Water and habitable zone

The existence of liquid water, and to a lesser extent its gaseous and solid forms, on Earth are vital to the existence of life on Earth as we know it. The Earth is located in the habitable zone of the [solar system](http://en.wikipedia.org/wiki/Solar_system); if it were slightly closer to or farther from the [Sun](http://en.wikipedia.org/wiki/Sun) (about 5%, or about 8 million kilometers), the conditions which allow the three forms to be present simultaneously would be far less likely to exist.

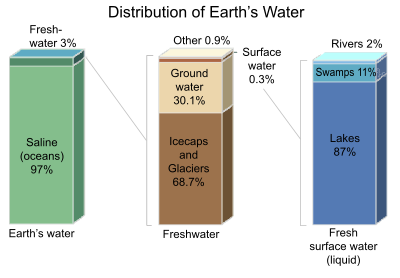
Earth's [gravity](http://en.wikipedia.org/wiki/Gravity) allows it to hold an [atmosphere](http://en.wikipedia.org/wiki/Celestial_body_atmosphere). Water vapor and carbon dioxide in the atmosphere provide a temperature buffer ([greenhouse effect](http://en.wikipedia.org/wiki/Greenhouse_effect)) which helps maintain a relatively steady surface temperature. If Earth were smaller, a thinner atmosphere would allow temperature extremes, thus preventing the accumulation of water except in [polar ice caps](http://en.wikipedia.org/wiki/Polar_ice_cap) (as on [Mars](http://en.wikipedia.org/wiki/Mars)).

The surface temperature of Earth has been relatively constant through [geologic time](http://en.wikipedia.org/wiki/Geologic_time) despite varying levels of incoming solar radiation ([insolation](http://en.wikipedia.org/wiki/Insolation)), indicating that a dynamic process governs Earth's temperature via a combination of greenhouse gases and surface or atmospheric [albedo](http://en.wikipedia.org/wiki/Albedo). This proposal is known as the [*Gaia hypothesis*](http://en.wikipedia.org/wiki/Gaia_hypothesis).

The state of water on a planet depends on ambient pressure, which is determined by the planet's gravity. If a planet is sufficiently massive, the water on it may be solid even at high temperatures, because of the high pressure caused by gravity, as it was observed on exoplanets [Gliese 436 b](http://en.wikipedia.org/wiki/Gliese_436_b)[[27]](http://en.wikipedia.org/wiki/Water#cite_note-26) and [GJ 1214 b](http://en.wikipedia.org/wiki/GJ_1214_b).

There are various theories about [origin of water on Earth](http://en.wikipedia.org/wiki/Origin_of_water_on_Earth).

Main articles: [Hydrology](http://en.wikipedia.org/wiki/Hydrology) and [Water distribution on Earth](http://en.wikipedia.org/wiki/Water_distribution_on_Earth)

[](http://en.wikipedia.org/wiki/File:Earth%27s_water_distribution.svg)

A graphical distribution of the locations of water on Earth.

Water covers 71% of the Earth's surface; the oceans contain 97.2% of the Earth's water. The [Antarctic ice sheet](http://en.wikipedia.org/wiki/Antarctic_ice_sheet), which contains 61% of all fresh water on Earth, is visible at the bottom. Condensed atmospheric water can be seen as [clouds](http://en.wikipedia.org/wiki/Cloud), contributing to the Earth's [albedo](http://en.wikipedia.org/wiki/Albedo).

[](http://en.wikipedia.org/wiki/File:The_Earth_seen_from_Apollo_17.jpg)Hydrology is the study of the movement, distribution, and quality of water throughout the Earth. The study of the distribution of water is [hydrography](http://en.wikipedia.org/wiki/Hydrography). The study of the distribution and movement of groundwater is hydrogeology, of glaciers is glaciology, of inland waters is [limnology](http://en.wikipedia.org/wiki/Limnology) and distribution of oceans is [oceanography](http://en.wikipedia.org/wiki/Oceanography). Ecological processes with hydrology are in focus of ecohydrology.

The collective mass of water found on, under, and over the surface of a planet is called the [hydrosphere](http://en.wikipedia.org/wiki/Hydrosphere). Earth's approximate water volume (the total water supply of the world) is 1,360,000,000 km3 (326,000,000 mi3).

Groundwater and fresh water are useful or potentially useful to humans as [water resources](http://en.wikipedia.org/wiki/Water_resources).

Liquid water is found in [bodies of water](http://en.wikipedia.org/wiki/Body_of_water), such as an ocean, [sea](http://en.wikipedia.org/wiki/Sea), [lake](http://en.wikipedia.org/wiki/Lake), [river](http://en.wikipedia.org/wiki/River), [stream](http://en.wikipedia.org/wiki/Stream), [canal](http://en.wikipedia.org/wiki/Canal), [pond](http://en.wikipedia.org/wiki/Pond), or [puddle](http://en.wikipedia.org/wiki/Puddle). The majority of water on Earth is [sea water](http://en.wikipedia.org/wiki/Sea_water). Water is also present in the atmosphere in solid, liquid, and vapor states. It also exists as groundwater in [aquifers](http://en.wikipedia.org/wiki/Aquifer).

Water is important in many geological processes. Groundwater is present in most [rocks](http://en.wikipedia.org/wiki/Rock_%28geology%29), and the pressure of this groundwater affects patterns of [faulting](http://en.wikipedia.org/wiki/Fault_%28geology%29). Water in the [mantle](http://en.wikipedia.org/wiki/Mantle_%28geology%29) is responsible for the melt that produces [volcanoes](http://en.wikipedia.org/wiki/Volcano) at [subduction zones](http://en.wikipedia.org/wiki/Subduction_zone). On the surface of the Earth, water is important in both chemical and physical [weathering](http://en.wikipedia.org/wiki/Weathering) processes. Water and, to a lesser but still significant extent, ice, are also responsible for a large amount of [sediment transport](http://en.wikipedia.org/wiki/Sediment_transport) that occurs on the surface of the earth. [Deposition](http://en.wikipedia.org/wiki/Deposition_%28geology%29) of transported sediment forms many types of [sedimentary rocks](http://en.wikipedia.org/wiki/Sedimentary_rock), which make up the [geologic record](http://en.wikipedia.org/wiki/Geologic_record) of [Earth history](http://en.wikipedia.org/wiki/History_of_the_Earth).