



METAR Remarks

Remarks are supplemental information that add to the basic METAR report.

Remarks

RMK indicates that supplemental remarks follow.

AO1 indicates an automated station without a precipitation discriminator.

AO2 indicates an automated station with a precipitation discriminator.

Peak Wind

PK WND dddff(f)/(hh)mm

PK WND indicates the peak wind since the last METAR report.

ddd indicates the direction of the peak wind in degrees.

ff(f) is the peak wind speed in knots.

(hh)mm is the time (UTC) of the peak wind.

Peak Wind (cont.)

For example,

PK WND 28045/15 indicates that the peak wind was blowing from a direction of 280° (i.e. just north of due west) at 45 knots and it occurred at 15 minutes past the hour

Wind Shift

WSHFT (hh)mm

WSHFT indicates that a wind shift occurred.

(hh)mm indicates the time of the wind shift.

Wind Shift (cont.)

For example,

WSHFT 30 FROPA indicates that a wind shift occurred at 30 minutes past the hour associated with a frontal passage (**FROPA**).

Sea Level Pressure

Sea level pressure is the pressure that a station would measure if the station were located at mean sea level, assuming a standard environmental lapse rate of $6.5^{\circ}\text{C}/\text{km}$.

Sea Level Pressure (cont.)

Sea level pressure is reported for plotting on surface synoptic maps in an attempt to eliminate the influence of different station elevations and to make it easier to identify significant weather features.

Sea Level Pressure (cont.)

The reduction of station pressure to sea level requires knowledge of the height of the station above mean sea level, the temperature and dew point temperature at the time of observation and 12 hours prior to the time of observation, and the current surface pressure.

Sea Level Pressure (cont.)

$$p_{SL} = p_{sta} e^{\exp \left[\frac{(9.80665 \text{ m/s})(Z)}{(R_d)(T_v)} \right]}$$

where

p_{SL} – is the sea level pressure

Sea Level Pressure (cont.)

p_{sta} – is the surface pressure measured at the station

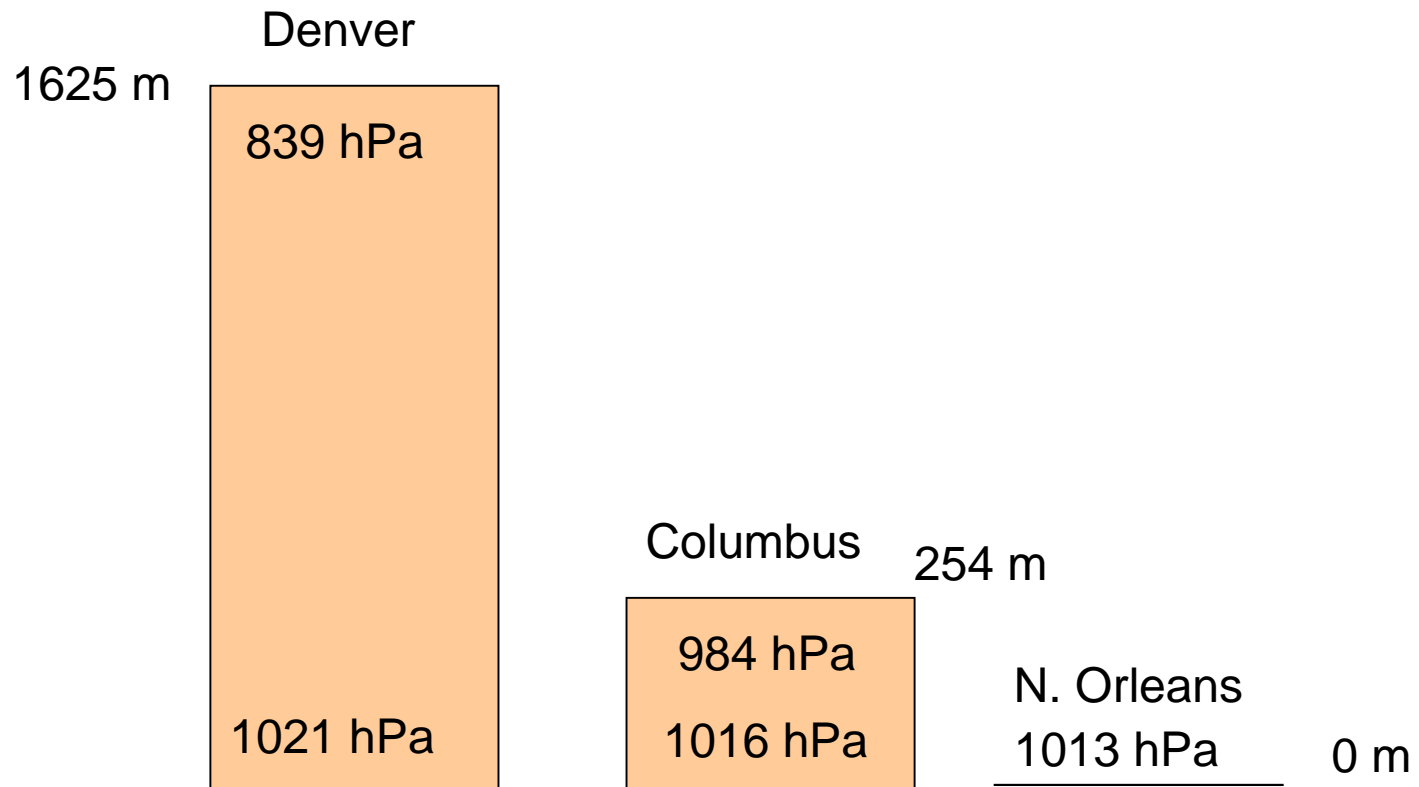
e_{exp} – is the base of the natural logarithms

