

Geol - meteorology and space science

[Science](#), [Physics](#)



Meteorology and Space Science The major components of dry air include argon, Oxygen and Nitrogen. 2. During a solstice(summer and winter), the earth's poles point most straightly to the sun compared to other times, therefore during the summer solstice, the north pole experiences the longest day, while the other parts experiences their shortest days. During a winter solstice, the case is the same for the South Pole experiences the same. An equinox is the time when the sun is at the same plane as the earth's equator. During the equinox, days and nights take the same time, and the time of sunrise or sunset depends on the location of the observer (Meeus 75). 3. Conduction: where heat is transferred across the direct contact of the objects. An example is the electric cooker, when a pan is placed above the hot plate. The second is convection, which takes place through the movement of liquid or solid particles from hot to cold areas, due to the expansion of particles, which leads to the loss of density. An example is the boiling of the water at the brim of a kettle, when the heater coil is powered. Radiation is the transfer of heat without any medium. The transfer takes place through electromagnetic waves, for example in the case of the heater coil used in houses (Korolev & Mazin 2957 -2960). 4. Out of the 100% radiation, 16% is absorbed by the atmosphere, 6% is reflected by the atmosphere; 3% is absorbed by clouds, 20% is reflected by the clouds and 4% is reflect by the surface of the earth, leaving 51%, which is absorbed by the earth – the oceans and the lands. 5. The North Pole is cold, and then temperatures increase to the equator. Past the equator, temperatures decline towards the cold South Pole. 6. Freezing (liquid to solid), boiling (liquid to gas), melting (solid to liquid), condensation (gas to liquid)

evaporation (liquid to gas) and sublimation (solid to gas). 7. Saturation is the point where a solution cannot take more of the solute. Relative humidity is the ratio of gaseous water in air-water mixture, relative to the water vapor level at a given temperature. Dew point is the temperature, where the vapor in air at the given pressure changes to liquid water, at a rate similar to that of its evaporation. 8. As the earth's temperatures increase, ground air containing water vapor is heated, therefore rises as it cools. Clouds are formed after the humid air is cooled beyond the critical temperature, condensing the particles into tiny particles, which combine to form droplets of water. 9. Adiabatic means the nature of a process, that takes place without the transmission of the heat of the system in question, with the immediate environment. 10. Organic lifting, convergence, frontal wedging and localized convective lifting (Tarbuck, Lutgens & Frederick 456). 11. Stable air is used to refer to the weather outlook, which is more likely to remain calm. Under such a weather outlook, it can snow or rain in a steady and slow manner; it may remain sunny, but the distinctive outlook of such a weather is that the weather will not change abruptly. On the other hand, unstable air implies the weather outlook, where weather conditions may change quickly, and without making any warnings regarding the change. Unstable air leads to the change of weather, to one where sudden and unanticipated thunderstorms are experienced (Korolev & Mazin 2957 -2960). 12. For the condensation process to take place the air containing moisture releases the water vapor it contains, releasing it to the surrounding area, which takes the form of water droplets. For the process to take place, a number of conditions are required to be present. These include that there

should be a temperature difference (gradient) between the air outside and that inside the container; there should be a center that produces moisture, and there should be a channel, using which to move through (Korolev 3374).

13. Radiation fog, which is formed during a clear night, after radiation cooling makes the temperature of the air at the surface to drop to the dew point. After reaching that point, the condensation process takes place, which results in the formation of fog. Advection fog is formed after warm and moist air passes over a cold surface horizontally, causing the air to reduce its temperature to the dew point, leading to the formation of fog. Upslope fog is formed after moist, warm air moves up a slope area, to the level of reaching the LCL (lifting condensation level), which is the point, at which the air temperature is the same as the dew point, triggering the formation of fog. Ice fog is the one formed under the surroundings, where air temperature is at levels below the freezing temperature, which makes it get compressed into very small ice particles that are suspended in the air. This form of fog is only seen in very cold areas – polar/ arctic areas. Freezing fog is the one formed after the water droplets that form the fog are cooled extremely. The extremely cooled droplets of water maintain their liquid state, to the time that they attach to a surface where they can freeze. The effects of the process include that any object, which come into the path of the fog will be covered under a layer of the ice. Precipitation fog is that which is formed after there is plenty of raining. The water released onto the surface of the earth by the rainfall evaporates into the atmosphere, saturating the air contained there already, which leads to the formation of fog. 14. The Bergeron process is an ice crystal growth process, which takes place in

mixed phase clouds – where ice and super cooled air is contained – at areas where the ambient pressure of vapor reduces between the pressure of the saturation vapor above water and the pressure of the saturation vapor above ice (Korolev 3372-3375). The pressure above water is usually higher than that above the ice, when under the same temperature environment, leading to the development of a supersaturated surrounding for ice and a subsaturated surrounding for the water. The process results in the speedy evaporation of the water, and the growth of the ice crystals, due to vapor disposition. In the case that the number density of ice is lower than that of the water, the ice crystals can enlarge to the extent that they fall away from the cloud, melting to form rain drops, particularly, in the case the lower-level temperatures are substantially warm (Korolev 3372-3375). 15. Drizzle is the gentle raining of fine, mist-like drops of water. Sleet is the precipitation comprising, generally, of partially frozen or transparent frozen rain drops. Glazing refers to a layer of compacted ice, due to freezing rain. Rime refers to the accumulation of particulate ice, at the windward side of objects, which forms after a super cooled cloud or fog – it is built on the side against the wind. Hail is a form of solid precipitation, consisting of lumps of ice. One of the lumps is called a hailstone. Works Cited Korolev, Alexei, & Mazin, Ilia. "Supersaturation of water vapor in clouds." J. Atmos. Sci. 60 (2003): 2957–2960. Korolev, Alexei. "Limitations of the Wegener–Bergeron–Findeisen Mechanism in the Evolution of Mixed-Phase Clouds". J. Atmos. Sci 64 (2006): 3372–3375. Meeus, Jean. Mathematical Astronomy Morsels. Virginia: Willmann-Bell, 1997. Tarbuck, Edward, Lutgens, Frederick, Tasa, Dennis.

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