Defining the Polar Field Reversal

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ABSTRACT

The polar fields on the Sun are directly related to solar cycle variability. Recently there has been interest in studying an important characteristic of the polar fields: the timing of the polar field reversals. However this characteristic has been poorly defined, mostly due to the limitations of early observations. In the past, the reversals have been calculated by averaging the flux above some latitude (i.e. 55° or 75°). Alternatively, the reversal could be defined by the time in which the previous polarity is completely canceled and replaced by the new polarity at 90°, precisely at the pole. We will use a surface flux transport model to illustrate the differences in the timing of the polar field reversal based on each of these definitions and propose standardization in the definition of the polar field reversal. The ability to predict the timing of the polar field reversal using a surface flux transport model will also be discussed.