
Introduction: The Atlantis basin (Fig. 1) is a depression of about 225 kilometers in diameter located at Terra Sirenum, at the martian highlands, centered at 35°S, 177°W. This basin, together with others like Gorgonum basin, forms the East side of the region that could be covered by the water of the ancient Eridania Lake [1] [2] that was the source of water of Ma’adim Vallis [1] [2]. The existence of tectonic, sedimentary, erosive and volcanic features in this site are indicative of the complex geologic and hydrological history of this martian basin. To have a better knowledgement of the geological history of this region is the objective of the geomorphologic map of the Atlantis basin here showed (Fig. 2).

Fig. 1: Mosaic of Viking images of the Atlantis basin region used like mapping base for the geomorphologic cartography.

Data and methodology: The geomorphologic map of the Atlantis basin (between 30-40°S and 172-182°W) was elaborated by means of Illustrator® software and with a mosaic of Viking images. Contact between the different units was elaborated thanks to individual Viking images and high and medium resolution MOC (Mars Orbiter Camera sensor on board of Mars Global Surveyor spacecraft) and THEMIS (Thermal Emission Spectrometer on board of Mars Odyssey spacecraft) images. The topographic maps derived of MOLA (Mars Orbiter Laser Altimeter on board of ars Global Surveyor spacecraft) data were used too.

Geomorphologic cartography: Five main geomorphologic units were mapped in the Atlantis basin region according to its relief, features and erosive stage. In this way, the preliminary named like Unit 1 represent the most eroded surface with more impact craters and with some channels excavated. Secuencially the next units represent less eroded surfaces with a minor abundance of impact craters. The altimetric distribution of that five units is clearly marked. Unit 1 is located at higher altitude regions and Unit 5 takes up the interior of the Atlantis basins and other small surrounding basins of the study area. The origin of most of these units seems to be volcanic and sedimentary [3].

Other secondary geomorphological units were mapped too. These units have different origin and geological interpretations. Unit 6 represent the chaotic terrains, including Atlantis Chaos, and they are located inside the depressions of the studied area. The most important extension of this unit is the Atlantis Chaos. Unit 7 are located most of the impact basins of this area, and they could have different origins: sedimentary, volcanic or eolian. Unit 8 is located inside few impact craters and around some of the chaotic terrains of this area. The morphology of this unit and its altimetric distributions could indicate that they were originated by mud-flows.

Together this main and secondary geomorphological units, other features with different origins were mapped in the Atlantis basin region. Volcanic edifices and volcanic flows, tectonic structures like graben systems, faults, lineations and ridges, impact craters and dissected terrains complete this geomorphologic map.

Conclusions: The geomorphologic cartography of the Atlantis basin and a future detailed analysis of each geomorphologic units will made possible to have a deeper knowledgement of how could be the hydrological evolution of the Eridania lake [1] [2] [4] and its implications at the geologic evolution of this region and of the martian climate.
