The Dst index has a long-term variation which is not associated with magnetic storms. This fact means that the quiet-time level of the Dst index is not constant but variable. We estimated the quiet-time level of the Dst by removing the short-term variation due to magnetic storms using an empirical model by Burton et al. (1975). The result shows that the variation of the quiet-time level includes not only a seasonal variation but also an irregular variation. The irregular variation anti-correlates with a long-term (monthly or longer) variation of solar-wind activity and the quiet-level can be much more enhanced than predicted by the Burton's model under long low solar-wind activity. It is notable that this irregular variation even anti-correlates with a long-term variation of the solar-wind dynamic pressure. This indicates that the contribution of the magnetopause current to long-term geomagnetic variations is not significant. To extend the period of analysis, we also analysed magnetic H-component values for several mid-latitude observatories. We decomposed the variation of the quiet-time level of H for each observatory into secular, seasonal, and irregular variations using a state space model with the Kalman filter and confirm that the same result is obtained. We interpret this result to mean that long low solar-wind activity would cause plasma depletion in the magnetosphere resulting in the increase of magnetic H-component.