Z – is the geopotential height of the station in meters

R_d – is the gas constant for dry air

T_v – is the mean virtual temperature for an imaginary column of air from the height of the station to mean sea level.

Sea Level Pressure (cont.)



Sea Level Pressure (cont.)

SLPppp

SLP indicates the sea level pressure group

ppp indicates the last three digits of the sea level pressure in tenths of a hectoPascal (mb) with the hundreds and thousands digits omitted

Sea Level Pressure (cont.)

If **ppp** greater than **500**, it is normally necessary to put a **9** in front of **ppp** and divide by **10** in order to get the sea level pressure in hectoPascals (mb).

SLP965 indicates a sea level pressure of **996.5 hPa (mb)**.

Sea Level Pressure (cont.)

If **ppp** is less than **500**, it is normally necessary to put a **10** in front of **ppp** and to divide by **10** to get the sea level pressure in hectoPascals (mb).

SLP152 indicates a sea level pressure of **1015.2 hPa (mb)**.

Hourly Temperature and Dew Point Temperature

$T_s T' T' T' s_n T' T' T' T'$

where

T indicates that the hourly temperature and dew point temperature in tenths of a degree Celsius follows.

Hourly Temp. and Dew Pt. (cont.)

s_n indicates the sign of the temperature and dew point temperature

$s_n = 0$ indicates a temperature above 0°C.

$s_n = 1$ indicates a temperature below 0°C.

T'T'T' indicates the temperature in tenths of a degree Celsius with the decimal point omitted.

Hourly Temp. and Dew Pt. (cont.)

$T'_d T'_d T'_d$ indicates the dew point temperature in tenths of degrees Celsius with the decimal point omitted.

For example, **T00581032** would indicate

$$T = 5.8^\circ\text{C}, \quad T_d = -3.2^\circ\text{C}.$$

Six Hourly Maximum and Minimum Temperatures

At 0000, 0600, 1200 and 1800 UTC stations may report the maximum and minimum temperatures that have occurred during the previous six hours.

Six Hourly Maximum Temperature

$1s_n T_x T_x T_x$

1 indicates that the six hourly maximum temperature group follows

s_n indicates the sign of the temperature

T_xT_xT_x indicates the maximum temperature in tenths of a degree Celsius during the previous six hours.

Six Hourly Minimum Temperature

$2s_n T_n T_n T_n$

2 indicates that the six hourly minimum temperature group follows

s_n indicates the sign of the temperature

T_nT_nT_n indicates the minimum temperature in tenths of degrees Celsius that occurred during the past six hours.

24 Hourly Maximum and Minimum Temperatures

$4s_n T_x T_x T_x s_n T_n T_n T_n$

4 indicates that the 24 hourly maximum and minimum temperature group follows

s_n indicates the sign of the temperature

$T_x T_x T_x$ indicates the maximum temperature in tenths of degrees Celsius measured during the past 24 hours

24 Hr. Max./Min. Temp. (cont.)

$T_n T_n T_n$ indicates the minimum temperature in tenths of degrees Celsius measured during the past 24 hours.

