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A statistical study of the Bz-dips in front of magnetotail dipolarization fronts

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Dipolarization fronts (DF) are a key ingredient of magnetic flux transport in the magnetotail towards Earth. They are accompanied by fast flows, also called bursty bulk flows (BBFs), and a sharp increase in the magnetic field Z-component perpendicular to the current sheet in the tail. That increase in Bz is typically preceded by a decrease, a Bz-dip, which sometimes even turns negative.
We present a study on the depth of the Bz-dips with respect to DF -characteristics, -geometry and location in the tail. For our study, we use a comprehensive DF-list introduced in Schmid et al.(doi:10.1002/2014JA020380), which is based on 9 years (2001-2009) of Cluster magnetotail observations.
Relative to the Bz change across the DF, we find the Bz-dip depth, to be independent of the distance to the centre of the neutral sheet. However, in azimuthal direction the Bz-dip is more pronounced at the DF centre. We relate these results to the current systems and density distribution on and in the vicinity of DFs.