

The Big Picture

By Shawn Stevenson, Source Water Specialist

Our home is a unique place that defines us compared to our closest neighbors. I am not talking about living in a single-wide trailer or even a 3,000 square-foot home with a wrap-around porch. The home I am referring too is at a much larger scale, probably bigger than most people normally even consider. The place I am alluding to is the sphere that we all inhabit and is hurdling through space at over 67,000 miles-per-hour. Yes the place we all call home is planet Earth.

The planets are in constant motion and the distances are changing but, our closest astrological neighbors are Venus and Mars. Initially some of you reading this might think that I must be spending too much time watching reruns of the X-files. But the true intentions of this article are to provide insight to some of the aspects of water that usually aren't thought of on a daily basis.

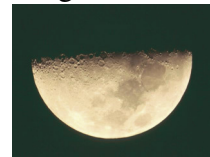
The space race has lost momentum significantly over the past several decades. Mankind has not ventured further than to our own moon as of yet. But several unmanned missions have journeyed into the cosmos over the past 10 years. The closest any craft had ever come to Mars was 250 miles aloft. At that distance NASA had the ability to take high resolution pictures of the Martian surface. Scientists were then provided with details of areas that posed even more questions once closely examined. These early orbital missions sparked theories and set scientist's beliefs into motion about specific areas of the Martian landscape and where to look for the signs of water.

The newest arrivals to the red planet were the Opportunity and Spirit Rovers on opposite sides of Mars in 2004. Their mission was to explore the Martian surface for evidence of water in the form of minerals and geologic structures. Once on the surface, the vehicles were able to closely examine the geology via samples and relay the information back. This has provided researchers hard evidence toward proving the previous existence of water. Some geographic areas did not produce the intended results and quashed several of scientist's beliefs about the locations of water. But based upon the combination of both rovers' findings, there is strong evidence of an ancient large body of water that was approximately the size of the Baltic Sea. Other

unintended areas were also examined and produced positive results in terms of the mineral identification (*National Geographic*, July 2005).

If we head back home and take a look at Earth from space. The first thing you would notice is the vast blue oceans contrasted by a varying coverage of white clouds. This distinctive visual difference from an intrastellar view clearly illustrates the Earth's unique qualities. Planet Earth is somewhat of an anomaly within our solar system. Water constitutes over 70% of the surface area of the planet in liquid form. Although named Earth; the abundance of liquid water on the surface and in the atmosphere makes the name somewhat of a misnomer.

A question that one might ponder is "What role does water play on Earth and how does it differ from neighboring worlds?" The answer to such a question cannot be truly answered as a whole. However, a discussion of some of general topics might help put the big picture into perspective no matter which neighborhood you reside in.



Water content in the atmosphere produces clouds which reflect some incoming radiation from the sun as well as helping to retain heat within the atmosphere to make temperatures reasonable. Without this **greenhouse-effect** the earth would be similar to Mars and very cold. Much of the warming here is attributed to the abundance of the most prevalent green-house gas in the atmosphere, **water vapor**.

In *overly simplified terms* the Water Cycle controls many aspects aside from providing drinkable fresh water. Water from the ocean is evaporated into the atmosphere which then forms clouds, in turn causing fresh water rain. Surface water sources are replenished and groundwater is recharged via surface water infiltration. Ocean currents with the help of heat from the sun drive our current weather patterns. Changes in the salinity and amount of fresh water within the oceans can have drastic affects on the world's climate.



In comparison to Earth, Mars has a very thin atmosphere and there is no oxygen. The atmospheric pressure is only a fraction of that on Earth



(about 1% of Earth's atmospheric pressure at sea level), and it varies greatly throughout the year. Occasionally, there are clouds in Mars' atmosphere. Most of these clouds are composed of carbon dioxide ice crystals or, less frequently, of frozen water crystals.

(Col, Jeananda Enchanted Learning
[.http://www.EnchantedLearning.com/subjects/astronomy/planets/earth/1996](http://www.EnchantedLearning.com/subjects/astronomy/planets/earth/1996)).

Venus is our closest neighbor and has an atmosphere with 30-45 ppm by volume of water vapor. The combination of average temperatures of 470* F, the weathering process of certain rocks, and release of water through volcanism supply the atmosphere of Venus with the majority of its water vapor. In its early history scientists believe that Venus had at least 0.1% as much water as Earth's oceans and plausibly much more (Donahue et al. 1982; Donahue 1995). Whether or not all of this water was lost to space or some of it was transported into its interior is still unknown (Fegley, Lodders, Zolotov, 1997).

Most of the time we think of water from the standpoint of providing a service or the regulations associated with being a water purveyor. Water is a part of our daily lives: in terms of profession, livelihood, consumption, and existence. We are dependent on water in many ways, the utmost being our health. Water is of major importance to all living things; in some organisms, up to 90 percent of their body weight comes from water. Within single cells water content ranges between 70 and 85 percent. The percentage of water in the entire body by weight varies with age, sex, and physical conditioning. Up to 60 percent of the human body is water. The brain is composed of 70 percent water, and the lungs are nearly 90 percent water. About 83 percent of our blood is water, which helps digest our food, transport waste, and control body temperature

(USGS,
<http://ga.water.usgs.gov/edu/propertyyou.html>, 2005).

Whether we consider water from the perspective of inner space or outer space the impact that it has on our lives is enormous. Water makes our world habitable; it controls the weather and sustains life on multiple levels. One common factor that all living things share is the need of water. So the next time you look to the stars, you just might think about those very thirsty little green men.