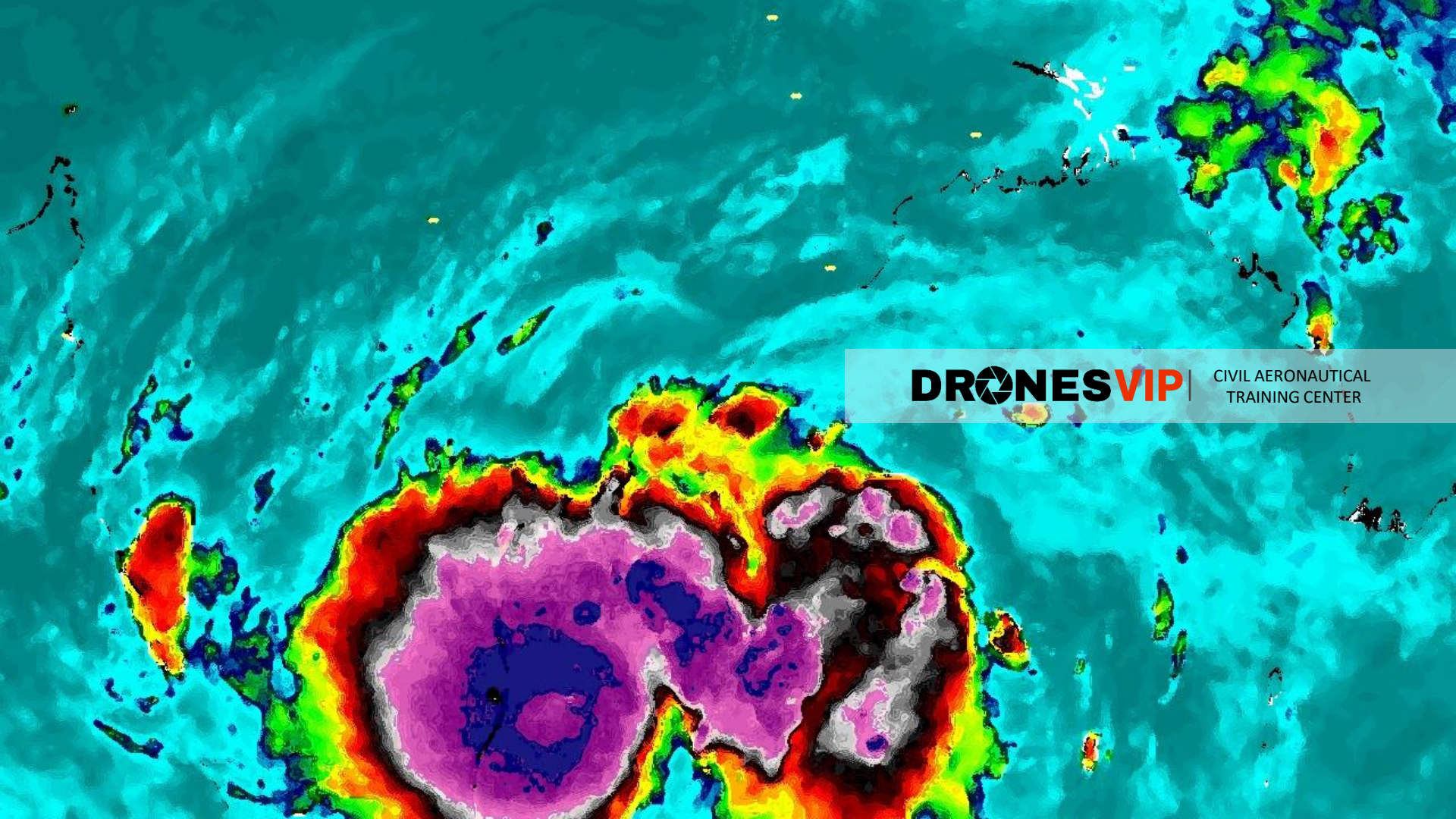
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TEMPERATURE

