Cosmic Origins of Space Water: Sun's Water Theory

Asteroids, particularly carbonaceous chondrites, provide crucial insights into Earth's water history and the dynamics of planetary formation. These meteorites are rich in water-bearing minerals, such as clays and hydrated silicates, as well as complex organic molecules. Formed in the outer regions of the solar system, where water ice and organic compounds remained stable, these asteroids migrated inward and impacted early Earth, playing a significant role in its development. The rocky bodies that orbit the Sun primarily in the asteroid belt between Mars and Jupiter can contain significant amounts of hydrated minerals, indicating the presence of water. Carbonaceous chondrites are especially important because their isotopic composition closely matches that of Earth's water. Interstellar dust particles, tiny grains of material found in the space between stars, can contain water ice and organic compounds, which can be incorporated into the forming solar system. As the solar system evolved, these particles contributed to the water inventory of planetesimals and eventually Earth.

Comets, long-fascinating astronomers for their spectacular appearances, also play a crucial role in delivering water to Earth. Composed of water ice, dust, and various organic compounds, comets originate from the outer regions of the solar system, such as the Kuiper Belt and the Oort Cloud. These pristine materials, remnants from the early solar nebula, offer a window into the conditions prevailing during the solar system's formation over 4.6 billion years ago. Comets, with their highly elliptical orbits, occasionally venture close to the Sun, undergoing sublimation of volatile ices and releasing gas and dust into space. The isotopic compositions of water in comets, such as Comet 67P/Churyumov-Gerasimenko studied by the Rosetta mission, differ slightly from Earth's oceans, suggesting comets may not be the sole source of terrestrial water but likely contributed significantly during early Earth's formation. The impacts of comets on Earth during the Late Heavy Bombardment period around 3.9 billion years ago are believed to have deposited significant amounts of water and volatile compounds, supplementing Earth's early oceans and creating a conducive environment for the emergence of life.

Greening Deserts founder has developed a simple theory about the main water source, called "Sun's Water Theory" which proposes that much of the space water was created by our star. According to this theory, most of the planetary water came directly from the Sun as hydrogen particles. Combining analytical skills, a deep understanding of complex systems, and simplicity, the founder of Greening Deserts formed a comprehensive understanding of planetary processes and the solar system.

Helium and Oxygen from the Sun

While hydrogen is the primary component of the solar wind, helium ions and traces of heavier elements, including oxygen, are also present. The presence of oxygen ions in the solar wind is significant because it provides another potential source of the necessary ingredients for water formation. When oxygen ions from the solar wind interact with hydrogen ions either from the solar wind or from local sources, they can form water molecules.

On the Moon, the detection of solar wind-implanted oxygen along with hydrogen further supports the hypothesis that the Sun contributes to the Moon’s surface water content. The interactions between these implanted ions and lunar minerals can lead to the production of water and hydroxyl compounds, which are then detected by remote sensing instruments.

Magnetospheric and Atmospheric Interactions

The Earth’s magnetosphere and atmosphere serve as a complex system that mediates the impact of solar emissions. The magnetosphere deflects most of the solar wind particles, but during geomagnetic storms caused by solar flares and CMEs, the interaction between the solar wind and the magnetosphere can become more intense. This interaction can lead to phenomena such as auroras and can enhance the influx of solar particles into the upper atmosphere.

In the upper atmosphere, these particles can collide with atmospheric constituents, including oxygen and nitrogen, leading to the formation of water and other compounds. This process contributes to the overall water cycle and atmospheric chemistry of the planet.

Interstellar dust particles also offer valuable insights into the origins and distribution of water across the solar system. During the early stages of the solar system's formation, the protoplanetary disk captured interstellar dust particles containing water ice, silicates, and organic molecules. These particles served as building blocks for planetesimals and larger bodies, influencing their compositions and the volatile inventory available for terrestrial planets like Earth. NASA's Stardust mission, which collected samples from Comet Wild 2 and interstellar dust particles, revealed the presence of crystalline silicates and water-bearing minerals. Analysis of these samples provides essential data on the isotopic compositions and chemical diversity of water sources within the solar system.

Solar Wind and Solar Hydrogen

The Sun's Water Theory proposes that a significant portion of Earth's water originated from the Sun, delivered in the form of hydrogen particles through the solar wind. The solar wind, a stream of charged particles primarily composed of hydrogen ions (protons), constantly flows from the Sun and interacts with planetary bodies. When these hydrogen ions encounter a planetary surface, they can combine with oxygen to form water molecules.

