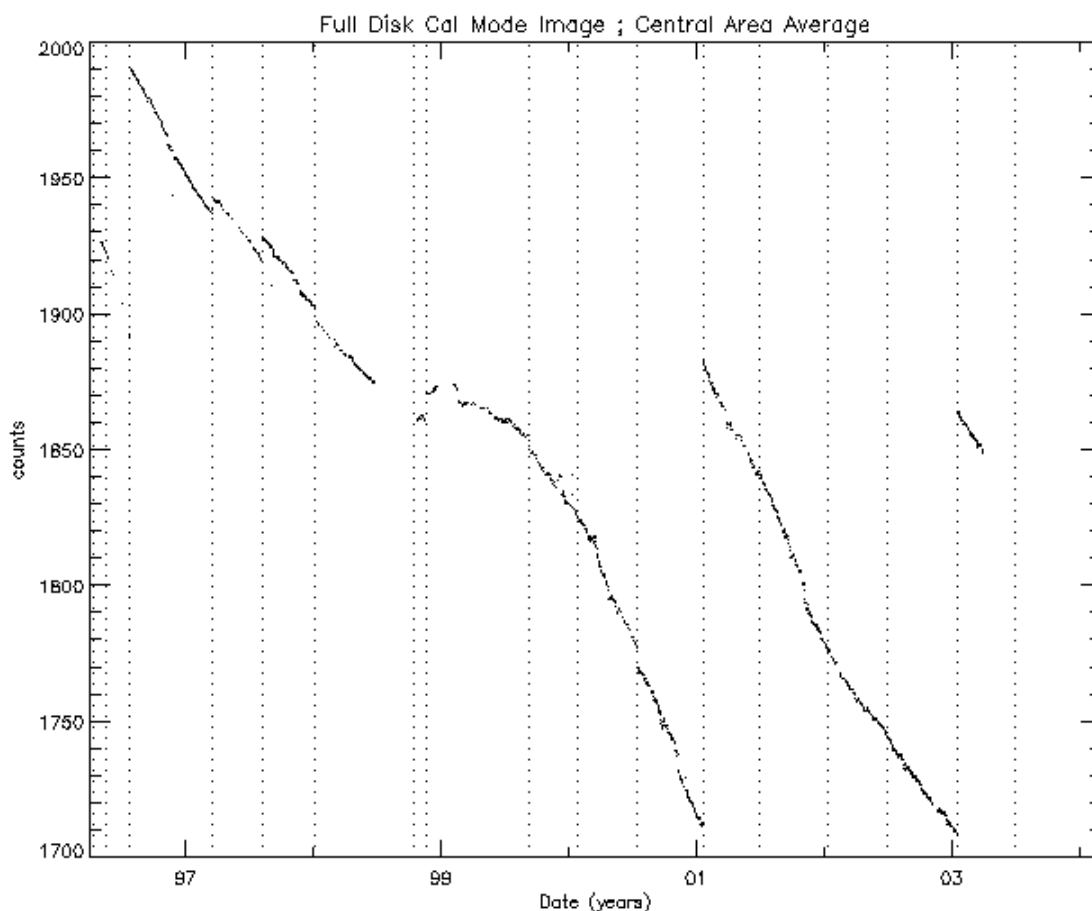


Michelson Doppler Imager Transmission Degradation

The following plots detail the decrease in the Michelson Doppler Imager transmission for the duration of the SOHO mission. A measure of the end-to-end instrument transmission is obtained by putting the instrument into “calibration” mode which illuminates the CCD detector with integrated sunlight. The mean intensity of a central 64x64 pixel area is determined from this image and corrected for the dark current. The mean intensity adjusted by the Sun-SOHO distance is plotted below. The vertical lines indicate where tuning adjustments have been made to the Michelson rotating waveplates to recenter the line or to adjust the exposure. Two exposure adjustments of 10% have been made in January 2001 and January 2003.



The second plot shows the mean transmission decrease arbitrarily taking out the jumps by matching the transmission values before and after a tuning or exposure adjustment. The total transmission decrease over the 7 year mission duration is approximately 25%, and based on a quick analysis of the limb tracker photodiodes somewhat more than half of this decrease is due to the degradation of the front window with the remainder likely coming from the Michelson cubes and other optical elements. The deviation to the exponential fit to this curve is probably due to solar cycle dependent modulation of intergalactic cosmic rays and solar proton flares. The last plot shows the difference between the fit and measured curve – the drops due to the flares are much clearer.

