Identification of Albedo Variegations on Asteroid Surfaces Through Comparisons Between Optical and Infrared Datasets

Nowinski, Jack (School: Academies of Loudoun)

One of the leading problems plaguing optical asteroid research is the presence of albedo variegations: areas on the surface of the asteroid that reflect light incongruously due to differing surface properties. The effect and presence of these variegations can often be misinterpreted, impacting conclusions drawn from optical asteroid studies. Infrared asteroid measurements in the w1(3.4μm) and w2(4.6μm) bands are far less affected by these albedo variegations. Thus, a comparison between the infrared and optical datasets of asteroids should yield evidence to determine the presence of these surface imperfections. Using infrared asteroid data from NASA's NEOWISE data release, Lomb-Scargle periodograms and subsequent infrared lightcurves were generated for ten asteroids. Each asteroid's infrared lightcurve was then compared against the established optical curve listed by the Minor Planet Center's Lightcurve Database. Substantial evidence to suggest the presence of albedo variegation on the surface of asteroid 349 Dembowska was discovered. This discovery indicates that it is indeed feasible to discover surface imperfections through the use of optical-infrared data comparisons.

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