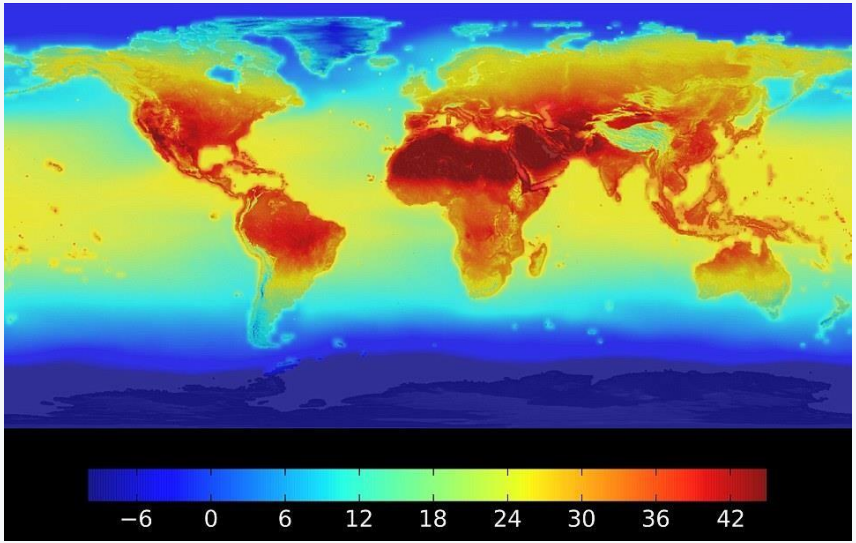
TEMPERATURE

Atmospheric air is called diathermic, since it does not absorb direct solar energy to raise its temperature, but it does manage to exchange energy by "conduction" with the earth's surface, causing the heat absorbed by the earth's crust to be transferred to the air during the day and during the night the reverse process occurs.

TEMPERATURE

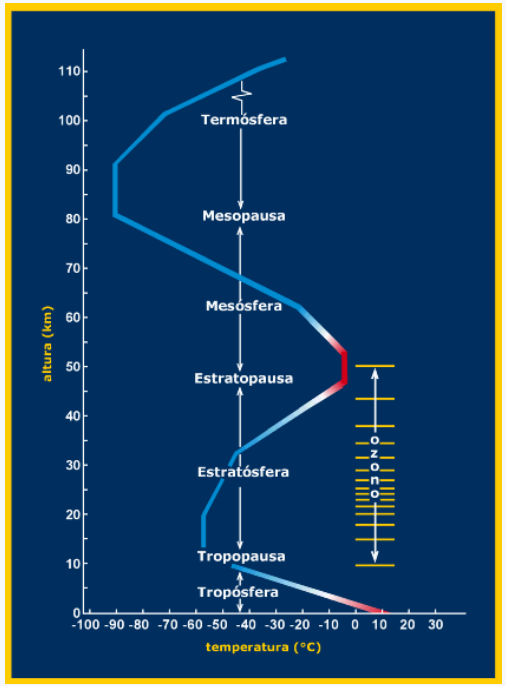
Otros procesos físicos pueden modificar la temperatura del aire, por ejemplo, la compresión/expansión del mismo, logra que la temperatura del aire aumente o disminuya respectivamente. Esto da como resultado que debido a la perdida de presión atmosferica con la altura, la temperatura del aire disminuya, con un gradiente medio de 6,5ºC/1000mts.

TEMPERATURE



Due to the earth's curvature, solar radiation is used in a differential way between the intertropical zone and high latitudes and that results in warmer and colder climates respectively

