

## Effects of solar wind density and speed on substorm occurrence frequency

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To investigate the controlling factor of substorm onset (triggering), we examined substorm occurrence frequency rather than substorm magnitude and its dependence on solar wind parameters. Three different phenomena are used for the detection of substorm onsets, i.e., a rapid increase in the mid-latitude asymmetric disturbance index ASY-D with a shape so called positive bay, a sharp decrease in the AL index and an onset of Pi2 geomagnetic pulsation at Kakioka. A statistical results indicate a strong control of SWS on substorm occurrence frequency. However, if we examine some special cases where the solar wind density is very low, the frequency seems to be controlled by the density. We examine the density dependence more detail and discuss the mechanism of it.