Comparison of Aurora Activity With Thermosphere-Ionosphere Na and Fe (TINa and TIFe) Layers at McMurdo Station

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This project investigated the correlation between solar indices (AE, By, Bz, SYM_H, and F10.7), aurora activity, and TIMt layers. This research was motivated by the findings of Chu et al. 2020, which investigated the potential correlation of Thermosphere-Ionosphere Sodium (TINa) layers and Thermosphere-Ionosphere Iron (TIFe) layers with aurora activity. We used aurora images from Japan's National Institute of Polar Research (NIPR)'s all sky camera to create keograms (a visualization of aurora activity) and averaged aurora intensity over the course of a night to create an auroral index. We found that there was not a significant correlation between the aurora index we had created, and any of the solar parameters we looked at. We believe that this is due to the location of McMurdo Station in relation to the auroral oval, since McMurdo Station is frequently located outside of the auroral oval. Because of this, it is possible that McMurdo could experience a dark night, despite there being strong geomagnetic activity elsewhere in the world. As a result, we believe that the solar parameters we investigated are not a good representation of geomagnetic activity directly above McMurdo. However, this means that the auroral index we have created could be a good representation of geomagnetic activity, as it provides a localized view of solar storms occurring directly overhead. Because of this, we believe our auroral index will be for our future research, in order to investigate the potential correlation between atmospheric metal layers and aurora activity.

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