TEMPERATURE

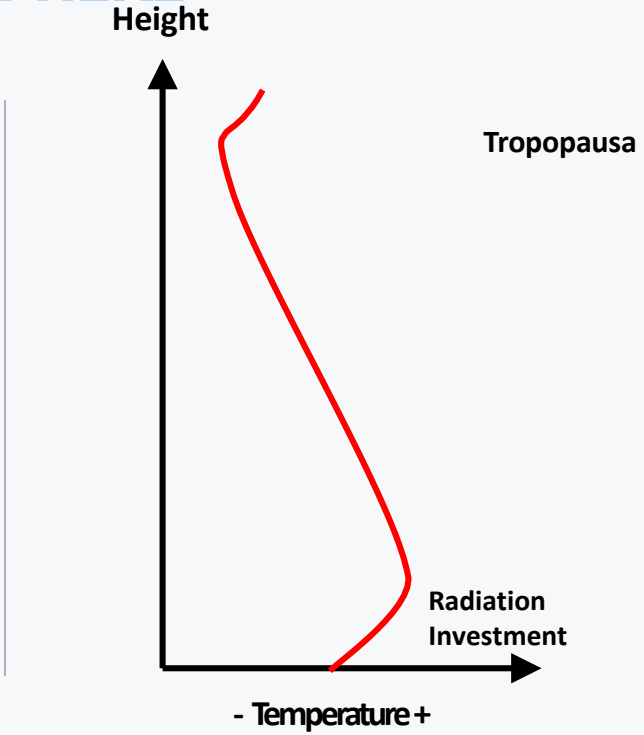


And depending on the physical processes that occur, the so-called "inversions of the vertical temperature gradient" will appear, when the rule that says that it decreases with height is not met.

TEMPERATURE: VERTICAL THERMAL GRADIENT INVERSIONS IN THE TROPOSPHERE

Radiation Investment

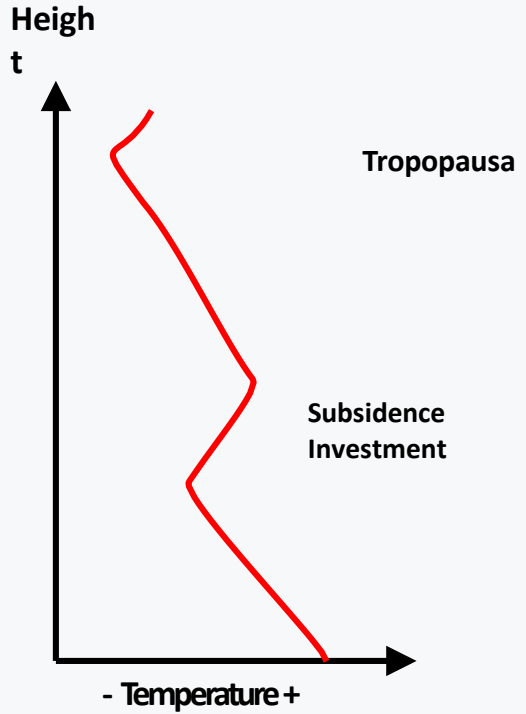
During the night, the earth's surface only loses electromagnetic energy, lowering its temperature and by contact with the colder surface, the adjacent air does the same. The effect becomes more noticeable in the lower layer and decreases with height. This process is very marked in winter, particularly on clear nights with little wind. This process is linked to the formation of fog and frost



TEMPERATURE: VERTICAL THERMAL GRADIENT INVERSIONS IN THE TROPOSPHERE

Subsidence Investment

High Pressure or "Anticyclone" systems are characterized by exerting compression from top to bottom and due to the increase in atmospheric pressure the air is heated. This same concept can be applied to descending slope winds (catabatic), where adiabatic compression is experienced generating air heating. In the first case, the effect occurs above the boundary layer and the middle areas of the troposphere. In the second case, it is common for such inversion to occur close to the surface in the most extreme cases



WATER IN THE ATMOSPHERE

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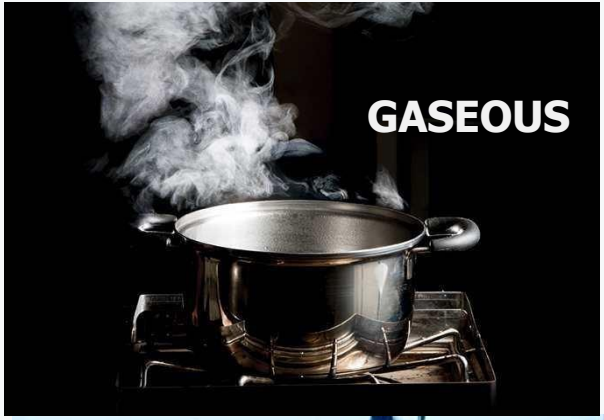
WATER IN THE ATMOSPHERE