Depth of Snow on the Ground

4/sss

4/ indicates that the depth of snow on the ground group follows

sss indicates the depth of snow on the ground in whole inches.

Three Hourly Pressure Tendency

Some stations report the change in sea level pressure during the past three hours at 0000, 0300, 0600, 0900, 1200, 1500, 1800, and 2100 UTC.

Three Hourly Pressure Tendency (cont.)

5appp

5 indicates that the three hourly pressure tendency group follows

a indicates the character of the pressure change during the past three hours

ppp indicates the magnitude of the pressure change during the past three hours.

Pressure Change Characteristics

$0 \leq a \leq 3$ indicates that the sea level pressure is higher than it was three hours ago

$a = 4$ indicates that the sea level pressure is the same as it was four hours ago

$5 \leq a \leq 8$ indicates that the sea level pressure is lower than it was three hours ago.

Pressure Change Char. (cont.)

$a = 0$ indicates increasing, then decreasing

$a = 1$ indicates increasing then steady; or increasing, then increasing more slowly

$a = 2$ indicates increasing steadily or unsteadily

$a = 3$ indicates decreasing or steady, then increasing; or increasing, then increasing more rapidly

Pressure Change Char. (cont.)

$a = 4$ indicates steady

$a = 5$ indicates decreasing, then increasing

$a = 6$ indicates decreasing then steady; or decreasing, then decreasing more slowly

$a = 7$ indicates decreasing steadily, or unsteadily

$a = 8$ indicates steady or increasing, then decreasing; or decreasing the decreasing more rapidly

Hourly Precipitation Totals

PRRRR

P indicates the hourly precipitation group follows

RRRR indicates the total precipitation during the past hour in hundredths of an inch with the decimal place omitted.

Three and Six Hourly Precipitation Totals

Some stations report the precipitation during the past three hours at 0300 UTC, 0900 UTC, 1500 UTC and 2100 UTC.

Some stations report the precipitation during the past six hours at 0000 UTC, 0600 UTC, 1200 UTC, 1800 UTC.

3 and 6 Hourly Precip. (cont.)

6RRRR

6 indicates that the three or six hourly precipitation group follows

RRRR indicates the precipitation during the past three or six hours in hundredths of an inch with the decimal point omitted.

24 Hourly Precipitation Total

$7R_{24}R_{24}R_{24}R_{24}$

7 indicates that the 24 hourly precipitation group follows

$R_{24}R_{24}R_{24}R_{24}$ indicates the precipitation during the past 24 hours in hundredths of an inch with the decimal point omitted.

Trace of Precipitation

A **trace** of precipitation is reported if precipitation is observed reaching the surface, but the rain gauge does not record 0.01 inch.

RRRR = 0000 to indicate a trace.

For example,

P0000 indicates that a trace of precipitation was recorded during the past hour.

Cloud Type

Some stations supplement the automated reports with information on cloud types and coverage taken by human observers.

This information is typically included in METAR reports at 0000, 0600, 1200, and 1800 UTC.

Cloud Type (cont.)

8/ $C_L C_M C_H$

8/ indicates that the cloud type group follows

C_L indicates the predominate type of low cloud

C_M indicates the predominate type of middle cloud

C_H indicates the predominate type of high cloud

Low Cloud Types

$C_L = 1$ indicates Cumulus of fair weather, little vertical development and seemingly flattened.

$C_L = 2$ indicates Cumulus of considerable development, generally towering, with or without other cumulus or stratocumulus

Low Cloud Types (cont.)

$C_L = 3$ indicates cumulonimbus with tops lacking clear-cut outlines, but distinctly not cirriform or anvil shaped; with or without cumulus, stratocumulus or stratus.

$C_L = 4$ indicates stratocumulus formed by spreading out of cumulus; cumulus often present.

Low Cloud Types (cont.)

$C_L = 5$ indicates stratocumulus not formed by spreading out of cumulus.

$C_L = 6$ indicates stratus or fractostratus but not fractostratus of bad weather.

$C_L = 7$ indicates fractostratus and/or fractocumulus of bad weather (scud).

