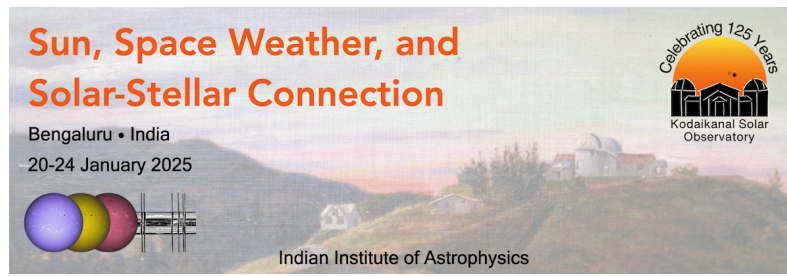


## Sun, Space Weather, and Solar-Stellar Connection



Contribution ID: 122

Type: Poster

### Exploring reliability and physical link between polar field rise rate and the Waldmeier effect for solar cycle prediction: Cycle 25 is likely to be stronger than Cycle 24

The solar activity is directly related to its variable magnetic field, which is generated in the Sun's convection zone. Solar activity increases and decreases with the solar cycle strength, popularly measured by the sunspot number (SSN). This activity creates space weather and impacts the interplanetary and Earth's atmosphere. The sunspot number (solar cycle) prediction provides a cutting-edge advantage in comprehending space weather and understanding the dynamo process physically. However, predicting the solar cycle is challenging but several physics-based methods are used to forecast the cycle strength. We have shown an aspect of the Waldmeier effect to predict the solar cycle strength and its physical connection with the polar field rise rate, which makes the solar cycle prediction possible much earlier. Additionally we have explored the reliability of the polar field rise rate as a precursor for solar cycle prediction using dynamo and SFT models. Using the polar field rise rate after the polar field reversal, we can predict the upcoming cycle strength to be about 7 to 8 years before the solar cycle maximum. Our prediction of cycle 25 based on the polar field rise rate is  $137 \pm 23$ , which shows that cycle 25 will be slightly stronger than cycle 24.

#### Contribution Type

#### Theme

Solar Magnetism over Long-Time Scales

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