

# **Laboratory of Analytical**

## **Surface and level map analysis pressure in the upper atmosphere**

**(First Semester)**

**ASD / 2<sup>nd</sup> Stage**

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**Lab.(4)**

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## drawing of isotherms

**The purpose of the experiment:** Drawing isothermal lines along with isometric lines on the upper atmosphere maps for pressure levels 850 hPa, 700 hPa, and 500 hpa to determine the warm and cold air masses.

**The theoretical part** : They are isothermal lines, and these lines connect to stations with equal values of temperature. The purpose of drawing isothermal lines is to identify areas of hot air flow and areas of cold air flow, and thus determine Thermal regression regions. As the convergence of the isothermal lines indicates a large temperature regression and the presence of An area of turbulence. As for the spacing of the temperature lines, it gives an indication of the weakness of the thermal gradient in that region and thus be a stable area.

There are two classifications of air masses. The first classification depends on the amount of moisture it contains and its altitude. It is classified into a continental mass, symbolized by the lowercase letter **C** or maritime **m**, and symbolized by the lowercase letter **m**. The other classification depends on the temperature of the mass, so it is called polar and symbolized by the capital letter **P** or tropical. Tropical lane and symbolized by the capital **T** or equatorial and symbolized by the capital letter **E**. There is another classification according to the temperature of a mass in relation to the surface over which it passes, if it is colder than the surface it is symbolized by the capital letter **C** and it is unstable, but if it is warmer than the surface it is symbolized by the letter Big **W** and be stable. We can express the mass in terms of its moisture content and temperature by writing the letter that represents its classification in terms of humidity and then the letter that represents its thermal classification as an example (**c P**), i.e. a dry cold polar mass.

**The practical part:** Isotherms are subject to the rules of isometric lines, but they differ from isobaric lines by several points:

- 1- The isotherm line passes through the station bearing the value of the line, but does not take into account the direction of the wind.
- 2- The intervals between the isothermal lines are 5 degrees Celsius, and sometimes the temperature is read in Fahrenheit. We also take the same period.
- 3- Isothermal lines are usually drawn in red and dashed lines to distinguish them from isobaric lines.
- 4- The isotherm line with the lowest value represents a region of cold air and is written inside it in the color cool, while the highest value of the isotherm line represents a region of warm air and is written inside it in the color warm red.

**Discussion:**

- 1- **Explain the relationship between the values of characteristic altitudes and their temperatures?**
- 2- **How many types of air masses? And talk about them briefly.**
- 3- **Determine the region of cold air mass and warm air mass.**
- 4- **While drawing the lines, can lines of equal height intersect with lines of equal temperature? Explain this.**

