

INVESTIGATION OF THE DISTRIBUTION AND CHARACTERISTICS OF IONIAN PATERAE USING A RELATIONAL DATABASE.

Q. Zhang, J. Radebaugh, E.P. Turtle, L.P. Keszthelyi, M.P. Milazzo, W.L. Jaeger, and A.S. McEwen,

Introduction: In recent years the Galileo spacecraft has returned numerous images of Io's volcanic paterae, ranging in resolution from ~10 m/pixel to a few km/pixel [1,2]. Based on these observations, Radebaugh et al. [2] estimate that there are ~500 paterae on Io. The Galileo data make it possible to perform an extensive statistical analysis of the paterae. Systematic variations in spatial distribution, size, and association with other tectonic features will provide insight into patera formation and Io's interior processes. In support of such a study we are gathering quantitative information about the paterae, e.g. their dimensions, area, orientation, and roundness, to generate a relational database. This database will be the foundation of a statistical analysis to investigate variations in patera distribution, sizes, and orientations and their implications.

Methodology: We have begun analyzing the 1.3 km/pixel global color mosaic of Io acquired by Galileo on July 3, 1999 during the C21 flyby. This mosaic is centered at 0.3° north latitude and 137.5° west longitude. Taken using the near-infrared (756 nm), green and violet filters of the SSI camera, this mosaic is the highest resolution global observation currently available. In an attempt to minimize any distortion of measured areas and angles we tested

various projection methods and chose to use Lambert

azimuthal equal-area projections centered on areas of interest. We divided the mosaic into 12 horizontal slices, each 15° wide. Sample measurements made on each slice demonstrate that the discrepancies at regions where the slices overlap are less than 0.2%.

Within each slice the boundaries of each patera are traced. NIH Image will be used to analyze the results to generate lists of the patera characteristics for each slice. These will

then be combined and any duplicates will be used to determine the level of uncertainty in

measurement accuracy and removed. The final list will be incorporated into an Oracle DB database for which MySQL software will be written to facilitate analysis of global variations in the patera characteristics. Access to this database will be made available to all project collaborators, via a web interface. In addition, this site will be designed to be accessible by the general public.

References: [1] McEwen A.S. et al. (2000) *Science*, 288, 1193-1198. [2] Radebaugh et al. (2001) *JGR-Planets*, 106, 33,005-33,020.