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Poster
We review what happened to the electron and proton radiation belts during the May 2024 (Gannon) storm using results from the SWIMMR N1 forecasting system. The BAS radiation belt model (BAS-RBM) predicted that the magnetopause was “pushed” inside geostationary orbit. This was confirmed by observations by GOES 16 and 18. The model also predicted that the outer belt would be depleted and re-formed much closer to the Earth affecting satellites in the slot region. This was also confirmed by satellites in low earth orbit (LEO). The flux in the slot region increased by over 4 orders of magnitude and charging currents (behind 0.5 mm of Al shielding) exceeded NASA design guidelines. We show that it took between a few weeks to a months for this high level of flux to decay. Charging currents also reached high levels where Galileo and GPS satellites orbit. The BAS proton radiation belt model showed that the outer proton belt region decreased during the storm. This was confirmed by satellite data and is consistent with a reduction in single event upsets reported by some spacecraft in medium Earth orbit (MEO). Data show that proton belt was enhanced at lower L but this was not reflected in the model. We discuss the need to revise the models. We conclude that the changes in the electron and proton belts would have increased radiation exposure to satellites undergoing electric orbit raising for a few months following the storm.

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