Evaporation Encyclopedia Article

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Evaporation is a geologic process that concentrates the ion solute residues in the ocean basins. At a fundamental level, evaporation is the transition of the molecule of a liquid from the liquid state to the gaseous state by diffusion from the surface of the liquid.

Driven by **solar energy**, the only significant loss of **water** from the ocean basin occurs via evaporation. As the ocean surface and atmospheric interface is small compared to the total volume of the ocean, estimates of the time a particular molecule remains in the liquid phase range in the order of thousands to tens of thousands of years before once again entering the atmosphere as part of the **hydrologic cycle**.

Because solutes (e.g., dissolved salts) from **weathering** and **erosion** are not as volatile (i.e., as easy to move into the gas or vapor phase as the water molecules, evaporation plays a significant role in the formation of many geologic features (e.g., Great Salt Lake, Dead Sea, etc.).

Evaporation is usually also responsible for the majority of the loss of water from **precipitation** and results in a high cycling of water molecules during the hydrologic cycle.

Evaporation may be driven by solar energy or be a directed process used to concentrate an aqueous solution of nonvolatile solutes and a volatile solvent. In evaporation, a portion of the solvent is vaporized or boiled away, leaving a thick liquid or solid precipitate as the final product. The vapor is condensed to recover the solvent or it can simply be discarded. A typical example is the evaporation of sea water to produce salt.

Evaporation may also be used as a method to produce a liquid or gaseous product obtained from the condensed vapor. For instance, in desalinization processes, sea water is vaporized and condensed in a water-cooled heat exchanger and forms the fresh water product.

Although evaporation can be driven by the random motion of molecules near the liquid-gas interface, the addition of heat to a system speeds the evaporative process.

See Also

Caliche; Condensation; Drainage Calculations and Engineering; Leaching; Oceans and Seas; Phase State Changes; Runoff