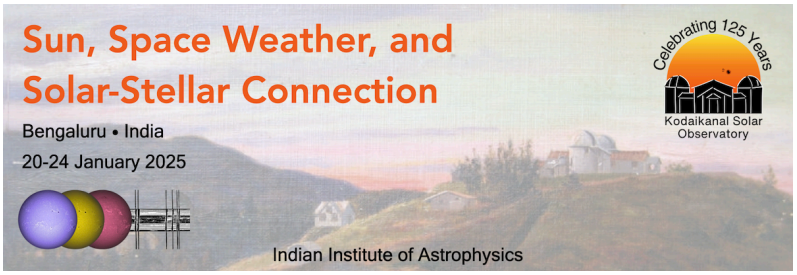

Contribution ID: **157** Type: **Poster**

Forecasting Space Weather Using a CNN-LSTM Model: A Multispacecraft Approach with Aditya-L1.

The dynamic connection between the solar corona and the heliosphere is critical for understanding and forecasting space weather. Active regions and solar eruptions, including extreme events, significantly influence the heliospheric environment, with profound implications for Earth's magnetosphere. Leveraging data from new space missions like ASPEX-SWIS from Aditya-L1, Parker Solar Probe (PSP), Solar Orbiter, and WIND, we aim to enhance space weather forecasting capabilities through a data-driven approach.

A machine learning model based on a hybrid CNN-LSTM architecture has been developed to forecast space weather conditions by predicting the Dst index using bulk parameters at L1 and IMF Bz. This work presents a comprehensive approach by integrating Aditya-L1, WIND, and Solar Orbiter observations with ground-based data. The model processes L1-point measurements to classify and quantify Earth's response to solar disturbances. Initial results suggest that by incorporating Aditya-L1's observations of the solar wind, magnetic fields, and energetic particles, the accuracy of predicting geomagnetic storms has improved, offering critical insights into their potential impact on Earth's technological systems.

Our results demonstrate the strength of data fusion from multiple space missions, providing a more comprehensive understanding of solar-heliospheric coupling. This approach opens new avenues for advancing heliospheric and space weather studies, with significant implications for extreme solar events and their terrestrial consequences. These findings and their broader impact will be discussed.

Contribution Type

Poster

Theme

Connecting Solar Corona to Heliosphere

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Session Classification: Poster Session-II / Coffee Break