This process has been observed on the Moon, where hydrogen ions implanted by the solar wind react with oxygen in lunar rocks to produce water. Similar interactions could have occurred on early Earth, contributing to its water inventory. The study of solar wind interactions with planetary bodies, using missions like NASA's Parker Solar Probe and ESA's Solar Orbiter, provides valuable data on the potential for solar-derived water formation.

Theoretical Models and Simulations

Advanced theoretical models and simulations can play a crucial role in understanding the processes that contribute to water formation and distribution in the solar system. Models of planetary formation and migration, such as the Grand Tack Hypothesis, suggest that the movement of giant planets like Jupiter and Saturn influenced the distribution of water-rich bodies in the early solar system. These models help explain how water from the outer regions of the solar system could have been delivered to the inner planets, including Earth.

Simulations of solar wind interactions with planetary surfaces provide insights into the mechanisms through which solar hydrogen could contribute to water formation. By replicating the conditions of the early solar system, these simulations help scientists estimate the contribution of solar-derived hydrogen to Earth's water inventory.

The journey of water from distant cosmic reservoirs to Earth has profoundly impacted our planet's history and its potential for life. Comets, asteroids, and interstellar dust particles each provide unique insights into the early solar system's dynamics, delivering water and volatile elements that shaped Earth's geology and atmosphere. Ongoing research, advanced space missions, and theoretical advancements continue to refine our understanding of water's cosmic origins and its broader implications for planetary science and astrobiology. Future studies and missions will further explore water-rich environments within our solar system and the search for habitable exoplanets, illuminating the significance of water in the quest to understand life's potential beyond Earth.

Theoretical models and simulations offer insights into the processes that shaped Earth's water reservoirs and the distribution of volatiles. The Grand Tack Hypothesis suggests that the migration of giant planets, like Jupiter and Saturn, influenced the orbital dynamics of smaller bodies, including comets and asteroids. This migration could have directed water-rich objects from the outer solar system toward the inner regions, contributing to the volatile content of terrestrial planets. The Late Heavy Bombardment period, characterized by intense comet and asteroid impacts around 3.9 billion years ago, likely delivered significant amounts of water and organic compounds to Earth, shaping its early atmosphere, oceans, and potentially the prebiotic chemistry necessary for the emergence of life.

Understanding the origins of Earth's water involves exploring the primary space sources that delivered water to our planet. The main hypotheses focus on contributions from comets, asteroids, and interstellar dust particles. Each of these sources has been the subject of extensive research, providing valuable insights into the complex processes that brought water to Earth. Comets, originating from the outer regions of the solar system, such as the Kuiper Belt and the Oort Cloud, are composed of water ice, dust, and organic compounds. When comets approach the Sun, they heat up and release water vapor and other gases, forming a visible coma and tail. Comets have long been considered potential sources of Earth's water due to their high water content.

The Sun's Contribution to Earth's Water

Continued exploration and research are essential to validate and refine the Sun's Water Theory. Future missions targeting the analysis of solar wind interactions with planetary bodies, along with advanced laboratory experiments, will provide deeper insights into this process. The integration of data from these endeavors with theoretical models will enhance our understanding of the origins and evolution of water in the solar system.

Recent research in heliophysics and planetary science has begun to shed light on the potential role of the Sun in delivering water to planetary bodies. Studies of lunar samples, for instance, have revealed the presence of hydrogen implanted by the solar wind. Similar processes might have occurred on early Earth, especially during periods of heightened solar activity when the intensity and frequency of solar wind particles were greater. This hypothesis aligns with observations of other celestial bodies, such as the Moon and certain asteroids, which exhibit signs of solar wind-implanted hydrogen.

Solar winds, composed of charged particles primarily hydrogen ions (protons), constantly emanate from the Sun and travel throughout the solar system. When these particles encounter a planetary body, they can interact with its atmosphere and surface. On early Earth, these interactions might have facilitated the formation of water molecules. Hydrogen ions from the solar wind, upon reaching Earth's surface, could have reacted with oxygen-containing minerals and compounds, leading to the gradual accumulation of water. This process, although slow, would have occurred over billions of years, contributing to the overall water inventory of the planet.

