

Time evolution of the active region NOAA 12673 calculated by SFT model

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Predicting the next solar cycle is crucial for the forecast of the "solar-terrestrial environment". To build prediction schemes for the next solar cycle is a key for the long-term space weather study. Recently, the relationship between polar magnetic field at the solar minimal period and next solar activity is intensively discussed. Iijima et al. (2017) discussed the polar magnetic field at the solar minimum by using the surface flux transport model (SFT) and conclude next cycle is weaker than the current solar cycle. To evaluate their result, we have calculated the time evolution of the solar magnetic field for specific active region by SFT, and discussed the discrepancy between the model result and observations obtained by Helioseismic and Magnetic Imager (HMI). The peculiar example of the observation data is the active region NOAA 12673 which caused X9.3 solar flare occurred on September 6, 2017. By adopting this example, we compared the result after one solar rotation with the observation data and as a result we found a high correlation 0.5567. Furthermore, we compared the predicting results and observation after a couple solar rotations and found that the correlation become worse and it was -0.0958 and -0.2100. We also evaluate how much magnetic flux of active region can reach to the polar region.