Water on our planet is distributed in its three states, both on the surface and in the subsoil, but also in the atmosphere. In the form of clouds and precipitation (liquid and solid state) or dissolved in the air in its gaseous state (water vapor)

WATER STATES



WATER IN THE ATMOSPHERE

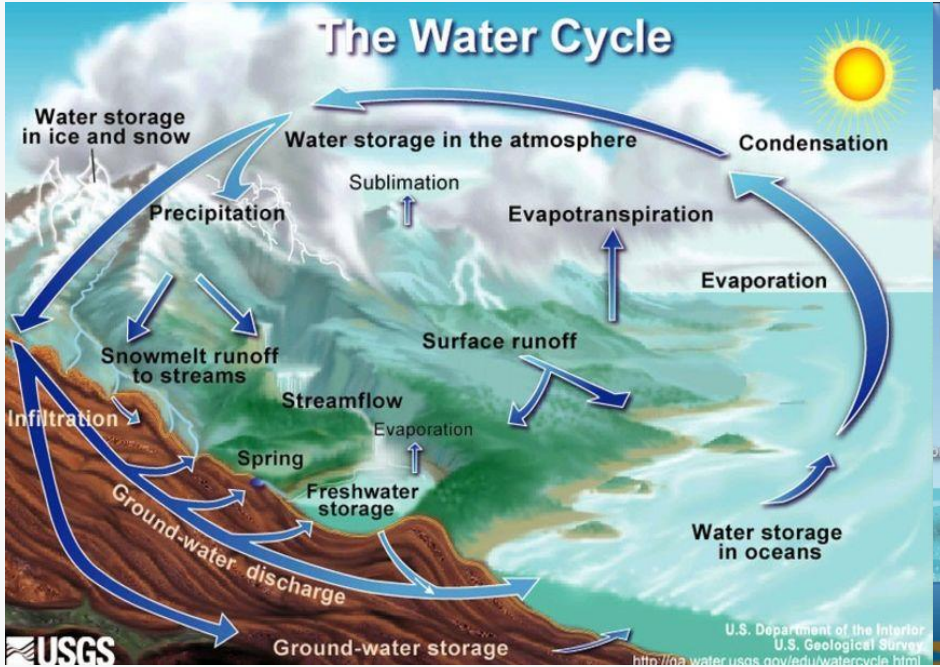
The origin of water vapor in the atmosphere is due to evaporation from the planet's liquid surface and transpiration from vegetation.

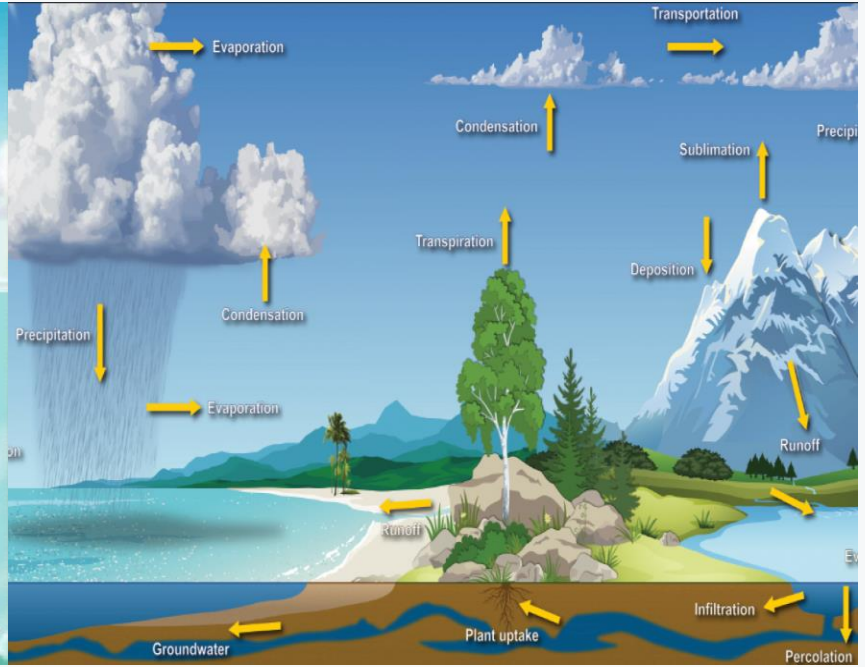
The physical processes in the atmosphere maintain a constant "recycling", called the "Hydrological Cycle".

