R010-03
B 会場 ： 11/24　PM2（16:05-18:05）
16:35〜16:50:00

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Empirical Optimization of the Source-Surface Height in the PFSS extrapolation

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The Potential Field Source Surface (PFSS) method is a widely used magnetic field extrapolation technique in the space weather community. The only free parameter in the PFSS method is the source-surface height (Rss), beyond which all field lines are open. Although Rss is known to vary with solar activity, there is no consensus on how to determine it for a given surface magnetic field distribution. In this study, we investigate the nature of Rss using a long-period (2006 – 2023) data, covering two solar minima and one maximum. We adopt ADAPT-GONG magnetograms and determine Rss by matching the open flux estimated from observations at 1 au with that calculated using the PFSS method. The analysis reveals that Rss increases slightly after the solar minima and around the solar maximum and can be fitted by the following empirical formula:

Rss/R0 = Max[0.067 (B0 / 1 G) + 1.36, 2.93 fdip + 0.73],

where R0 is the solar radius, B0 is the mean unsigned radial magnetic field at the photosphere, and fdip is the ominance of the dipolar-field component over quadrupolar and octupolar components in terms of energy. Our results suggest that Rss does not exhibit a simple monotonic dependence on the solar activity and must be determined by properly considering both surface magnetic field strength and global field structure.