$C_L = 8$ indicates cumulus and stratocumulus (not formed by spreading out of cumulus with bases at different levels

Low Cloud Types (cont.)

$C_L = 9$ indicates cumulonimbus having a clearly fibrous (cirriform) top, often anvil-shaped, with or without cumulus, stratocumulus, stratus or scud.

Middle Cloud Types (cont.)

$C_M = 1$ indicates thin altostratus (most of the cloud semitransparent).

$C_M = 2$ indicates thick altostratus, greater part sufficiently dense to hide the sun or moon, or nimbostratus.

$C_M = 3$ indicates thin altocumulus, mostly semitransparent; cloud elements not changing much and at a single level.

Middle Cloud Types (cont.)

$C_M = 4$ indicates thin altocumulus in patches; cloud elements continually changing and/or occurring at more than one level at a time.

$C_M = 5$ indicates thin altocumulus in bands or in a layer gradually spreading over the sky and usually thickening as a whole.

Middle Cloud Types (cont.)

$C_M = 6$ indicates altocumulus formed by spreading out of cirrostratus.

$C_M = 7$ indicates double-layered altocumulus, or a thick layer of altocumulus, not increasing; or altocumulus with altostratus and/or nimbostratus.

Middle Cloud Types (cont.)

$C_M = 8$ indicates altocumulus in the form of cumulus shaped tufts or altocumulus with turrets.

$C_M = 9$ indicates altocumulus of a chaotic sky, usually at different levels; patches of dense cirrus are usually present also.

High Cloud Types

$C_H = 1$ indicates filaments of cirrus, or “mares’ tails”, scattered and not increasing.

$C_H = 2$ indicates dense cirrus in patches or twisted sheaves, usually not increasing.

$C_H = 3$ indicates dense cirrus, often anvil-shaped, derived from or associated with cumulonimbus.

High Cloud Types (cont.)

$C_H = 4$ indicates cirrus, often hook-shaped, gradually spreading over the whole sky and usually thickening as a whole.

$C_H = 5$ indicates cirrus and cirrostratus, often in converging bands, or cirrostratus alone; generally growing denser; the continuous layer not reaching 45 degrees altitude.

High Cloud Types (cont.)

$C_H = 6$ indicates cirrus and cirrostratus, often in converging bands, or cirrostratus alone; generally overspreading and growing denser; the continuous layer exceeding 45 degrees of altitude.

$C_H = 7$ indicates veil of cirrostratus not increasing and not covering the entire sky.

High Cloud Types (cont.)

$C_H = 8$ indicates cirrostratus not increasing and not covering the entire sky.

$C_H = 9$ indicates cirrocumulus alone or cirrostratus with some cirrus or cirrostratus, but the cirrocumulus being the main cloud.

Cloud Coverage

9/ccc

9/ indicates that the cloud coverage group follows

c indicates the cloud coverage at each level in octas (i.e. eighths)

Example

METAR KCMH 261151Z VRB04KT 6SM BR
FEW080 BKN200 21/18 A3006 RMK AO2
SLP171 70026 T02060183 10217 20206
51009

Example Decoded

METAR indicates routine hourly report

KCMH indicate Port Columbus, Ohio.

261151Z indicates **1151 UTC** on the **26th**
day of the month

VRB04KT indicates **variable wind directions**
at 4 knots

6SM indicates the visibility is **6 statute miles**

BR indicates **mist** is obscuring the visibility

Example Decoded (cont.)

FEW080 BKN200 indicates 1/8 to 2/8 sky covered at 8000 feet and 5/8 to 7/8 sky covered at 20000 feet

21/18 indicates a temperature of 21°C and a dew point temperature of 18°C

A3006 indicates an altimeter setting of 30.06 inches

Example Decoded (cont.)

RMK AO2 indicates an automated station
with precipitation discriminator

SLP171 indicates of a sea level pressure of
1017.1 mb

70026 indicates that **0.26 inches** of
precipitation fell during the previous 24
hours

Example Decoded (cont.)

T02060183 indicates that the temperature is **20.6°C** and the dew point temperature is **18.3°C**

10217 indicates the maximum temperature during the past six hours was **21.7°C**

20206 indicates the minimum temperature during the past six hours was **20.6°C**

Example Decoded (cont.)

51009 indicates that the pressure was rising and then steady, or rising then rising more slowly, and is 0.9 mb higher than it was three hours ago