

UNDERSTANDING THE OLYMPUS MONS AND VALLES MARINERIS USING THEMIS IMAGERY. S. Mena-Fernandez, H. Xie.

To better understand Mars' geological features, water resources, possible life, and climate aspects, several spacecrafts such as the Mars Global Surveyor, Mars Express and Mars Odyssey had been launch into space. The latter, carries a sensor called Thermal Emission Imaging System (THEMIS), which combines a 5-band visible subsystem (VIS) and a 10-band infrared (IR) subsystem with 19m, 100m pixel resolution, respectively. This study aims at developing methods to eventually assess Mars' mineral and rock composition through the case study of the Olympus Mons and Valles Marineris from THEMIS image analysis. ISIS 3.0 software was utilized to transform individual THEMIS QUEB files to Cub and from Cub to Tiff files. Then, these Tiff images were brought to ENVI for further processing and analyses. All analyses will be based on three geophysical parameters of the two study areas: temperature, radiance, and emissivity. The spectral emissivity of materials in the two areas will be compared with the Earth's mineral library. This will allow us to finally understand the rock and mineral composition of the Mars surface and the geological and tectonic processes that Mars experienced. Initial results indicate that the temperatures are slightly different between the Olympus Mons (-27°F to 4°F) and the Valles Marineris (-28 to 9 °F), while the spectral radiance of materials in the two areas are obviously different. Further data processing and analyses are still in progress.