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Solar wind and IMF control of substorm onset

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Few studies on solar wind control of substorm onset exist and only two have good statistics using the IMF. Those studies with solar wind statistics employ only a few 10s of events, yet it has been proposed that solar wind dynamic pressure changes may trigger substorms. While a small percentage of substorms are believed to be triggered by solar wind dynamic pressure variations and hence, solar wind control of the substorms is not surprising, a significant number of substorm events exist that appear to have either IMF triggers or no triggers at all. We will show the results of a statistical examination of solar wind control of substorm onset with a database of over 3300 onsets using solar wind data propagated with the Weimer et al. [2003] technique. Our preliminary work demonstrates that the magnetic latitude of the substorm onset decreases with increasing magnitude of solar wind dynamic pressure, IMF Bx, By, and Bz. The solar wind plasma or IMF does not appear to influence the substorm onset magnetic local time. Furthermore, substorm onset location does not appear to be a function of dipole tilt, season, and universal time as one might expect. We will also present results examining the influence of triggered and non-triggered substorms as well as isolated and non-isolated substorms. The results of this study will be of interest to the upcoming THEMIS mission.