# Comparison of original orbits of Oort Cloud new comets given in various catalogues

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Nearly isotropic comets with very long orbital period are supposed to come from the Oort Cloud. Recent observational and theoretical studies have greatly revealed the dynamical nature of this cloud and its evolutionary history. However, many issues are yet to be known. Our goal is to understand current structure of this cloud as well as its dynamical origin. For estimating the current structure of the Oort Cloud, key information lies in the original orbit of the Oort Cloud new comets (OCNCs) that are defined at a distance where these objects do not receive gravitational perturbation from major planets (such as at rg = 250 au from the Sun before comets enter into the planetary region). There have been several attempts to obtain OCNC's original orbits, but it never has been an easy task. This requires numerical orbit propagation of the observed comets with high accuracy including perturbation from major disturbing bodies. In addition, non-gravitational forces often play significant roles here. First and foremost, the orbit determination of OCNC includes substantially large uncertainty because of limited number of observational arcs and very large eccentricity of the comets (~1). Here we show our preliminary result of comparison of various catalogues of OCNCs' original orbital elements at rg = 250 au: So-called the Warsaw catalogues by Krolikowska, the ephemeris given by MPC (Minor Planet Center), that given by Horizons/JPL, and others calculated by a few individuals (Marsden, Kinoshita, and Nakano). The resulting orbits that these catalogues yield are overall similar, but sometimes they are starkly different by reasons yet to be known. Through a series of plots with a help of our own orbit propagation using numerical and analytic methods, we give considerations on which catalogue yields the information that is the most significant (or the most fundamental) for understanding structure, origin, and evolution of the Oort Cloud.

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