

GALILEO IMAGING OBSERVATIONS OF THE LEADING AND TRAILING HEMISPHERES OF EUROPA

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We have combined 93 Galileo images at ~220 meters/pixel resolution to produce two mosaics of the leading and trailing hemispheres of Jupiter's moon, Europa. The leading hemisphere mosaic covers ~75N to ~82S, centered around 75W; the trailing hemisphere mosaic covers ~80N to ~57S, centered around 225W. These mosaics are being used to map the geology of Europa, and to relate variations in morphology and structure to global models of lithospheric thickness, tidal deformation and non-synchronous rotation. Preliminary results indicate that the surface of Europa is very different in these two hemispheres. First, the equatorial region of the leading hemisphere is dominated by chaos terrain (fractured crustal blocks that have been rotated and translated). In contrast, the equatorial region of the trailing hemisphere is not dominated by a single material unit, but rather contains a combination of plains, band, and chaos materials. Based on the positions of these mosaics relative to global lithospheric thickness models, regions dominated by chaos terrain may be associated with a slightly thinner lithosphere than regions of plains material. Second, the orientation of ridges and bands at high latitudes in the leading hemisphere are consistent with the global stress field derived from tidal deformation and non-synchronous rotation models. However, in the trailing hemisphere there are many large bands that are inconsistent with the stress field, including Agenor Linea at ~42S and bands in the Wedges region at ~15S. This region appears to have had a complex geologic history, and is a focus of our geologic mapping.