
Parameters of Chelyabinsk and Tunguska meteorites and reassessment of the comet and meteorite threat degree

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The purpose of the article is to describe the application of a mathematical model relating the parameters of celestial bodies' motion with their mass and energetic features and characteristics of the explosions caused by the destruction of these bodies in the atmosphere. The model was used to calculate the meteoroid parameters that caused Chelyabinsk and Tunguska incidents. We assumed the closeness of their orbits, as the time interval between these events is consistent with the orbital period of Chelyabinsk meteoroid. The calculations showed that the diameter of Chelyabinsk meteoroid was 180...185 m, the weight was close to 1.8 Mt; the explosion energy was about 57 Mt of TNT. The diameter of Tunguska meteoroid was close to 105 meters, the weight was 0.35 Mt, and the explosion energy was about 14.5 Mt. The average density of the meteoroids was similar - about 570 kg / m³, which indicates a common origin of these heavenly bodies.

Keywords: Chelyabinsk meteorite, Tunguska meteorite, comet, trajectory, explosion, energy, the shock wave.

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