Theoretical models simulate the early solar system environment, including the flux of solar wind particles and their potential interactions with Earth. By incorporating data from space missions and laboratory experiments, these models help scientists estimate the contribution of solar-derived hydrogen to Earth's water inventory. The isotopic analysis of hydrogen in ancient rocks and minerals on Earth offers additional clues. If a significant portion of Earth's hydrogen has isotopic signatures consistent with solar hydrogen, it would support the idea that the Sun played a crucial role in water delivery.

The Sun's Water Theory proposes that a significant portion of Earth's water originated from the Sun, delivered in the form of hydrogen particles. This hypothesis suggests that solar hydrogen combined with oxygen present on early Earth to form water. By examining the isotopic composition of hydrogen on Earth and comparing it with solar hydrogen, scientists can explore the validity of this theory. Understanding the mechanisms through which the Sun might have contributed to Earth's water inventory requires a deep dive into the processes occurring within the solar system and the interactions between solar particles and planetary bodies.

This theory also has implications for our understanding of water distribution in the solar system and beyond. If solar-derived hydrogen is a common mechanism for water formation, other planets and moons in the habitable zones of their respective stars might also possess water created through similar processes. This widens the scope of astrobiological research, suggesting that water, and potentially life, could be more widespread in the universe than previously thought.

To further investigate the theory, scientists should employ a combination of observational techniques, laboratory simulations, and theoretical models. Space missions designed to study the Sun and its interactions with the solar system, such as NASA's Parker Solar Probe and the European Space Agency's Solar Orbiter, provide valuable data on solar wind properties and their effects on planetary environments. Laboratory experiments replicate the conditions of solar wind interactions with various minerals and compounds found on Earth and other rocky bodies. These experiments aim to understand the chemical reactions that could lead to water formation under solar wind bombardment.

The Sun's Water Theory for Space and Planetary Science

Understanding the origins of Earth's water not only illuminates the history of our planet but also informs the search for habitable environments elsewhere in the universe. The presence of water is a key factor in determining the habitability of a planet or moon. If solar wind-driven water formation is a common process, it could significantly expand the number of celestial bodies considered potential candidates for hosting life.

The study of water's cosmic origins also intersects with research on the formation of organic compounds and the conditions necessary for life. Water, in combination with carbon-based molecules, creates a conducive environment for the development of prebiotic chemistry. Investigating the sources and delivery mechanisms of water helps scientists understand the early conditions that might lead to the emergence of life.

The exploration of water-rich environments within our solar system, such as the icy moons of Jupiter and Saturn, is a priority for upcoming space missions. These missions, equipped with advanced instruments capable of detecting water and organic molecules, aim to uncover the secrets of these distant worlds. Understanding how water arrived on these moons and its current state will provide crucial insights into their potential habitability.

The quest to understand water's role in the universe extends to the study of exoplanets. Observations of exoplanets and their atmospheres using telescopes like the James Webb Space Telescope (JWST) enable scientists to detect signs of water vapor and other volatiles. By comparing the water content and isotopic compositions of exoplanets with those of solar system bodies, researchers can infer the processes that govern water distribution in different planetary systems.

Most of the water on planet Earth has very probably been emitted from the sun as hydrogen. It may be unimaginable to many how so much hydrogen has reached the Earth from the sun. In the millions of years of Earth and solar history, there have certainly been much larger solar eruptions and flares than humans have yet recorded. CMEs and solar winds can transport solid matter and many particles. The theory can be proven by ice samples!

Laboratory experiments and computer simulations continue to play a vital role in this research. By recreating the conditions of early solar system environments, scientists can test various hypotheses about water formation and delivery. These experiments help refine our understanding of the chemical pathways that lead to the incorporation of water into planetary bodies.

In summary, the study of water's origins on Earth and other celestial bodies is a multidisciplinary endeavor involving space missions, laboratory research, theoretical modeling, and observations of exoplanets. The integration of these approaches provides a comprehensive understanding of water's cosmic journey and its implications for planetary science and astrobiology. Continued exploration and technological advancements will further unravel the mysteries of water in the universe, guiding the search for life beyond our planet.

