

HOW ACTIVE WILL THE NEXT SOLAR CYCLE BE?

The “Solar Dynamo” (SODA) Index is a predictor of solar cycle activity (sunspot number). It is created from the sun’s polar magnetic field (measured by Stanford’s Wilcox Observatory) and the Sun’s 10.7 cm radio emission (F10.7). F10.7 alone is a good representation of sunspot number.

What is the science question?

What is the prediction for the next solar cycle, 25 and how does its amplitude compare to the current cycle, 24?

What are the findings?

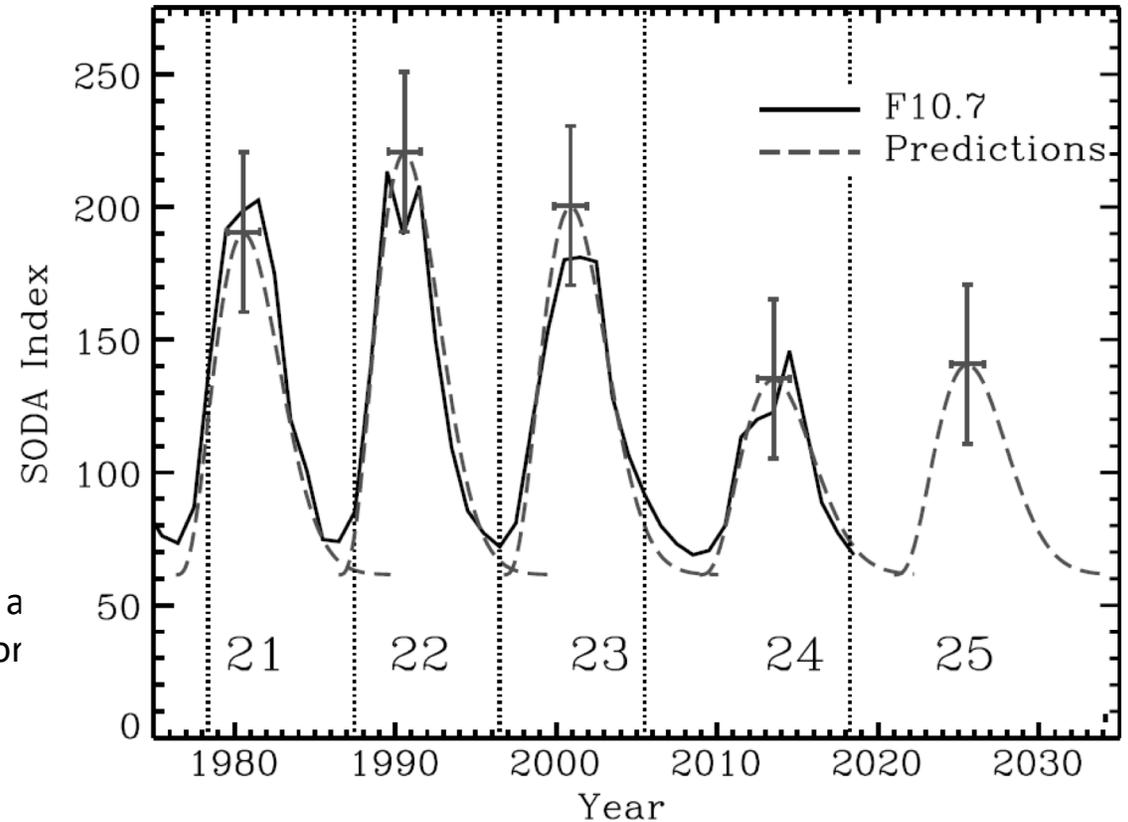
The SODA index prediction for the next solar cycle is a sunspot number of 140 ± 30 . The sunspot number for the current cycle, 24, is 135. So cycle 25 is predicted to be as large as and possibly larger than cycle 24.

What is the impact?

This work has verified the usefulness of the SODA index by comparing predicted values with early solar cycles (see figure) and thus provided more support in its use for predicting the next cycle (25). The method has also shown that the error in the prediction will improve with more data and as we get into cycle 25.

Why does it matter?

This predictor is an important supplement for physics based models. It has proven to be a useful solar cycle predictor, enabling missions to plan for solar activity and resulting space weather.



A plot of the solar radio emission at 10.7 cm (F10.7) and predictions for Solar Cycles 21 – 25. The vertical lines are the publication dates of past predictions. The solid black line is the annually averaged F10.7, the dashed grey is the SODA prediction, and the error bars show the $\pm 1\sigma$ limits (including the estimated timing uncertainty of 1.5 year). Each prediction is labeled with the Solar Cycle number.



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