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Distribution profile of magnentic field By component in magnetotail current sheets with guide field

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The strong magnetic field B_y component (in GSM coordinates) has been increasingly noticed to play an important role as a guide field in the dynamics of the tail current sheet (CS). The distribution profile of strong B_y components in tail CS, however, is not well known. In the present work, by using the simultaneous multi-point observations of Cluster satellites, the distribution profile of the$B_y$component in the tail current sheets (with guide field) has been explored, through detailed cases study as well as a statistical study. It is discovered that around the midnight meridian, the strength of the B_y component, i.e.$|B_y|$, enhances at the center of the CS relative to that in the CS boundaries and lobes, and forms a north-south symmetric distribution about the center of CS. Generally, however, for the CS with strong guide field at the non-midnight meridian, the distribution profile of $|B_y|$ becomes north-south asymmetric, the B_y component in the northern side of the CS is found to be either stronger or weaker than that in the counterpart southern side of the CS. By considering the modulation of the tail flaring magnetic field, we propose an interpretation to account for the variation of the B_y-distribution profile with magnetic local time. This is supported by the statistical survey. These results would offer an observation basis for the further studies.