Oort Cloud Encyclopedia Article

Oort Cloud

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In 1950, the Dutch Astronomer Jan Hendrik Oort noted several facts about the orbital parameters of the known comets.When Oort examined the population of LPCs (**comets** with orbital periods longer than 200 years), he found that the distribution of orbits was concentrated so that the furthest distance in the orbit was often far beyond the limits of the solar system. Moreover, he noted that the cometary orbits appeared to be random; they approached the solar system from all directions in **space**, and as many orbited with the solar system (prograde) as in the opposite sense (retrograde). Oort hypothesized that the origin of the LPCs was a large spherical cloud of perhaps 10^{12} comets, located at some 50,000 AU (1 AU = distance from Earth to **Sun** = 1.5×10^{8} km) distance from the Sun. This hypothetical cloud is termed the *Oort cloud* in his honor.

In this conceptual framework, a gravitational disturbance—for instance, passage of the Sun near another star, passage of the Sun through the plane of the galaxy, or passage of the sun through a dense gaseous molecular cloud--stirs up the Oort cloud, and sends a large number of comets moving in towards the solar system in a vast cometary shower. On their first passage through the solar system, these comets would tend to be scattered by the presence of Jupiter and Saturn, and tend to be captured onto SPC (comets with orbital periods of less than 200 years) orbital trajectories.

Scientists hotly debate whether these comets play a role in episodic extinctions on Earth. Some astronomers have demonstrated that there are definite periods in the flux of cometary bodies; for instance, every 30 millions years, the Sun, executing a slow vertical **motion** in its orbit through the galaxy, passes through the midplane of the disk of the galaxy. During this time, scientists expect a much higher incidence of nearby stellar encounters, which should result in an increase of cometary influx in the inner solar system by about a factor of four or so. Other scientists point to **mass** extinctions in the fossil record which occur on roughly this same timescale, though it is still unclear whether the two are directly related.