
Introduction The objective of studying Amphitrites Patera in Highland Patera is to gain an understanding of the volcanic history and conduct a geologic overview through the analysis of its surface features. This area was chosen as it represents explosive eruptions on Mars.

Methods All mapping was created on the application Adobe Illustrator CS4. The base map was created with THEMIS VIS images taken from the application Java Mission-planning and Analysis for Remote Sensing (JMARS). Following the collation of the base map, higher resolution imagery was added, in the form of MOC and HIRISE images.

JMARS was used for any measurements and analysis of the surface. The base map was created by collecting THEMIS images from JMARS. Furthermore, JMARS was utilized to create numerous topographic profiles.

Geologic Setting Amphitrites Patera is located in the southwestern Hellas Basin at 60.25°E, 60.125°S. Amphitrites Patera's caldera spans approximately 120 kilometers. It is located in the northern area of the Circum Hellas volcanic region, which also includes the following volcanoes: Tyrrhena, Hadriaca, Peneus, Malea, and Pityusa Patera.[1] The Circum Hellas region contains the oldest central vent volcanoes, which were all formed between 4.0 and 3.6 Ga.[1]

Mapping: The primary map units consist of the caldera, explosive deposits, and a surficial layer. The caldera spans approximately 120 kilometers in all directions. Explosive deposits cover much of the entire map.

One of the main impediments to the research was the surfical layer (pictured below). The surficial layer is an easily-erodable layer with a swiss-cheese like surface. It covers much of the maps and impedes direct observation of true surface features.

Geologic History: Amphitrites Patera’s observable history begins with an era of prolonged, explosive activity represented by the outer caldera. Following is a second era of explosive eruptions, represented by the smaller, inner caldera. Throughout Amphitrites Patera’s observable history, there is little evidence of effusive eruptions. However, the surficial layer impedes direct observation, and it could potentially cover much effusive activity.

Discussion: Amphitrites Patera likely does not contain much effusive activity, rather the analysis of the imagery suggests that it consists of explosive eruptions. This contrasts prior findings, by Williams et al. (2009), that suggested Amphitrites Patera had collapsed lava tubes, which would be suggestive of effusive activity [1]. This is consistent with prior findings of explosive activity [2].

Geologic Map:

Blue Shading: Surficial Layer, Black dotted line: Change In Morphology