Long-term measurements of the Sun’s poles show that reversal of the dominant magnetic polarity generally occurs within a year of solar maximum. Current observations suggest that the northern polar field above 55° degrees will reverse in mid 2012. The southern pole will reverse months later. If a smaller polar cap is considered, the reversal will be observed to occur later, since the flux that reverses the field comes from lower latitude. Because the polar field was so weak during the last minimum, a smaller amount of flux is required to accomplish the reversal this cycle. If the historic relationship holds, the current weak solar cycle may already be near its maximum.

The shape of the heliospheric current sheet is strongly asymmetric, with both geographic poles having the same magnetic polarity for some time.

There are a variety of ways to measure the polar field.

- The TILT ANGLE gives one indication of the coronal magnetic field configuration.
- The AXIAL DIPOLE component tells about the large-scale photospheric field.
- The most POLEWARD WSO measurement of the field gives the polarity above 55°.
- The ZONAL average field shows the net flux at each latitude in the photosphere.

**WSO Observations of the Sun’s Polar Field**

The northern magnetic field strength is shown in blue. The negative of the south is shown in red. The averages of North and South is shown in black. The heavy black line is smoothed.

The two poles show a strong annual periodicity due to the inclination of the Sun’s rotation axis to the ecliptic.

The polar field was asymmetric in Cycles 21 and 22, but fairly symmetric in 20 and 23.

The polar field was weak in Cycle 23 and is weakening gradually and quite early, particularly in the north.

- Decay of the Polar Fields
- The negative northern pole has weakened quickly at the beginning of Cycle 24, in part because the field was so weak in Cycle 23.
- Streams of positive flux from the more active north are moving poleward to reverse the field direction, perhaps by mid 2012. These surges can be seen in the zonal maps, synoptic maps and magnetograms.
- The southern field has not been weakened by negative polarity streams and is not weakening as quickly.
- The blue lines show a 33Hz low pass filter of the annually varying polar field. The green arrow is a by-eye extrapolation of the field trend.

- The Polar Field Reverses Direction Progressively, From Lower to Higher Latitudes.
- The progressive reversal was also clearly evident in Cycle 23.
- MDI Figures from Sun & Hoeksema, 2009

- WSO North Polar Magnetic Field Since January 2000
- WSO South Polar Magnetic Field Since January 2000
- WSO Polars: Since 1996

- MDI/HMI Zonal Field – 1996-2012

- WSO Zonal Magnetic Field over 3.5 Solar Cycles (Los)

- MDI/HMI Zonal Field Above 50 Degrees Since 1996

- MDI/HMI Polar Fields Above 50 Degrees Since 1996

- Polar Views of MDI Magnetic Field near reversal in 1999/2000. The spiral-shaped streams of flux led to the reversal of the polar field. The four frames on the left are CR 1953 and 1954 and show a negative stream (N1) in 1999 at mid latitude. The leftmost column shows 30° to the pole; a close-up of 60° poleward is next to it. A second stream (N2) about a year later in 2000, shown on the right, is about to arrive and reverse the polarity in the north.