Lab No (1)

Finding atmospheric stability classes using the Pasquille method

Aims: Finding classes of atmospheric stability to calculate the degree of dispersal of pollutants on the surface of the earth through atmospheric data of wind speed, the number of recorded clouds, and radiation recorded in the Automatic station of the Department of Atmospheric Sciences**.**

Tools:

1- A display screen for the Meteorological data of the automatic station, such as wind speed and solar radiation.
2- Table No. 1 and 2 to find the stable classes of pasquille.
3- Electronic stopwatch.

Theoretical Part:

Pasquille suggested a method for classifying stability, which was widely used later. He classified stability into six classes, as shown in Table (1).

Table (1): shows the types of atmospheric stability

class	Stability type
A	Extremely unstable
B	Moderately unstable
C	Slightly unstable
D	neutral
E	Moderately stable
F	Extremely stable

Where the class of stability can be calculated based on the amount of total solar radiation instead of the class of solar heating, which depends on the angle of elevation of the sun this method was used by Turner in 1964 when he added another class to the Pasquale classes, class G, to represent low winds in stable conditions during the night and They are called pasquille -Gifford Turner (PGT) classes.

Table 2: shows Pasquale's modified classification for atmospheric stability

U (m/s)	Daytime incoming Solar Radiation (w/m²)				Within 1h before Sunset or or after sunrise	Night cloud amount (oktas)		
	Strong >600	Moderate (300- 600)	Slight (<300)	overcast		0-3	4-7	8
U≤2	A	A-B	B	C	D	F-G	F	D
2.0-3.0	A-B	B	C	C	D	E	E	D
3.0-5.0	B	B-C	C	C	D	D	D	D
5.0-6.0	C	C-D	D	D	D	D	D	D
>6.0	C	D	D	D	D	D	D	D

Methodology:

1- The total amount of incident solar radiation is measured through the solar brightness device located at the station of the department every minute.
2- At the same time, wind speed readings are taken every minute.
3- The average wind speed and the amount of solar radiation recorded within 15 minutes are found.
4- Use the same steps 1, 2, and 3 four times in an hour.
5- The rates of wind speed and solar radiation are shown in Table No. 2 to find the stability varieties.
6- The mentioned stability classes are taken, which will be considered the prevailing stability classes.
7- This method is used only to find stable varieties during the day because it depends on the amount of solar radiation.
8- Varieties of stability during the period of fully or partially cloudy weather are neutral to slightly stable.

Discussion

1- What is the reason for the different types of stability produced?
2- What are the weather features associated with each of these types?
3- What is the effect of the presence of clouds on the types of existing types of stability?