WATER IN THE ATMOSPHERE

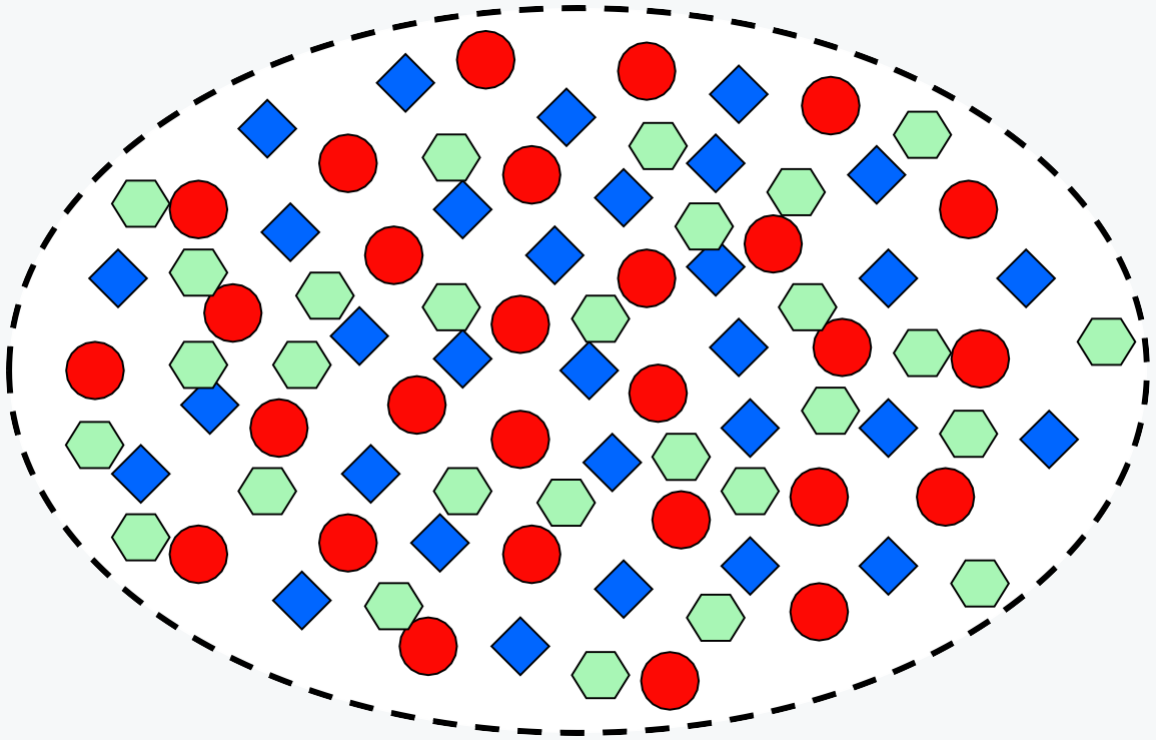
The distribution of water vapor in the atmosphere is not constant, its highest concentration is found in the troposphere, but within this layer the lowest part of it has most of the vapor dissolved in the entire atmosphere.

