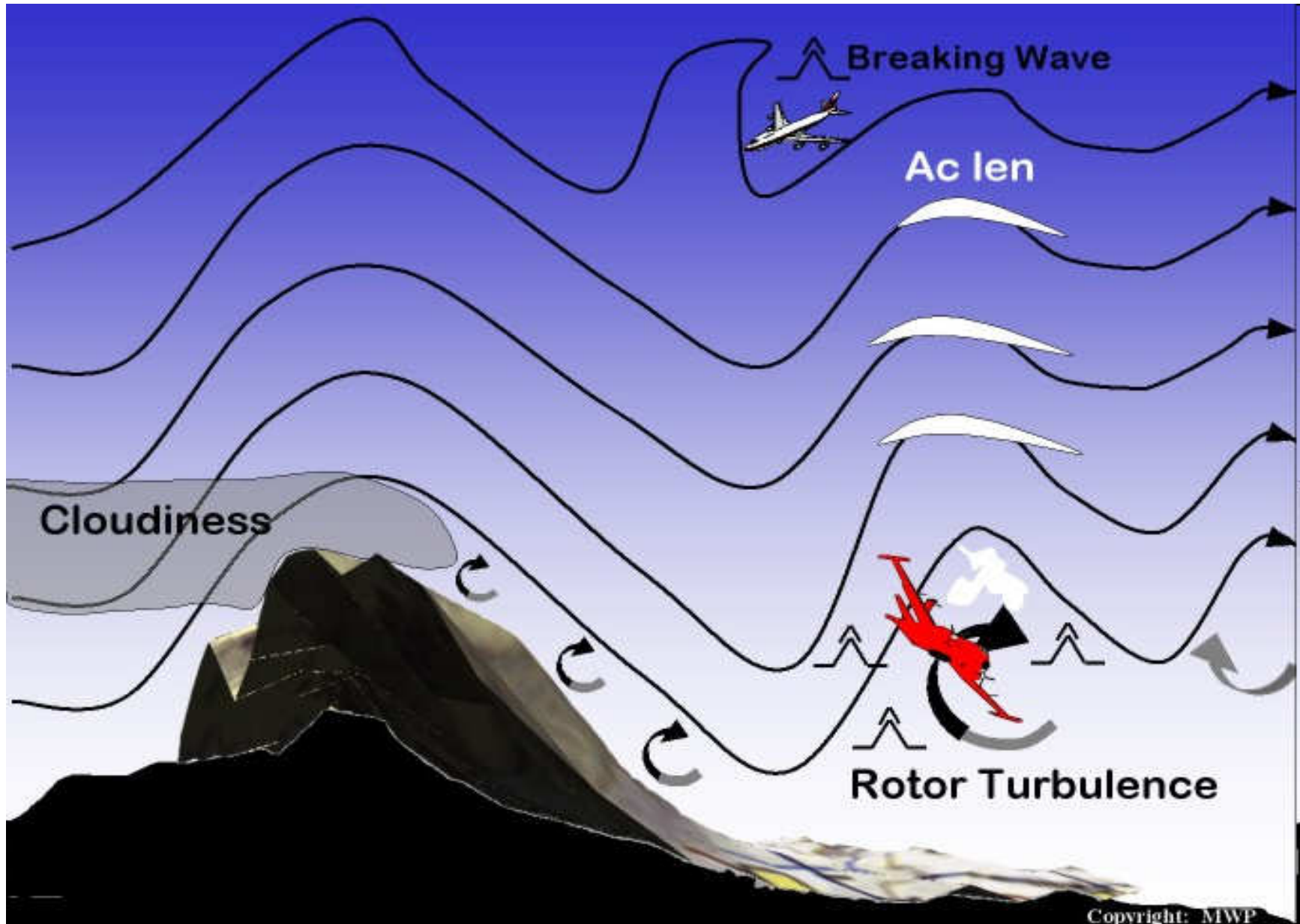
16113 Cuneo-Levaldigi



SLAT	44.53
SLON	7.61
SELV	-9999
SHOW	12.39
LIFT	-9999
LFTV	-9999
SWET	55.01
KINX	13.00
CTOT	18.60
VTOT	19.20
TOTL	37.80
CAPE	-9999
CAPV	-9999
CINS	-9999
CINV	-9999
EQLV	-9999
EQTV	-9999
LFCT	-9999
LFCV	-9999
BRCH	-9999
BRCV	-9999
LCLT	-9999
LCLP	-9999
MLTH	0.00
MLMR	0.00
THCK	5355.
PWAT	11.75

