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Paper Abstract

Title: Observed *spectral properties of near-Earth objects: results for population distribution, source regions, and space weathering processes*
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More than 400 near Earth (NEO) and Mars crossing (MC) objects have been spectroscopically (visible and IR) surveyed over the past ten years through the Small Main-Belt Asteroid Spectroscopic Survey (SMASS) program This has allowed astronomers to investigate taxonomic types among the NEO and MC population and use this information to trace their dynamical history Albedos were also measured for most of the population NEOs have a short lifetime ($t \sim 10^6$-10^7 yrs) so there must be some source replenishing the current amount of NEOs detected The most likely sources include the main belt asteroids and extinct comets Relating taxonomic characteristics is one way to provide a connection between the NEOs and their origin 90% of the minor bodies observed seem to match the characteristics of C-, S-, Q- and X- complexs A- and E-type asteroids were found to be at around 5% in the MC population These trace to back to asteroids in the inner part of the main belt V-type asteroids were found among the NEOs but were missing among the MCs This is attributed to the v6 and 3:1 asteroid family resonances, which quickly move the asteroid from the main belt to near or beyond the Earth's orbit A grouping of C-types asteroids were found near the 5:2 resonance The composition of D- and X- types connect to the Jupiter family comets (JFC) Tisserand parameters were also used to separate minor bodies between asteroid and cometary origins Finally, the size dependence of the NEOs' spectral properties was inspected A connection between S- and Q- type asteroids was found "Space weathering", the accumulation of subatomic iron, is explained as a method of Q-type asteroids transitioning into S-types The size range between 01 and 5 km was discovered to be a critical factor for the "space weathering" process