



## **Estimating the energy of the polar wind transformed from solar illumination**

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The ionospheric outflow through the polar wind can dominate the ion population in the magnetosphere. Both the solar illumination and the solar wind energy input are known to be the energy sources of the polar wind. The two energy sources with long-term changes affecting the polar wind outflow play important roles in evolution of the atmosphere and dynamics in the magnetosphere. However, observational studies on energy transformation between the two energy sources and the polar wind are difficult. Because the low-energy ions consisting of the polar wind are invisible to regular ion detectors onboard a positively charged spacecraft. With a new technique to indirectly measure these low-energy ions, a recent study has calculated the energy transform efficiency between the solar wind and the polar wind. This gives us a clue to evaluate the control of the solar wind energy input. As a follow-up study, this paper estimates the relative importance of these two energy sources. Our results show that the solar illumination provides about  $10^7$  W to the kinetic energy of the polar wind, in addition to the energies transformed from the solar wind energy input into the magnetosphere.