Solar Flares and Coronal Mass Ejections

Solar flares are intense bursts of radiation and energetic particles caused by magnetic activity on the Sun. Coronal mass ejections (CMEs) are massive bursts of solar wind and magnetic fields rising above the solar corona or being released into space. Both solar flares and CMEs release significant amounts of energetic particles, including hydrogen ions, into the solar system.

When these high-energy particles reach Earth or other planetary bodies, they can induce chemical reactions in the atmosphere and on the surface. The energy provided by these particles can break molecular bonds and initiate the formation of new compounds, including water. For instance, on Earth, the interaction of energetic solar particles with atmospheric gases can produce nitric acid and other compounds, which then precipitate out as rain, incorporating into the hydrological cycle.

Solar Hydrogen and Water-Causing Emissions from the Sun

The Sun, as the central star of our solar system, plays a pivotal role in the dynamics and chemistry of surrounding planetary bodies, including Earth. One particularly intriguing area of research involves the contribution of solar hydrogen and other emissions from the Sun to the formation and distribution of water in the solar system. This includes the processes through which solar wind, solar flares, and other solar activities potentially deliver hydrogen and create water molecules on planetary surfaces.

Solar Radiation and Photodissociation

Solar ultraviolet (UV) radiation plays a crucial role in the chemistry of planetary atmospheres. In the context of water formation, UV radiation can photodissociate water vapor into hydrogen and hydroxyl radicals. These radicals can then recombine in different ways, potentially leading to the formation of new water molecules. While photodissociation primarily breaks down water, the subsequent chemical interactions in the presence of abundant solar radiation can contribute to a dynamic cycle of water formation and destruction. In the upper atmospheres of planets and moons, UV radiation can drive the photochemistry that influences the overall water budget. For example, in the thin atmospheres of Mars and some icy moons, the interaction of solar UV radiation with surface and atmospheric molecules can lead to a complex interplay of water-related chemistry.

Theoretical Models and Simulations

Simulations of solar-induced water formation can also explore various scenarios, such as the effects of planetary magnetic fields, surface composition, and atmospheric density on the efficiency of water production. These models provide valuable predictions that guide future observations and experiments, helping to refine our understanding of solar-induced water formation.

The development of sophisticated theoretical models and simulations is essential for predicting and explaining the processes through which solar hydrogen contributes to water formation. Models of solar wind interactions with planetary surfaces, incorporating data from laboratory experiments and space missions, help scientists understand the dynamics of these interactions under different conditions.

The expanded theory that the Sun is a primary source of water in the solar system through solar hydrogen emissions provides a comprehensive framework for understanding water's origins and distribution. This theory integrates multiple processes, including solar wind implantation, solar flares, CMEs, UV radiation-driven photochemistry, and the contributions of comets and asteroids. By exploring these processes through space missions, laboratory experiments, and theoretical modeling, scientists can unravel the complex interactions that have shaped the water content of planets and moons. This understanding not only enhances our knowledge of planetary science but also informs the search for habitable environments and potential life beyond Earth. The Sun's role in water formation is a testament to the interconnectedness of stellar and planetary processes, highlighting the dynamic and evolving nature of our solar system.

The influence of the Sun on planetary water cycles extends beyond direct hydrogen implantation. Solar radiation drives weathering processes on planetary surfaces, releasing oxygen from minerals that can then react with solar hydrogen to form water. On Earth, the interaction of solar radiation with the atmosphere contributes to the hydrological cycle by influencing evaporation, condensation, and precipitation processes.

The initiator of the theory has spent many years researching and studying the nature of things. He made a great discovery in early summer and documented the creation and forming process of a new element, a hydrogen-like material, he calls it "Sun Granulate". A scientific name for the substance was also found, it's Solinume. The **Sun's Water Theory** was formed and developed by Greening Deserts founder, an independent researcher and scientist collective from Germany.

This article is a final draft, scientific publication and very important paper for further studies on astrophysics and space exploration. We researchers believe that many answers can be found in the polar regions. This is also a call to other sciences to explore the role of space water and to reconsider all findings on planetary water bodies and space water, especially Arctic research and studies on ancient ice. A big thank you goes to all colleagues, family members, friends, researchers and scientists. Anyone can use the findings, ideas and research for educational, historical and scientific research, historical and scientific research - but please cite this study and theory.

There is plenty of room and lots of space here for comments, good ideas, notes and scientific findings. Feel free to send constructive feedback and useful tips to protonmailsunswater.