

The Experiments of Weather Instruments & Observations lab.

(First Semester)

ASD / 2nd Stage

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Atmospheric pressure

It is defined as the perpendicular force exerted by the atmosphere per unit area, and is measured in units (hpa) rather than millibars.

Atmospheric pressure gauges:

1. Mercury barometer.
2. Metallic barometer.
3. Barograph.



Mercury barometer



Barograph



Metallic barometer

$3P_0P_0P_0$



The pressure at the station surface level, is not drawn on the station since (3) is the group guide

$P_0P_0P_0$ represents the pressure value with tenths, and the real pressure value is calculated as follows:

$$39872 \quad \Longrightarrow \quad P_0 = 987.2 \text{ hpa}$$

$$30043 \quad \Longrightarrow \quad P_0 = 1004.3 \text{ hpa}$$

4PPPP



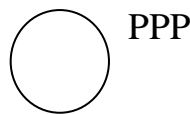
Corrected or calculated pressure at mean sea level, where (4) is the group index.

PPPP represents the pressure value with tenths, and the real pressure value is calculated as follows:

$$49956 \implies P = 995.6 \text{ hpa}$$

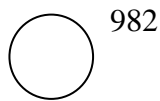
$$40107 \implies P = 1010.7 \text{ hpa}$$

The pressure value is recorded in the last 3 positions, The location of the pressure on the station is as follows :

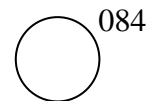


* When encoding the pressure value drawn on the station, we take into account the following:

- a. If the plotted value is **greater than 500**, add **9** to the pressure value.
- b. If the plotted value is **less than 500**, we add **10** to the pressure value.



$$P = \underline{9}982 \implies 49982$$



$$P = \underline{10}084 \implies 40084$$

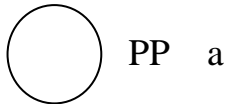
* **Note:** The real pressure value is adjusted or corrected to the pressure value at sea level when the station is at an altitude above 1000 meters, and if it is less than or equal to 1000, the real pressure value is considered the same as the pressure at sea level, meaning it becomes $3P_0P_0P_0P_0 = 4PPPP$

5aPPP



The pressure slope group and its characteristic as (5) is the group index a pressure slope form and takes the values (0 - 8).

PPP is the value of the pressure slope with its tenths, and it represents the real change during the 3 hours ending at the real time of monitoring, and it is recorded on the station with the last two numbers and its location is as follows



*Notes:

- 1. If the values of a are (0,1,2,3) then the pressure slope is described as **positive** and the figures are drawn in **black**.
- 2. If the values of a are (5,6,7,8), the pressure slope is described as **negative** and the figures are drawn in **red**.
- 3. If the value of a (4) indicates that the pressure is **constant throughout the monitoring period**.

53004 \Rightarrow PP= 00.4 ○ 04 ✓

56016 \Rightarrow PP= 01.6 ○ 16 ↘

54000 \Rightarrow PP= 00.0 ○ 00 —

| WW | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | W | a | N | Cl | CM | CH |
|----|-----|----|----|----|----|-----|----|----|-----|----|---|---|---|---|----|----|----|
| 00 | ○ | ○ | ○ | ○ | ∞ | S | \$ | E | (S) | | | | ∧ | ○ | | | |
| 10 | = | ≡ | ≡ | ≠ | ∞ | (∞) | R | V | ∩ | ∩ | 1 | | ∧ | ⊕ | ∩ | ∨ | ∩ |
| 20 | ∩ | ∩ | ∩* | ∩* | ∩ | ∩ | ∩ | ∩ | ∩ | ∩ | 2 | | ∧ | ⊕ | ∩ | ∨ | ∩ |
| 30 | ∩ | ∩ | ∩ | ∩ | ∩ | + | + | + | + | + | 3 | S | ∧ | ⊕ | ∩ | ∨ | ∩ |
| 40 | (∩) | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | ≡ | 4 | ≡ | ∧ | ⊕ | ∩ | ∨ | ∩ |
| 50 | ∩ | ∩ | ∩ | ∩ | ∩ | ∩ | ∩ | ∩ | ∩ | ∩ | 5 | ∩ | ∧ | ⊕ | ∩ | ∨ | ∩ |
| 60 | • | •• | •• | •• | •• | •• | •• | •• | •• | •• | 6 | • | ∧ | ⊕ | ∩ | ∨ | ∩ |
| 70 | * | ∩* | ** | ** | ** | ** | ↔ | ∩* | * | ∩ | 7 | * | ∧ | ⊕ | ∩ | ∨ | ∩ |
| 80 | ∩ | ∩ | ∩ | ∩ | ∩ | ∩* | ∩* | ∩ | ∩ | ∩ | 8 | ∩ | ∧ | ⊕ | ∩ | ∨ | ∩ |
| 90 | ∩ | ∩ | ∩ | ∩* | ∩ | ∩ | ∩ | ∩ | ∩ | ∩ | 9 | R | | ⊗ | ∩ | ∨ | ∩ |