

Long-Period Comets and the Oort Cloud

Paul R. Weissman, Jet Propulsion Laboratory, Pasadena, CA 91109

Long-period comets from the Oort cloud contribute ~ 25% of the impactor flux at the Earth. Approximately 10 long-period (LP) comets with nucleus radius > 1 km cross the Earth's orbit per year, most of which are not currently detected due to observational selection effects. The average impact probability is 2.2×10^{-9} per perihelion passage, and the most probable impact velocity is 56.6 km s^{-1} . Because of the random orientation of LP comet orbits on the celestial sphere, possible impact velocities range from 16.9 to 72.9 km s^{-1} . Approximately one-third of the L.P. comets arrive as part of the steady-state flux from the oort cloud, and about two-thirds arrive in "comet showers" caused by close but infrequent stellar encounters with the Oort cloud. Earth-approaching LP comets are typically detected between 2 and 5 AU from the Sun, with warning times on the order of several months.