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The global proton aurora dependence on the solar wind characteristics and the IMF orientation on night and day sides.

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The intensity of proton aurora observed with the FUV-SI12 imager on board the IMAGE satellite is correlated with the solar wind and the IMF characteristics measured by ACE satellite instruments. We find a large correlation between the proton power and the solar wind dynamic pressure, both on night- and day-sides. For southward and northward IMF, the proton power increases with $|\mathrm{B}_z|$, but much more rapidly on nightside for southward conditions. Correlations were also made with response functions of the nightside aurora and we found best results for functions containing the dynamic pressure in their expression, like $P^{1/3} V B_t^2 \sin^4\left(\theta_c/2\right)$ with B_t the transversal IMF component and θ_c the clock angle. The influence of the solar wind dynamic pressure on the proton aurora is explained indirectly by the effect of the pressure on the magnetosphere shape, generating magnetospheric stretching and proton precipitation. Adding FUV-WIC and SI13 electron aurora images in the study, we show how the protons and the electrons simultaneously react with solar wind and IMF characteristics and with Kp. Results shows that the IMF orientation and the solar wind dynamic pressure influence differently the proton and electron aurora. Moreover, for higher activity levels, it is suggested that similar mechanisms can cause the proton and electron auroral precipitation, while they appear different for lower activity.