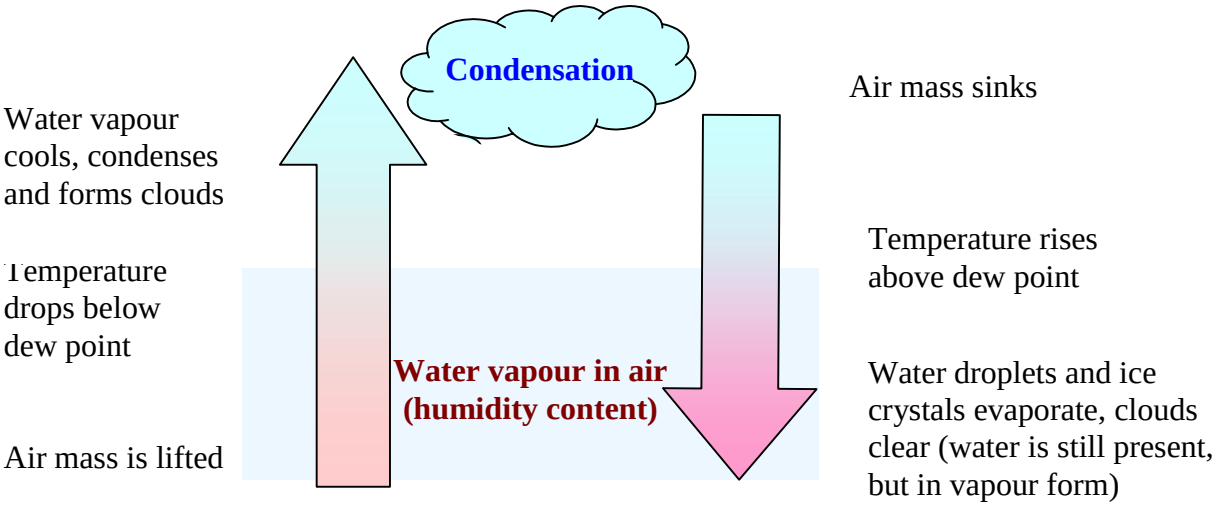
(3/10) Lift, convection, and the origin of clouds

Throughout the atmosphere, water is present in the form of vapour. The highest concentration is in the lower atmosphere. Some of that vapour condenses into suspended droplets of liquid water or tiny icy crystals even at low levels, causing fog similarly to what happens on the screen of a car

Air masses rising through the atmosphere gradually cool down. When the temperature approaches the dewpoint, water vapour starts to visibly condense out of the air, which will be filled with suspended droplets and ice crystals. At a distance, we see such air masses as clouds, and their origin is the lifting of an air mass.

Lifting can take place for other reasons, too. Thus, air masses moving horizontally may encounter an obstacle (e.g. a mountain range) that causes them to lift, sometimes forming a visible line of clouds all along the mountain range.



Clouds and rain

Clouds are local regions of the atmosphere laden with suspended drops of water and ice crystals. In an updraft, the smaller particles will be carried by the air, while larger, heavier ones will fall downwards. On the way down the water droplets may evaporate before they reach the ground, or they may freeze and form snowflakes. Ice crystals precipitating out of a cloud may grow so large that they come down as hail.

Fronts:

Major cloud formations form around low-pressure cells, forming migratory systems that typically drift eastwards. The spiral arms of a low form ‘fronts’ (curved lines of clouds that may be hundreds of kilometres in length). A front in which the advancing air masses are cooler than the air they displace is a cold front; otherwise it is a warm front. Clouds associated with warm and cold fronts are not of the same type, due to the different way air will be lifted.

Types of clouds

Clouds come in two characteristic shapes: cumulus and stratus clouds, with many variations within those groups. The former are typical of a cold front, while the latter are associated more commonly with a warm front. They are also often classified according to the level of their bases.