Session 4

Comparison of polar magnetic fields derived from MILOS and MERLIN inversion for Hinode/SOT-SP data

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The detailed investigation of the polar magnetic field and its time evolution is one of the important achievements of Hinode. The precise measurements of the polar magnetic field are essential for understanding the 11-year solar cycle, and they provide important boundary conditions for identifying the source regions of the solar wind. In this study, we compare the polar magnetic field derived by the MILOS inversion code used in Shiota et al. 2012 with the Hinode/SOT-SP Level-2 data provided by the HAO. The Hinode/SOT-SP Level-2 data are derived by the HAO MERLIN inversion code. Both MILOS and MERLIN are Milne-Eddington inversion codes. The method of converting the magnetic field vector to the local vertical and the method of disambiguation of the magnetic field azimuth are also applied for the results with the two inversion codes in the same way. A date set used in this study was taken in the North polar region of the Sun in HOP 206 on August 23, 2021. We found that the magnetic flux density with respect to the local vertical tends to be about 1.2 times larger in the results with the MERLIN inversion than those with the MILOS inversion and this is due to the fact that the result with the MERLIN inversion tends to have a larger magnetic filling factor. The difference in the magnetic filling factor between the MILOS and MERLIN inversion is larger compared with the other magnetic field parameters (field strength, inclination, and azimuth). When we run MILOS with the fixed filling factor to equal the HAO MERLIN values, the flux density derived from the MILOS and HAO inversion codes is almost same. The discrepancy of the filling factor is most probably related to the difference in the assumptions of the stray light profile.