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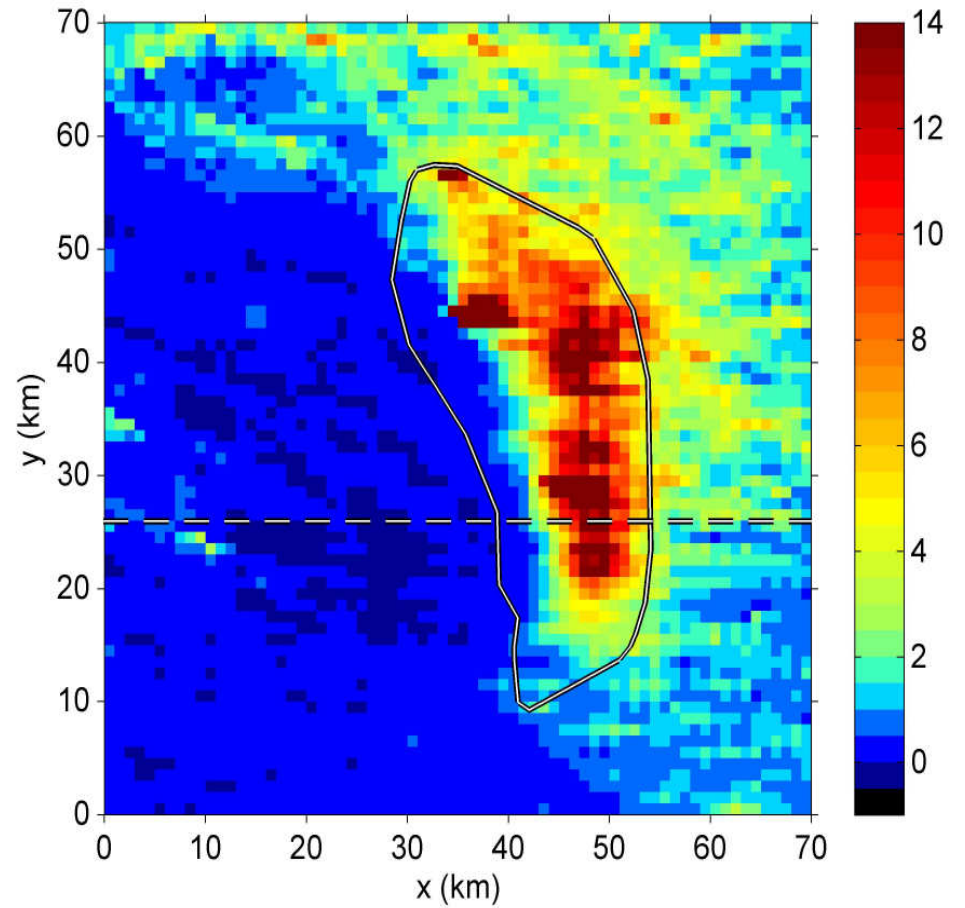
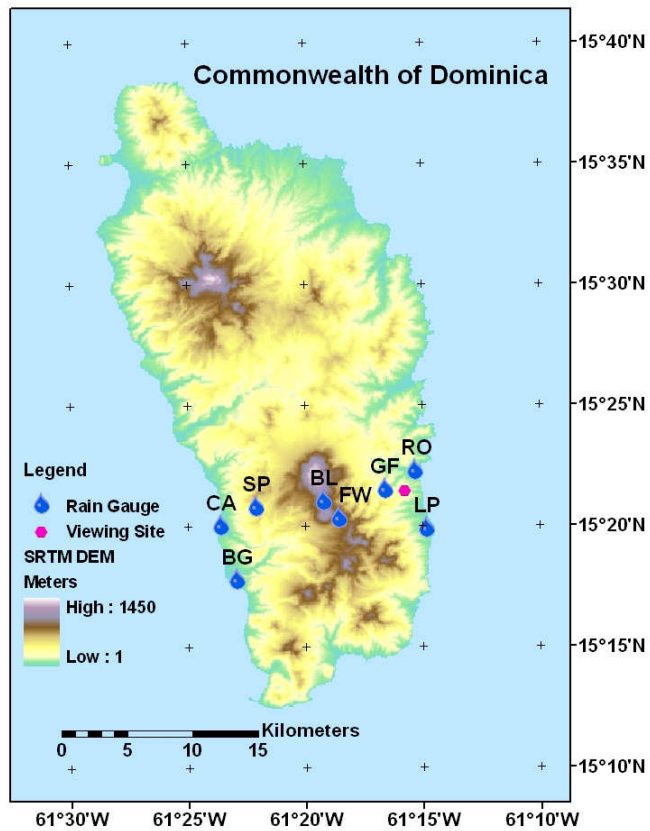






Kopernik

Dominica (1400meters)



Sources

- “Mountain Meteorology” by Whiteman
- “The influence of mountains on the atmosphere” by Smith (review article)
- Bi-annual meeting on mountain meteorology run by the American Meteorological Society
- Bi-annual International Conference on Alpine Meteorology (ICAM)