

# Formation of the comet reservoir by a planet

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We performed the numerical simulations to investigate the origin of the Comet clouds, like the Oort cloud. The Oort cloud is the spherical comet reservoir surrounding the Solar system. Comets are thought to be the remnants of the planetesimals and the investigation of the origin of the Oort cloud is important also for investigation of the origin of the Solar system.

The standard scenario of the formation of the Oort cloud is as follows.

(1) Planetesimals are formed from dusts.

(2) The aphelion distances of the planetesimals become large by the planetary perturbation.

(3) The perihelion distances and the inclinations become large by the external forces.

We treat the second stage of this standard scenario as the restricted three-body problem and calculated the orbital evolution of the planetesimals. There are 4 fates of planetesimals under the strong gravitational influence of the planet: to collide with the planet, to fall on to the Sun, to escape from the planetary system and to survive. We calculated the dependence of the collision/escape rate on orbital parameters of the planetesimals and the planet by numerical simulations. Using these results, we obtained the efficiencies of the collision with the planet and the escaping from the planetary system.

We show the fitting formulas of these efficiencies and discuss the analytical reasons in the coming presentation.