Long-term component of the variation of the Dst index

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The Dst index is the most popular measure of a scale of magnetic storms. There have been several efforts which modeled temporal evolution of the Dst index empirically. However, long-term (monthly or longer) variations of the Dst index are not considered in those previous empirical models. In the present study, the component of the long-term variation are estimated from the Dst data, solar wind data, and a previous empirical model. It is suggested that the Dst index has a significant long-term component which can not be explained by the previous empirical models. In addition, the result suggests that the long-term variation is associated with one of solar-wind parameters, dynamic pressure. It is well-known that the short-term variations in the solar-wind dynamic pressure has positive correlation with the short-term variation in the Dst index. On the contrary, the long-term variation of the dynamic pressure is likely to have negative correlation with the long-term variation of the Dst index. Some possible reasons of the negative correlation are discussed.