SDO/HMIおよびSDO/AIA画像にもとづく太陽フレア予測
Solar flares in GOES X-ray flux forecast based on SDO/HMI and SDO/AIA images

*羽田 裕子[1]、村主 崇行[2]、浅井 歩[1]、根本 茂[1,3]、柴田 一成[1]
*Yuko Hada-Muranushi[1], Takayuki Muranushi[2], Ayumi Asai[1], Shigeru Nemoto[1,3], Kazunari Shibata[1]

1. 京都大学、2. 国立研究開発法人理化学研究所　計算科学研究機構、3. 株式会社ブロードバンドタワー
1. Kyoto University, 2. RIKEN Advanced Institute for Computational Science, 3. Broadband Tower, Inc.

We have been studying methods for automated flare forecasts, and have been operating automated flare forecast services. The automated forecast of solar flares and other space-weather related events have two crucial goals. One is to enable real-time forecast and thus provide truely predictive test for the space weather theories. The other is to enable numerous variation of tailor-made space weather forecasts for various space weather users.

We have been building space weather prediction system UFCORIN (Universal Forecast Constructor by Optimized Regression of INputs), a software framework that can provide forecast based on generic time series data. Recently, we have been updating UFCORIN so that it can handle image time-series data in addition to scalar-values time series, with the help of convolutional neural network.

We have been operating space weather forecast since August, 2015 that provides 24-hour-ahead forecast of solar flares, every 12 minutes, based on the time-series data of GOES X-ray flux and wavelet features of the line-of-sight magnetic field images. However, the TSS for M and C class flares achieved so far has been approximately 0.3, much less than those values of 0.7-0.9 reported by simulated forecast studies. Especially, it is difficult to predict rim flares and those flares that take place on the East side of the Sun, where active regions have small, noisy features in magnetic field images. In order to better predict rim flares, we are now studying the effect of adding ultraviolet images to the input set, which includes solar rim information.

In this presentation, we report the method and prediction results of the system. In addition, we will report the results of adding ultraviolet images to the input data.

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