

# Sample research paper on exploration on mars

[Environment](#), [Water](#)



## **Introduction**

In 1975, two planetary exploration missions named Vikings 1 and 2 were launched to study the surface and atmosphere of Mars. These two missions were launched with only a few weeks apart from each other; the first on August 20, 1975 while the second on September 9 of the same year. Both of the missions had two parts: a lander and an orbiter. The plan of the missions was that as the orbiter orbits around Mars taking pictures and other data, the lander studies the Martian surface from the ground. With the program's total budget of a staggering 1 billion dollars, the Viking program was an ambitious mission designed to establish further knowledge about Mars and discover the secrets the planet may have (L. N. Ezell, E. C. Ezell, NASA & Space, 2012).

The Viking program was considered highly successful. However, the success of the program was seen on its influence to future exploration programs. The findings of the landers provided most of our knowledge of Martian surface, however, what is most astonishing about the program was the discovery of the orbiters. The orbiters provided us with pictures with stunning features that are assumed to be made by the existence of flowing water (L. N. Ezell, E. C. Ezell, NASA & Space, 2012). Due to this discovery, more and more programs were planned and proposed to study Mars. Thus, the race of discovering new proofs of the existence of water in the Martian surface began.

In this paper, the reason why the discovery of geologic features that may have been caused by flowing water by the Viking programs led to an increase in the activity of Mars exploration will be explained. Moreover, recent programs have provided us further clues whether water was or is

present on Mars. Thus, this paper will discuss the recent discoveries and provide a brief explanation how water may be associated with these discoveries. Lastly, since the existence of water is associated with a possibility of life, there will be a brief discussion whether life on Mars has been detected.

## **The Vikings Program**

The year 1976 was a highly celebrated year for scientists and researchers interested in studying Mars. It was in this year when the two Viking missions reached their planet destination. The landers of the program had a contact with the Martian surface while the orbiters remained in orbit. Both missions were to study the surface, atmosphere and other aspects of the Martian planet (L. N. Ezell, WSN, E. C. Ezell & NASA, 2012).

As the landers study the Martian surface on the ground, the orbiters were taking pictures on a close distance from pole to pole with a relatively high detail. When the photographs were sent back to Earth and analyzed, the specialists at NASA were astonished. The photographs of the southern hemisphere of the Martian planet contained a vast network of eroded channels and basins. These were clues that water existed in the history of the planet (L. N. Ezell, WSN, E. C. Ezell & NASA, 2012).

Upon the discovery of the evidences that support the claim that water existed on the surface of the Martian planet, theories began to appear how water shaped the surface of the planet and how the abundance of water is not visible today. Thus, to prove these claims, many proposed future explorations on Mars. The necessity to prove these theories can be attributed to the idea that Mars and Earth had a similar environment,

however, Mars remained its environment for a few billions of years (Munro, 2013). Therefore, the study of the Martian planet may provide us insights about how the Earth might have been few billion years ago.

Moreover, the features discovered by the Vikings missions were associated with water. However, water is not visible on the surface of Mars. Therefore, there is a need for Mars explorations to look for the “ missing” water or clues where all those water went.

Lastly, the discovery of the evidence that water may be present on Mars heightened the possibility of life on the planet. The reason for this lies in the idea that water is a crucial factor in the emergence of life. Therefore, the abundance of explorations on Mars could be to look for evidences of the existence of life on the Martian planet.

## **Water on Mars**

Most of the explorations on Mars focused on the discovery of water or further evidences that support the claim that water existed on Mars. Recent discoveries have provided us further knowledge about the Martian planet.

For example, an examination of sedimentary rock outcrops at the Yellowknife Bay in Gale Crater found an interesting discovery. The analysis of the sedimentary rock outcrops was done by the researchers from the Mars Science Laboratory Curiosity rover mission of NASA. The researchers discovered from the examination of the mudstones that the 150-kilometer impact basin may have at least a lake more or less than 3.6 billion years ago. The analysis of mudstones revealed that the lake was pacific. This is because mudstones are formed by sediments creating layers and layers on top of each other and that they are formed in calm and still waters. What's

more interesting is that the lake's composition was perfectly suitable for microorganisms (Smith, 2013).

Another discovery associated with the discovery of water on Mars was made by the Curiosity rover on September 2013. An analysis of a rock named as Jack\_M using the Alpha Particle X-ray Spectrometer confirmed that the Martian surface contains traces of water. More specifically, approximately 2% of the Martian surface is made up of water particles. This discovery of the composition of the Martian surface raises the possibility of water underneath the surface (Munro, 2013).

Another discovery important to the study of the Martian planet is the composition of its atmosphere. There have been lots of missions aimed to conclude the composition of the atmosphere, and many stumbled upon the abundance of water vapor. Some of the programs that studied the water vapor in the atmosphere of Mars were Mars Global Surveyor (MGS), Mars Express, Mars Reconnaissance Orbiter (MRO), Mars Pathfinder, the Mars Exploration Rovers and Phoenix missions. Some of these programs studied the atmospheric water-cycle while some collected measurements at the surface (Esposito et al, 2011). All the findings agree that the water vapor level varies with the latitudes and the seasons.

## **Possibility of Life on Mars**

The possibility that life could have emerged in Mars appeared way before man sent a probe to Mars. As observed using terrestrial telescopes, Mars seemed to have ice on its poles. As the possibility that water may be present on Mars comes the possibility that Mars could sustain life. However, until now, there have been no evidence of life on Mars. Instead, there are tons of

discoveries suggesting that Mars had an environment where life could thrive in. Nonetheless, explorations must still continue in exploring the Martian planet looking for the existence of life. The reason lies in the idea that if another body in the solar system had an environment where life emerged, then we really are not alone.

## **Summary**

In summary, the ideas presented on this paper focused on the exploration on Mars associated with the discovery of water and its connection with the possibility of life. First the paper discussed the reason why there was an increase in the activity of Mars exploration programs since the Vikings program. The Vikings missions in 1975 provided humanity with a shocking evidence that water was not just present on Mars surface, but was abundant. The eroded river channels and basins revealed a wetter and warmer past of the Martian planet. Needless to say, following the success of the Vikings mission were many programs proposed to explore and provide information about the water on Mars. Recent discoveries support the claim that water existed on the surface of Mars, while some provided us with assumptions that Martian surface and atmosphere is still abundant with water, thus, increasing the possibility that life may have emerged on Mars. However, there is no evidence that life exists on Mars.

## **References:**

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