WATER CYCLE OR HYDROLOGICAL CYCLE





CONCEPT OF SATURATION

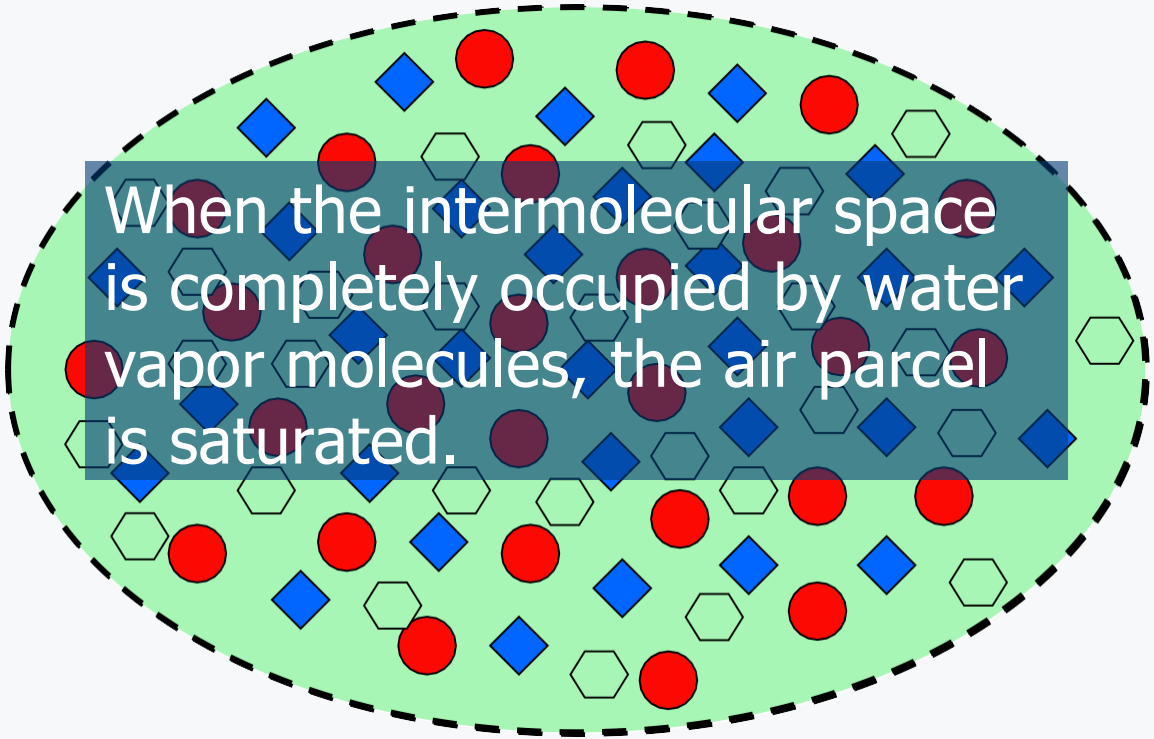


Gas molecules that make up the air

Intermolecular space

Space intermolecular

CONCEPT OF SATURATION



Gas molecules that make up the air

Intermolecular space

Space intermolecular

CONCEPT OF SATURATION

This process can be achieved in two ways:

- Air cooling: By contact or conduction with colder surfaces, by adiabatic expansion and mixing.
- Water vapour injection: By direct evaporation or mixing.

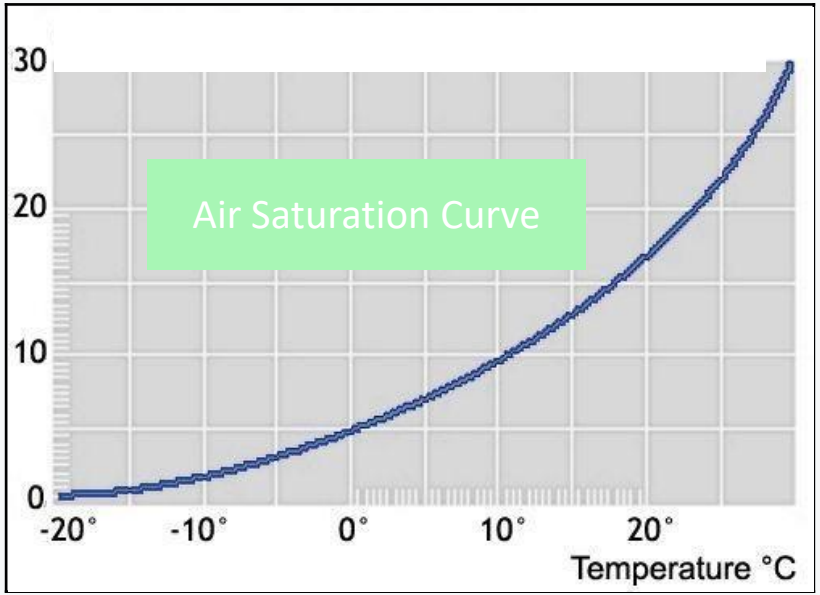
"In many of the cases these processes act simultaneously."

