



Characterizing charged particle weathering of Europa's surface by location and depth

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The Galilean moon Europa exists in an intense radiation environment, which leads to the weathering of its surface by photons and charged and neutral particles. These processes contribute to the formation of a thin (μm to m) regolith layer. We examine how weathering by energetic charged particles contributes to the formation of this layer. In particular, we focus on the asymmetric nature of their bombardment at energies ranging from 100 keV to 25 MeV. At these energies, electron bombardment occurs predominately on Europa's trailing hemisphere, with 100 keV electrons confined to latitudes equatorward of 65° and 10 MeV electrons confined to latitudes equatorward of 40° . Here we describe the effects of this bombardment, with location and depth, as it relates to the chemistry and astrobiological potential of Europa's surface. Using this information we draw connections to goals for the next and future missions to Europa, including potential landing site selection.