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# Statistical Properties of Magnetotail Magnetic Holes

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In this study we investigate the statistical properties of linear magnetic holes inside the Earth magnetotail plasma sheet region, including the occurrence rate, the temporal and spatial scales, the spatial distribution and the correlation between the occurrence rate and AE index, by using THEMIS satellites' magnetic field and plasma data for this paper. Our results indicate that the time scale of the magnetic holes inside the magnetotail plasma sheet region varies from several seconds to tens of seconds, and the spatial scale is smaller than the local proton gyro-radius. We compare the spatial distribution of satellite observations with the spatial distribution of magnetic holes. The results suggest that linear magnetic holes are often observed in the plasma sheet, while the occurrence rate is significantly lower than that of magnetic holes in the solar wind. We also analyze the correlation of the AE index with magnetic holes, and find that magnetic holes occurrence may be associated with the geomagnetic activity.