CONCEPT OF SATURATION

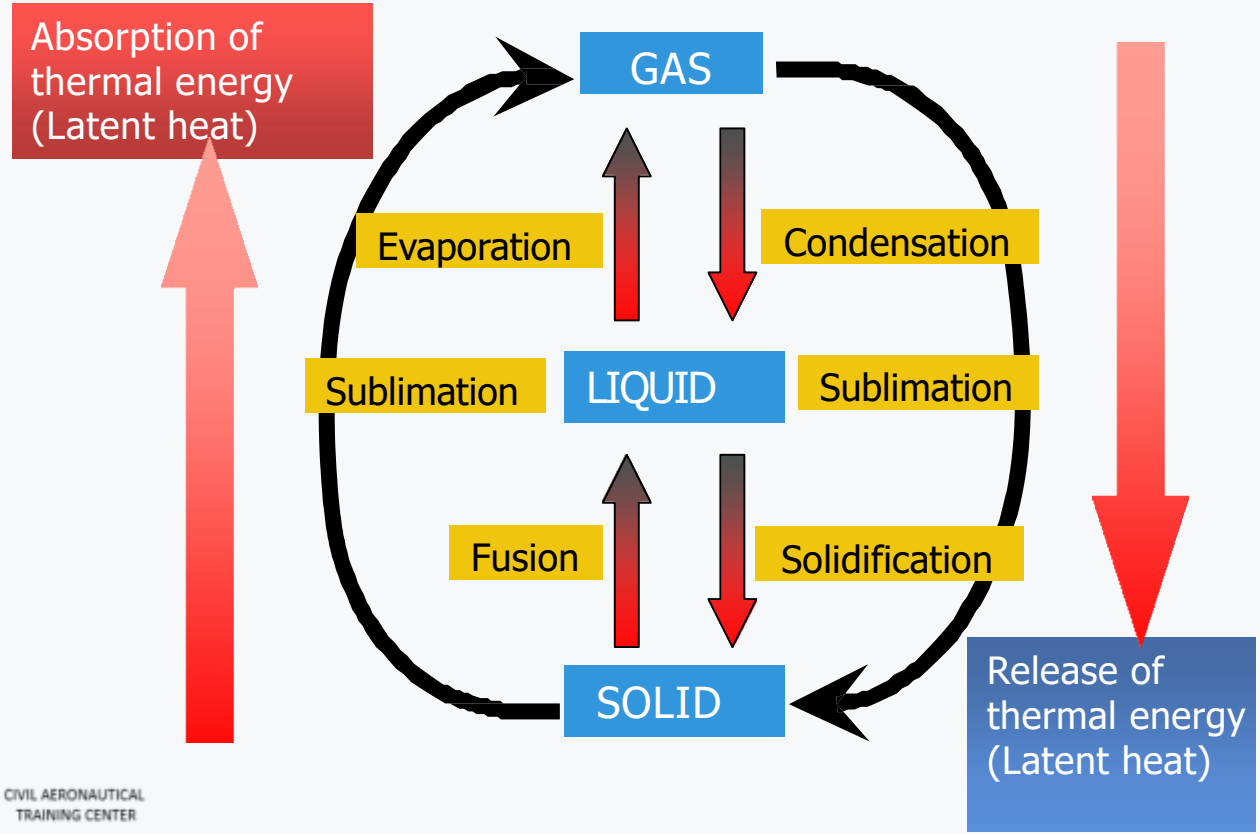
From this it can be deduced that the ability of air to contain water vapor without becoming saturated is directly proportional to its temperature. Because the density of air is inversely proportional to its temperature, and the lower it is, the higher its density increases, reducing the volume of the intermolecular space to accommodate water vapor molecules.

CONCEPT OF SATURATION

In this table we can see that the higher the temperature, the greater the amount of water vapor is necessary to achieve air saturation and vice versa.



