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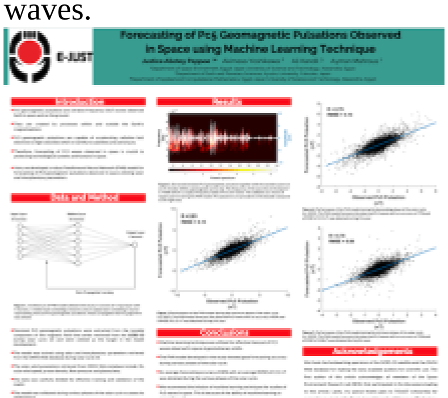
Pc5 geomagnetic pulsations in space can accelerate electrons to high velocities capable of causing harm to spacecraft and astronauts. The ability to timely and effectively forecast these waves is crucial for protecting spacecraft and astronauts. Here, we present a robust Feedforward Neural Network (FNN) model for effective forecasting of Pc5 waves observed in space. The dataset used in this study is the magnetic field-aligned measurements retrieved from the Geostationary Operational Environmental Satellite-10 (GOES-10) and the solar wind parameters: Bz, solar wind speed, proton density, flow pressure, and plasma beta obtained from the OMNI Web database during solar cycle 23. The magnetic field time series were transformed into the mean field-aligned coordinate system using the Empirical Mode Decomposition (EMD) method. Pc5 waves were extracted from the toroidal component of the magnetic field using a bandpass Butterworth filter. Prior to the model construction, the extracted Pc5 events were decomposed into details and approximations using the Daubechies wavelet transform, and denoised Pc5 events were obtained from the details signal. The denoised Pc5 events were utilized as the target in the model development, with the solar wind parameters as the inputs. The model was validated at various phases of the solar cycle. The FNN model forecasts the observed Pc5 events with an average accuracy of 80% and a corresponding average RMSE of 0.12 nT. In view of this, we recommend the infusion of machine learning techniques for studies of Pc5 waves in space. These will help mitigate the effects associated with these waves.


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