



A Geophysical Definition for 'Planet'

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The operational components of the Prague definition for planet passed at the IAU General Assembly last August provide no insight into the intrinsic characteristics of the objects they seek to define. This definition is rooted in a dynamical perspective which considers objects as point sources, distinguishable only by their effects on the motions of other objects. An alternative perspective arises from decades of robotic exploration of the solar system revealing increasingly detailed information about geophysical and atmospheric processes associated with planetary bodies as well as Earth. This has resulted in the inexorable merging of planetary science and terrestrial science. In fact, a sampling of society memberships suggest that today more planetary scientists belong to professional geophysical societies than astronomical societies. A slight modification of the definition initially proposed by the IAU Planet Definition Working Group is proposed: "A planet is an object orbiting a star that has mass sufficient to maintain a gravity-determined (hydrostatic equilibrium) shape." More simply put, planets are 'round' objects that orbit stars. Spacecraft imagery reveals that it is at this point of 'roundness' that solar system bodies begin to exhibit geology - reflecting interior processes, not just impact history. Smaller bodies (e.g., asteroids) are irregular 'inactive' objects. This definition is easily extensible to objects around other stars, unlike the Prague definition. Satellites of planets (e.g., Titan, Triton, the Moon) can also be 'planetary' (exhibit properties of planets). The application of this definition would embrace Pluto, Eris, and Ceres. It would also make sense to add Charon to this category as a double planet with Pluto as previously proposed. This definition opens the door to the future identification of planets as large objects continue to found at greater distances from the Sun. It avoids the pitfall of the Prague definition which would not classify a distant Earth-sized object as a planet. Definitions articulate how we group like objects into a category for easy intercomparison and study. While the Prague definition may suit the narrow purpose of dynamicists, the definition proposed here is suited for those who explore the universe with geophysical questions in mind.