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A Lunar-like Chronology Model as the Mass-influx Estimator for the Inner Solar System

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In this work will test one of the most elementary and straightforward hypothesis: What if the early highly populated Asteroid Belt (AB) is the main source for the masses impacted in the inner solar system, not only now, but also before 3.0 Ga. The model is tested by computing and comparing available impactor masses with masses needed to create all impact craters on the terrestrial planets. Analysis of the lunar impact-crater record and correlation of the crater size-frequency distribution (SFD) and with isotope ages of lunar rocks, lead to a chronology model for the Moon derived by Bloch et al., 1971, Neukum and Ivanov, 1994, Ivanov et al., 2001a. The chronology model suggests an exponential decline of mass influx since 4.5 Ga, and turning into a assumed steady flux from ~ 3.0 Ga henceforth (Neukum and Ivanov, 1994, Hartmann et al., 2007). As the AB is widely accepted as the primary source of projectiles at least for the inner solar system, its primordial total mass and the time-dependency of the mass flux caused by its depletion is still controversially discussed. In this work, by mapping the crater record of each planetary body via a suitable scaling law into hypothetical projectile masses, the total mass is estimated from the chronology and derived projectile distributions. We compare also our results with recent mass estimates of the AB using different dynamical *collision efficiencies* and other estimate methods. As the total impact masses are highly dependent on the estimated physical properties of the target and assumed, preliminary impact velocities of the impactors, the mass contribution of very large basin-forming impactors dominate the total mass balance. The method used in this approach by approximating the SFD piecewise, contains a large error towards high mass contributions. We will present new results based on a preliminary, extended lunar SFD polynomial for up to crater diameters of $D_{max} = 1250$ km and possibly beyond, to overcome this restriction.