

Offered Title: Where There's Water, There's Life

Our home planet...you know...Earth, has abundant life. From viruses that require an electron microscope to be seen to whales bigger than a bus, Earth is just covered with living things. Our skin is a veritable zoological park of bacteria, yeast, even follicle mites. All normal inhabitants and even essential to our health. There are inhospitable places on Earth, hot, frozen, acrid, toxic, that harbor life. What is the common denominator? Water. It doesn't take a lot, but it does take some, a little humidity or a couple of drops. Without water some living things can survive for very long periods but will eventually die without it.

OK, Earth has lots of water and lots of life, and much of it is not dependent on sunlight. What about other planets, or their moons?

Venus's surface is too hot but carbon dioxide, sulfur dioxide, a little water vapor, and cooler temperatures in high altitude clouds might allow floating moats of bacterial life.

Mars was once thought to have intelligent life, they developed a complex system of canals, right? Well, the canals didn't exist and Mars is very, very dry on its surface. A couple of meters below the surface might be more hospitable. There are indications of long past water flows at the surface and possibly some reservoirs of water/ice below. If life exists on Mars astrobiologists are betting it is well below the surface.

Europa, one of Jupiter's moons, appears to be kind of like Earth. Iron-nickel core, rocky mantel, and lots of water. OK, no atmosphere and the surface water is a frozen crust. But due to its proximity to massive Jupiter, gravitational tugging causes Europa's surface ice to continuously flex and fracture. This produces friction and heat in the ice, and below. There is evidence for a salty liquid water ocean beneath the icy surface.

Castillo and Ganymede are also moons of Jupiter and need to be included because they also have icy crusts and subsurface oceans.

Enceladus, one of Saturn's moons, shares aspects of Jupiter's Europa. It has a thick water ice crust, subsurface ocean, and rocky interior. Enceladus also has an internal heat source toward its south pole that might be the cause of water vapor jets shooting through the thick icy crust. Some of this vapor reaches escape velocity and is the source of Saturn's E ring. Enceladus's subsurface ocean might be relatively warm.

Titan, another of Saturn's moons has rock hard water ice, a nitrogen atmosphere, and methane/ethane lakes. This is potential for pre-biotic chemistry.

There seems to be plenty of water out there but conditions are extreme, and oh yeah, maybe water isn't even required. We'll find out.

What's in the Sky?

Pre-dawn risers alert!

October 15-30, faint, long, pyramid shaped zodiacal light is visible in the east

October 20-22, The Orionid meteor shower (Halley's comet) peaks. Look toward Orion in the east.