

# **Relationship between the mass and the acceleration of CMEs**

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It has been known that the CME associated with a filament eruption proceeds with an acceleration, while the CME associated with a flare shows a constant velocity or a deceleration. It is also well known that the CME with a core is associated with a filament eruption. These correlations indicate some relationship between the existence of CME core and the acceleration of CME.

We examined the relationship between the acceleration of CMEs and the variation of their mass distribution. We found that the mass of the accelerating CMEs with a core continued to increase as they developed, while the mass of the CMEs with constant or decelerating velocities saturated at an asymptotic value. Next, we approximated a CME geometrically by a sector and divided it into concentric layers with equal areas, and investigated the variation of the mass contained in them. In the layers closer to the sun, the accelerating CMEs showed an increase in mass with time, but the non-accelerating CMEs did not show the increase. From these results, we suggest that the CMEs show different development of their mass distribution depending on whether they have a core or not, and the acceleration of CMEs is also related to the existence of the core.