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Relationship between the quiet-time level of magnetic H component at mid-latitudes and long-term solar-wind activity

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Although the Dst index is expected to be near zero during quiet conditions, the quiet-time level of Dst has a long-term (monthly or longer) variation. This variation of the quiet-time level includes not only a seasonal variation but also an irregular variation.

In order to clarify the relationship between the quiet-time level and solar-wind activity further, we analyzed magnetic H-component values for several mid-latitude observatories. We decomposed the time series of monthly quiet-time H values for each observatory into secular, seasonal, and irregular variations using a state space model with the Kalman filter. The result shows that the quiet-level of H is enhanced under long low solar-wind activity for all the observatories. This fact indicates that this enhancement is a global magnetospheric phenomenon. We interpret the result to mean that long low solar-wind activity would cause plasma depletion in the magnetosphere.

Keywords: Dst index, long-term variation