

The collisional history in the Main Belt

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Asteroids in the Main Belt Mean collisional velocity between them is estimated to be about 5 km/s so that collisions lead to fragmentation. The collisional timescale for 100 km-sized or larger asteroids is estimated to be much longer than the age of the Solar System, while smaller asteroids are expected to have experience of catastrophic disruption. This estimate is consistent with the fraction of asteroids in collisional families. Therefore, such large asteroids may have formed in the planet formation era. The mass distribution of 100km-sized or larger main belt asteroids is explained by the onset of runaway growth of planetesimals. On the other hand, smaller bodies are fragmented into still smaller bodies. The mass distribution of 10km-sized or smaller asteroids is in the quasi steady state of the collisional cascade. However, the collisional lifetimes of such small asteroids highly depend on collisional outcome models. According to the collisional theory, we may discuss the possible histories of kilometer sized asteroids.

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