Spotting Space Weather: Finding a Correlation between Kp Index and Error Magnitude

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The purpose of this experiment was to see if there is a correlation between the Kp Index and the error magnitude of GPS readings with and without WAAS capability. Our hypothesis was that there is a direct correlation between the Kp Index and the error magnitude of GPS readings with and without WAAS capability. First, we found an open-sky area outside to take our GPS readings. Second, we recorded a latitudinal and longitudinal reading with and without using the Wide Area Augmentation System. We did this twice a day at 6:30 AM and 6:30 PM for 4 weeks. Then we found the standard deviation, average, and range of all our data. We found that our hypothesis was supported. There is a correlation between the error magnitude and the Kp index. We can come to this conclusion because the standard deviation and mean increased with the increasing Kp index. There is a direct relationship between the mean and the Kp Index because the higher the magnitude of a geomagnetic storm, the more blasts of plasma you get from the sun. The more blasts of plasma you get from the sun, the more the ionosphere is going to get disturbed. Since the signals from the satellites of a GPS have to travel through the ionosphere, the latitudinal and longitudinal coordinates change based on the amount of disturbance.

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