## The Heliospheric Current Sheet during the Peculiar Solar Minimum 23/24

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The heliospheric magnetic field (HMF) has long been hemispherically asymmetric so that the field dominant in the northern hemisphere is weaker and the area larger than in the south. As a consequence, the heliospheric current sheet (HCS) is shifted southwards. This asymmetry, also called the bashful ballerina, has existed during roughly three years in the late declining to minimum phase of solar cycles 16-22. We study here the asymmetry and thickness of the HCS during the exceptional declining phase of cycle 23 using ecliptic (low-latitude) and high-latitude observations. We find that the latitudinal ordering of HMF sectors at low latitudes is exceptional in SC 23: While the typical latitudinal variation was attained in the north in 2008, it did not take place in the south until Spring 2009, implying that the Rosenberg-Coleman rule is abnormally delayed or broken for the first time. Comparing the low-latitude HMF observations at 1 AU with the coronal source surface field, we find that the HCS is considerably less asymmetric at low latitudes during SC 23 than in earlier cycles. However, the Ulysses perihelion observations in 2007 show that the field asymmetry at high latitudes is as large in SC 23 as earlier. Ulysses also shows that the HCS region is considerably wider during SC 23 than in SC 22, which is likely due to the exceptionally large tilt angles and weak polar fields in Sc 23. Thus, the HCS is indeed southward shifted even during the exceptional solar cycle 23 but the exceptionally thick HCS makes this difficult to be observed by low-latitude observations. We also note that the exceptional properties of SC 23 (weak dynamo, wide HCS, small HCS asymmetry in low-latitude observations) agree with the historical evidence that the active Sun leads to a greater asymmetry in low-latitude observations.