

The Hydrologic Cycle

– involves the continuous circulation of water in the Earth–atmosphere system. Of the many processes involved in the hydrologic cycle, the most important are

- * evaporation,
- * transpiration,
- * condensation,
- * precipitation, and
- * runoff.

Evaporation

Evaporation is the change of state in a substance from a liquid to a gas. In meteorology, the substance we are concerned about the most is water. For evaporation to take place, energy is required. The energy can come from any source; the sun, the atmosphere, the earth, or objects on the earth such as humans.

Everyone has experienced evaporation personally. When the body heats up due to the air temperature or through exercise, the body sweats, secreting water onto the skin. The purpose is to cause the body to use its heat to evaporate the liquid, thereby removing heat and cooling the body. It is the same effect that can be seen when you step out of a shower or swimming pool. The coolness you feel is from the removing of bodily heat to evaporate the water on your skin.

Transpiration

Transpiration is the evaporation of water from plants through stomata. Stomata are small openings found on the underside of leaves that are connected to vascular plant tissues. In most plants, transpiration is a passive process largely controlled by the humidity of the atmosphere and the moisture content of the soil. Of the transpired water passing through a plant only 1% is used in the growth process of the plant. The remaining 99% is passed into the atmosphere.

Condensation

Condensation is the process whereby water vapor in the atmosphere is returned to its original liquid state. In the atmosphere, condensation may appear as clouds, fog, mist, dew or frost, depending upon the physical conditions of the atmosphere. Condensation is not a matter of one particular temperature but of a difference between two temperatures; the air temperature and the dewpoint temperature.

Precipitation

Precipitation is the result when the tiny condensation particles grow too large, through collision and coalesce, for the rising air to support, and thus fall to the earth.

Runoff

Runoff occurs when there is excessive precipitation and the ground is saturated (cannot absorb anymore water). This runoff flows into streams and rivers and eventually back into the sea.

Evaporation of this runoff into the atmosphere begins the hydrologic cycle over again. Some of the water percolates into the soil and into the ground water only to be drawn into plants again for transpiration to take place.