STATUS CHANGES

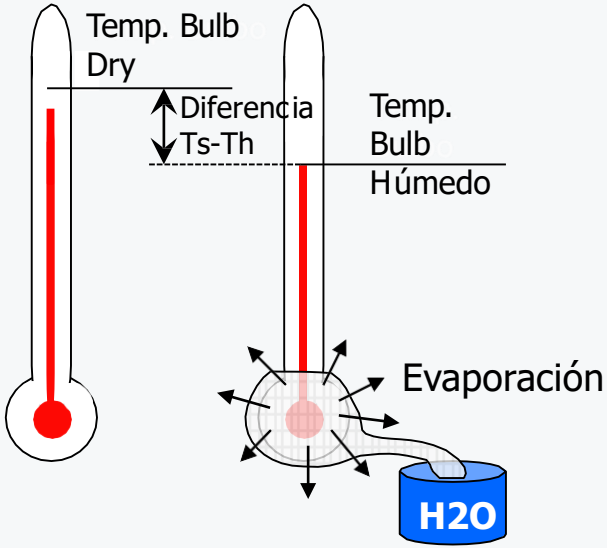


MEASURING MOISTURE CONTENT IN THE AIR

The "Mixing Ratio", expressed in Gr. H2O/m3 steam dry air; The "Relative Humidity (%) and the "Dew Point Temperature" are, among others, the variables obtained from an instrument called "Psychrometer", which is located inside the meteorological shelter.

MEASURING MOISTURE CONTENT IN THE AIR

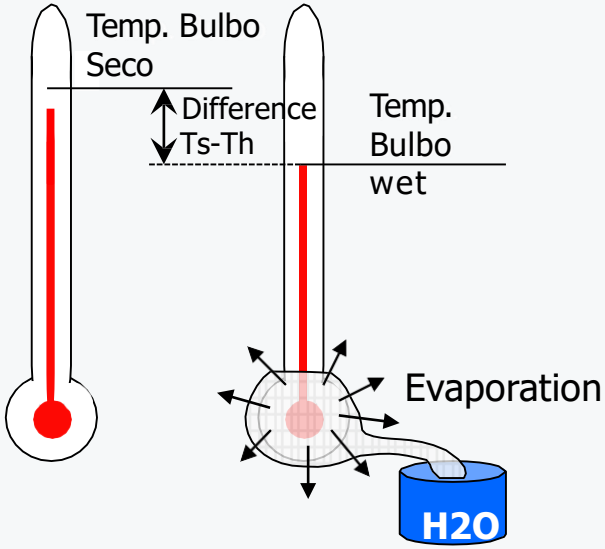
VOLCANIC ASH



Therefore, the cooling that occurs due to the absorption of energy (latent heat of evaporation) in the wet-bulb thermometer determines a certain difference with respect to the dry-bulb thermometer (air temperature).

MEASURING MOISTURE CONTENT IN THE AIR

VOLCANIC ASH



The greater the Ts-Th difference, the lower the water vapour content in the air and vice versa.

From this difference, it is possible to calculate, also considering atmospheric pressure, the different variables that determine the moisture content in the atmosphere. (Hr, Td, e, es, Mixing Ratio. etc.)

MEASURING MOISTURE CONTENT IN THE AIR

Hr=

50% T=

20ºC

This example indicates that with a certain content of water vapour in the air and at 20ºC., we should incorporate an amount of vapour equal to that contained in it, to achieve saturation of the same, keeping the temperature constant.
But if we were to modify the temperature while keeping the amount of water vapor constant, the value of the Hr would behave inversely to the temperature

MEASURING MOISTURE CONTENT IN THE AIR

Dew Point Temperature: (Td)

It is the temperature at which I must cool the air, so that it becomes saturated, keeping constant: the moisture content in the air (mixing ratio) and the atmospheric pressure.

T °C = Td°C → **100 % Hr**

METAR SAZY 011800Z 27030G34KT 9999 FEW050 FEW100 **14/M07** Q1013 = (Dry)

METAR SAEZ 011800Z 05004KT 9999 FEW040 SCT045 BKN080 **16/14** Q1020 = (Wet)

METAR SAOR 250600Z 00000KT **0800 FG** SKC **06/06** Q1024 = (Saturated)

QUESTION TIME!

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