



Solar cycle prediction on the basis of flux transport dynamo model

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Since the solar cycle influences many aspects of space climate and has effect on our lives, whether we can predict the strength of a solar cycle before its onset is a question of great theoretical and practical importance. After the flux transport dynamo model of the solar cycle was formulated around the turn of the century, efforts started for developing methods of solar cycle prediction on the basis of this model. The prediction of solar cycle 24 by Choudhuri, Chatterjee & Jiang^[1] on the basis of their dynamo model turned out to be the first correct dynamo-based prediction of a solar cycle in the history of this subject. This prediction was based on the idea that the irregularities of the solar cycle were caused by fluctuations in the Babcock-Leighton mechanism for generating the poloidal magnetic field. In the next few years, it was realized that a second source of irregularities

in the solar cycle has to be included in order to match various observations: the fluctuations in the meridional circulation of the Sun^[2]. Based on these insights, Hazra & Choudhuri^[3] proposed a formula for predicting an upcoming solar cycle just before its onset, when the relevant data about these two kinds of fluctuations become available. The next solar cycle 25 is predicted to be a moderate cycle on the basis of this formula.

References

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